

Tokuo Iwaisako *Editor*

Japan's Financial System

New Perspectives and Potential Risks in
the Post-Global Financial Crisis Era



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Hitotsubashi University IER Economic Research Series

Volume 49

Series Editor

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Japan

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ISSN 0441-0025

ISSN 2524-5147 (electronic)

Hitotsubashi University IER Economic Research Series

ISBN 978-981-97-9257-3

ISBN 978-981-97-9258-0 (eBook)

<https://doi.org/10.1007/978-981-97-9258-0>

The original submitted manuscript has been translated into English. The translation was done using artificial intelligence. A subsequent revision was performed by the author(s) to further refine the work and to ensure that the translation is appropriate concerning content and scientific correctness. It may, however, read stylistically different from a conventional translation.

Translation from the Japanese language edition: “Nihon no kinyu shisutemu: Posuto sekai kinyu kiki no atarashii chōsen to risuku” by Tokuo Iwaisako, © Tokuo Iwaisako 2023. Published by University of Tokyo Press. All Rights Reserved.

This work was supported by Hitotsubashi University.

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Introduction

This book brings together, in one volume, the papers resulting from a research project on the Japanese financial system, organized by Arito Ono, Ichiro Uesugi, Yukihiro Yasuda, and myself as part of the Tokyo Center for Economic Research (TCER)'s research activity. The project began in 2019, and a two-day conference on the final results was held at Hitotsubashi University in late July 2022, in which 11 papers and their respective discussions were presented.

Since the 1960s, TCER has held Zushi Conferences almost every year, and the results of these conferences have frequently been published as conference volumes. There have been periods in which fewer books have been published. However, since the publication of the edited volume on international trade by Fukunari Kimura and Hiroshi Inui in 2016, TCER conference reports have been consistently published at the pace of one book every two years. The subsequent themes are environmental economics and the economics of evidence-based policy making (EBPM) economics (2020). If things had gone according to the plan, our book would have been published by 2022. However, the COVID-19 pandemic forced a hiatus of nearly a year, and it was a weight off the organizers' shoulders to publish the original Japanese version in the fall of 2023.

The last TCER conference and book publication on the Japanese financial system dates back to 1992, when *Analysis of Financial System in Contemporary Japan* (in Japanese, *Gendai-Niho-no Kinyu Bunseki*), edited by Akiyoshi Horiuchi and Naoyuki Yoshino, was published by the University of Tokyo Press. In the following, I would like to motivate our project with a brief review of what has happened in the three decades since then as a background to each of the chapters in this book.

The nonperforming loans became the most important and urgent policy issue in the late 1990s and the early 2000s. This was when Japan entered a period of long-term economic stagnation known as the "lost decade," which later became "lost two decades." Japan's long-term economic stagnation, particularly from a financial perspective, has become a major research theme attracting attention in academic research worldwide. During almost the same period, neoclassical finance and financial engineering reached their peak in both business practice and academic research in Japan, as in many other developed countries.

However, the Global Financial Crisis of 2008 transformed the landscape of Japan's financial system, as in other developed countries. This has led to a major shift in the academic research paradigm in finance. In the past, the experience of major "crises" often led to the subsequent expansion of research to learn from these experiences and the resulting academic innovations in economics. The impact of both the Global Financial Crisis and the domestic banking crisis a decade earlier is reflected in the content of the chapters in this volume. However, we have observed a decline in interest in financial research among young Japanese academics, while finance has remained a popular field among graduate students and the young researchers in Europe and the USA. We hoped that our project and the publication of the original Japanese version of this book would contribute to changing this worrying domestic trend and reigniting young researchers' interest.

The importance of empirical research in economics has significantly increased in the twenty-first century. In recent years, the concepts of causal inference and natural experiments have become widely accepted as analytical methods in the fields of corporate finance and banking. On the other hand, the Global Financial Crisis at the end of the 2000s brought crisis response and financial regulation, particularly the handling of financial institutions that are "too big to fail," to the forefront of both policymaking and academic research. In the aftermath of the Great East Japan Earthquake in 2011 and the recent COVID-19 pandemic, the focus has shifted to private nonfinancial corporations and the extent to which public relief should cover private companies in the event of a major disaster.

In planning this research project, the organizers agreed that two popular themes, "Sustainable Development Goals (SDGs)/Environmental, Social, and Governance (ESG)" and "FinTech," should be addressed as chapter topics. Many economists are uncomfortable with the way in which these topics are generally discussed. However, they also acknowledge the importance of these issues and believe that presenting an academic perspective is an important social responsibility of researchers. Based on this, one chapter of this book is devoted to ESG investment, whereas FinTech is treated as a motivation and background for several chapters.

In considering who would write each chapter and who would serve as discussants, we tried to follow the tradition of the TCER research project by selecting researchers who were actively researching the topic rather than the authority in the field. At the same time, we received valuable advice on the choice of topics from those who participated in the TCER Japanese financial system project thirty years ago: Takatoshi Ito (Columbia University), Kazuo Ueda (Governor of the Bank of Japan, then at Kyoritsu Women's University), and Naoyuki Yoshino (Director of the Financial Research Centre, Financial Services Agency, Professor Emeritus at Keio University). At the time of the final conference, official restrictions related to COVID-19 had not been fully lifted in Japan. This made the conference staff more attentive than usual to various issues. We are particularly grateful to Yuki Matsuzaki and Hiroyuki Mochizuki for their help in organizing the conference. We cannot mention all of them by name, but we would like to express our deepest gratitude to the many people who helped me with this project.

Overview of the Book

Part I deals with the analysis of payment systems and is motivated by the active discussions in recent years on the impact of innovations in Information and Communication Technology (ICT) on financial systems. Fancy terms such as *FinTech* and *DeFi* are often used. Still, the impact of dramatic changes in ICT on financial business, such as asset management, bank lending, and payment systems, is so profound and diverse that it is difficult to discuss them together. Therefore, if we try to discuss the impact of ICT on the financial system from an economic perspective in a comprehensive way, the entire volume of this book will have to be devoted to it.

The two papers in Part I of the book “Payment Methods and Payment Systems” focus mainly on what recent developments in FinTech have brought to payment methods and payment systems. Internet technology and the use of smartphones have spread to all corners of society. As a result, online transactions of goods, services, and assets are taking place all the time, and there is growing interest in how payment methods will change as a result. Chapter 1, “Choice of Payment Method by Japanese Households” by Hiroshi Fujiki, provides a careful analysis of the current situation and prospects regarding the substitutability and complementarity of cash payments and various cashless payment methods for Japanese individuals and households based on data for Japan as of 2022. Fujiki carefully examines the growth of cashless payments during a disaster and reviews relevant domestic and foreign academic research. Based on this, the study also considers the impact of policies such as the issuance of central bank digital currencies and the improvement of household financial literacy. Commenting on Fujiki’s chapter, Masao Nakata further points out the impact of some factors unique to Japan on households’ choice of means of payment, such as differences in consumers’ perceptions of the safety of cashless payments and the reserve demand for cash for payments in emergencies due to the high incidence of natural disasters compared to other countries.

In Chap. 2, “Credit Economy and Payment Systems: Can a New Electronic Currency Replace Bank Deposits as a Means of Payment?,” Hajime Tomura starts his discussion with the current payment system in which the central bank issues currency and the banking system provides the means for credit transactions. This study theoretically examines the possibility of replacing this system with electronic money, cryptocurrencies, and foreign digital currencies. Modern banking systems are equipped with efficient and demand-driven money supply mechanisms. He argues that the current banking-centered payment system is unlikely to be replaced by electronic money, cryptocurrencies, or foreign digital currencies unless it becomes highly inefficient. This conclusion implies that it is important to make efforts to improve the usability of current payment systems, for example, by actively integrating nonbanking operators into banking systems. Such efforts are also advancing in the form of Banking as a Service (BaaS) and Embedded Finance, which integrates nonfinancial services with financial services. In his commentary on Tomura, “Future Vision on Credit Economy and Payment Systems,” Yasuo Maeda

generally supports Tomura's conclusion, but points out additional problems in using cryptographic assets in payment systems, such as unstable value and difficulties in providing credit.

Banks played a leading role in Japan's financial system during the high-growth era, but their presence steadily declined after the collapse of the Bubble Economy in the early 1990s. The turmoil caused by the domestic banking crisis disappeared by the early 2010s. However, the prolonged low interest rate policy of the Bank of Japan, together with sluggish productivity growth in the real economy and an aging society, has led to a slowdown in domestic demand for funds. The two chapters in Part II, "Transformation and Challenges of the Banking Industry," discuss the challenges facing Japanese financial institutions, especially commercial banks, from both a historical and macroeconomic perspective, as well as from a micro perspective of regional financial institutions and local economies, which are said to be facing particularly difficult challenges.

In Chap. 3, "The Transformation of Japan's Banking Industry: Analysis Based on Income Data," Arito Ono carefully computes the value added (income) generated by the financial and insurance industry, particularly the banking industry, over a long period starting from the interwar period, but the focus of the analysis is the post-war sample. This chapter outlines the evolution of the business model of the Japanese banking industry and its prospects with reference to the United States. Although similar studies exist for the United States, to our knowledge, Ono's contribution to the evolution of the banking industry over such a long period was the first such attempt for Japan. The study shows that the share of the banking industry in Japan's economic activity increased from the mid-1950s to the late 1980s, but has been declining since the 1990s, and that during the transition period, net interest income from deposit and loan operations, the largest source of income for banks, has declined significantly. In contrast, fees and net trading income have increased. Conversely, in the United States, after the Global Financial Crisis, income from securitization declined, but not income from traditional banking activities. In addition, Mitsuru Sawada's comments for Ono, "Trends in Bank's Business Model from the Perspective of Consolidated Financial Statements," emphasizes the conglomeration (diversification of business) in the banking industry through financial subsidiaries as a result of the deregulation of business intermediation since the 1990s. Using consolidated statements as the subject of analysis, he points out that the shift from deposit and lending activities to other operations in the banking industry has progressed more rapidly than Ono's paper suggests.

Chapter 4, "The Role of Regional Financial Institutions in the Post-COVID-19 Era: Challenges for Corporate Support Beyond Finance" by Nobuyoshi Yamori, Yoshihiro Asai, Tomoko Aizawa, Masao Ojima, Shingo Umino, and Masahiro Hashimoto, takes up regional trading company ("Shosha" in Japanese) function and personnel placement business as initiatives by regional financial institutions to support the core businesses of their client companies. They examined what should be addressed to make these operations to be appreciated by client companies based on their survey of companies. These new services are attracting the attention of borrower companies as their main concerns have shifted from cash management in the

post-domestic banking crisis era to their core business—developing customers and sales channels or recruiting and training employees. As a result, regional financial institutions cannot survive on traditional deposit and lending services alone. This is consistent with the decline in profits from deposit and lending activities in the Japanese banking industry, as pointed out by Ono (Chap. 3). The analysis in this chapter reveals that client companies' intentions and expectations regarding the use of both regional trading companies and recruitment services are generally not high. However, they also find that the more highly a company rated the main bank's response to the COVID-19 disaster, the higher its intention and expectation to use such services. The authors point out that the key to the acceptance of regional trading company business and recruitment services is to properly understand the challenges faced by borrower companies and to develop a business model that enhances their corporate value. In addition, in his comment in Chap. 4, "Transition to Problem-Solving Finance in Regional Financial Institutions," Yoshiaki Ogura discusses the conditions for the success of a regional trading company business and recruitment services based on the findings of academic research on venture capital and relationship banking.

In contrast to the relative decline of financial intermediaries discussed in Part II, financial markets—particularly stock markets—have increased their presence in the Japanese financial system. Since the start of Abenomics and the appointment of Haruhiko Kuroda as governor of the Bank of Japan in the early 2010s, Japanese policymakers have placed greater emphasis on communicating with the general public. As a result, stock market reactions to policy announcements and major economic events are frequently mentioned in the public press. Nevertheless, due to the specific circumstances in Japan, where cash transactions accounted for an overwhelmingly high proportion of retail sales until recently, the stock market still seems distant to many individuals and households compared with their familiarity with commercial banks. Two chapters in Part III, "Innovations and Developments in the Japanese Stock Market in the 21st Century," examine some of the key issues facing Japanese stock markets, including the paradigm shifts following the Global Financial Crisis in the late 2000s.

Chapter 5, "The Japanese Stock Market in the Twenty-First Century: New Market Environment Shaped by Digitization and Automated Transactions" by Tokuo Iwaisako and Masahiro Yamada, examines the impact of common elements that have been the driving forces behind the transformation of stock markets in developed countries since the 1980s, long before the advent of the term *FinTech*. Their study examines factor investing and high-frequency trading (HFT) as examples of the impact of digitization and increasing trading speed. They discuss how they have changed the current state of the stock markets in Japan and the rest of the world. First, while factor investing strategies enjoyed great success in both research and practice in the 1990s and 2000s, value investing, which was the primary driver of this success, has lost its effectiveness since the Global Financial Crisis. The authors confirm that what has happened in the Japanese market in this respect is broadly consistent with what has happened abroad, particularly in the United States. In the second half of the chapter, three characteristics of HFT in Japan are identified:

a dramatic increase in trading value share, a stronger aspect as a liquidity consumer that trades using supplied liquidity rather than as a liquidity provider that offers limit orders in advance, and a high ability to earn trading profits. Second, HFT has a strong aspect as a liquidity consumer, which differs from the results of previous studies using overseas markets and Japanese data, and further research is required. In this regard, the comment in Chap. 5, “Changes in liquidity in the Japanese stock market” (Wataru Ohta), points out that the liquidity of the Japanese stock market, as measured by the effective spread, has been declining since the 2000s and that it has become difficult to make profits by providing liquidity.

Chapter 6, “Ambiguity Aversion in Stock Investment: Analysis Using Stock Market Data from the United States and Japan” by Toshiki Honda, analyses the consistency between the standard asset pricing model and actual return data from an asset allocation perspective. Modern portfolio theory suggests that it is optimal for all investors to hold a portfolio of risky assets with the same composition as the market portfolio. Therefore, most general investment advice recommends buying mutual funds or exchange-traded funds (ETFs) that track market indices as a first step. However, there is always noise and parameter uncertainty in the information about expected returns and covariance that investors use to make investment decisions. Honda models the optimizing behavior of investors in the presence of such uncertainty by introducing the concept of “ambiguity aversion” and examines its validity using Japanese and US stock market data. His approach has been relatively successful with US data; however, analyses using Japanese data have been somewhat disappointing. Honda’s chapter also serves as an excellent introduction to the vast amount of academic research on two important topics of “model uncertainty” in finance and “ambiguity aversion” in microeconomic theory. In his comments to Honda, “Challenges and Solutions for the Estimation of the Ambiguity Aversion,” Hideyuki Takamizawa offers suggestions for improving the fit to Japanese data, as well as other potential applications of the concept of ambiguity aversion.

Part IV, “Challenges in Corporate Finance and Corporate Governance,” comprises three chapters on corporate finance and corporate governance, although the topics covered are relatively independent from each other.

Along with FinTech, *Environment, Social, and Governance* (ESG) has been a keyword subject of intense discussion and media coverage in recent years. In its simplest definition, ESG is a set of standards that socially conscious investors should use to screen investment opportunities. ESG concepts are of great importance, both for companies concerned about the market’s assessment of their share prices and for institutional investors, including pension funds and sovereign wealth funds, who are under pressure to comply with ESG standards. Chapter 7, “Nonhomogeneous Characteristics of Institutional Investors and ESG: From Long-Term Investment in Japanese Firms and CO₂” (Yoko Shirasu and Baosheng Yang), after reviewing the literature on ESG and institutional investors, conducts an empirical analysis focusing on the heterogeneity of institutional investors. The analysis considers ESG activities as a form of extended governance that is responsible to all stakeholders. Empirical evidence shows that foreign and long-term institutional investors promote long-term tangible and intangible investments in companies that engage in ESG activities,

leading to increased innovation in the long run. These findings contradict the common perception that foreign investors tend to focus on short-term outcomes. They also find that differences in carbon emission standards, which are of high interest to institutional investors, have an ownership structure of companies. They emphasize the importance of considering the characteristics and nationalities of institutional investors when analyzing companies' ESG. The comment paper by Kazuhiko Ohashi, "Relationship between the Actions of Investors and Companies Surrounding ESG," discusses various aspects and channels for ESG investment, including different forms of companies such as public and private companies. He also examines the so-called impact investing, which seeks not only financial returns but also environmental and social impact.

Recent discussions on corporate governance in Japan have focused on the 2021 revision of the Corporate Governance Code, which outlines the principles of effective corporate governance and its implications for the management of Japanese companies. However, since Masahiko Aoki's analysis in the early 1980s (e.g., Aoki 1984), academic research on the corporate governance of Japanese firms has continued from a perspective of comparative institutions, and Konari Uchida's arguments in his contribution and Hideaki Miyajima's discussion in this book are also placed in such a context. Chapter 8, "Japanese Corporate Governance: Institutional Complementarity and Evolution of Financial and Internal Governance" by Konari Uchida, analyses the governance of Japanese firms based on two aspects of governance structure: financial governance and internal governance. He asks whether they are complementary or not and, if so, whether such complementarity persists over time. Based on the status of the firms in 1984, he first identifies firms with relatively high level of borrowing and high level of shareholding by financial institutions as Type J firms and the opposite as Type N firms. The results of the empirical analysis confirm that in Type J firms, the tendency for the winner of internal promotion tournaments to be appointed to the top management has been maintained even after the 2000s. At the same time, the level of borrowing has declined significantly. These results suggest that the commonly held view that financial governance complements internal governance is not necessarily true. On the other hand, examining governance in terms of shareholdings by financial institutions reveals that the function of supporting the continuation of promotional tournaments is still alive and well. In his comments for Uchida, "The Japanese Governance Model Today," Hideaki Miyajima examines the complementarity of institutions and their robustness from the broader perspective of the diversity of capitalism. Based on the findings in this chapter, Miyajima argues that the unique mechanisms that underpin the performance of Japan's promotional tournaments need to be clarified.

Unlike ESG investing and corporate governance, insurance companies have not received sufficient attention from the public and researchers despite their social and economic importance. However, given the size of the insurance industry and its economic importance to the Japanese financial system, the organizers felt that the topic should be included in this project. If it had been possible, we would have included both the life and the non-life (property) insurance industries as separate

research topics; however, Chap. 9 focuses on the non-life insurance industry, particularly corporate insurance. Many important research topics cannot be examined in this volume, such as the impact of a rapidly aging society on the business of life insurance companies, the response of the non-life and life insurance industries to major natural disasters (hurricanes, earthquakes, etc.), and the importance of the insurance industry in terms of systemic risk in the Japanese financial system. In Chap. 9, entitled “Enterprise Risk Management and Corporate Insurance: Issues and Practice Based on Survey on Risk Managers in Japan,” Norihiro Yanase first provides a good summary of the importance of corporate insurance as a company-wide decision-making process from a theoretical point of view. He then reviews the results of an original survey of risk managers responsible for purchase and management of corporate insurance, and discusses the challenges and prospects for the corporate insurance business in Japan. The survey results suggest that even in Japan’s leading companies, risk management departments are hardly integrated into a company-wide financial decision-making process aimed at maximising corporate value. Based on this observation, Yanase discussed the importance of developing organizational and human resources capable of understanding these issues in an integrated manner. From the perspective of the non-life insurance industry, the corporate insurance sector may receive increased attention in the future, given the increasing saturation of the industry’s main post-war market. It then points to the importance of developing organizations and personnel capable of understanding the importance of purchasing corporate insurance as an important part of financial decision making, just as in the general corporate sector. In the comment in Chap. 9, “Current state of demand for corporate insurance and related research topics,” Takashi Yamasaki discusses two reasons why Japanese companies have not been able to make significant progress in company-wide risk management systems: internal and external problems. With regard to external problems, Yamazaki points to the problem of shareholders’ perceptions of risk financing and argues that the low number of responses to the survey in Yanase’s paper may reflect this.

Part V, “Misallocation of Capital and Its Macroeconomic Implications,” consists of two chapters that examine the persistent and prolonged low productivity growth rate in the Japanese economy to date from the perspective of the efficiency of resource (i.e., capital and credit) allocation by the financial system. After the collapse of the bubble economy in the early 1990s, the nonperforming loan problem became the focus of both policymakers and academics, with particular attention being paid to the issues of forbearance lending and zombie firms. It has been argued that zombie firms should have gone out of business, but survived with the support of financial institutions or public bailouts, providing negative externalities to the performance of the surrounding firms (Hoshi 2006; Caballero et al. 2008; Nakamura and Fukuda 2008). Another important issue is the decline in corporate borrowing, the increase in corporate cash holdings by firms, and the resulting increase in corporate savings.

Chapter 10, “Corporate Financing in Japan: Coexistence of Zombie Firms and Zero-Leverage Firms” by Yusuke Imani, Iichiro Uesugi, and Yukihiro Yasuda, examines the link and interaction between these two issues. They focus on the

coexistence of zombie firms, which are over-leveraged and unable to survive without the support of financial institutions, and debt-free firms, which do not borrow from external sources, which has been distinctive feature of the Japanese firms' financing behavior since the 1990s. The authors first report the transitions in the ratio of zombie and debt-free firms to all Japanese firms. They then examine the impact of zombie firms on non-zombie firms and the relationship between zombie firms and debt-free firms. The empirical analysis reveals that zombie firms often have a negative impact on the real economic activities of non-zombie firms and that non-zombie firms in industries with a high proportion of zombie firms tend to become debt-free. As pointed out in Daisuke Tsututa's comment, although previous studies have examined the externalities of zombie firms, the authors are the first to examine the effect of the ratio of zombie firms on debt-free firms both theoretically and empirically. Based on the recent experience that government support during the COVID-19 pandemic was focused on small- and medium-sized enterprises, Tsuruta also argued that future research should examine the effect of unlisted zombie firms on non-zombie firms and the efficiency of government support in the presence of the negative externalities of zombie firms.

The COVID-19 pandemic caused a severe global recession in the spring of 2020. However, due to active government policy responses, corporate bankruptcies in developed countries, including Japan, has declined since before the coronavirus disaster (OECD 2022). This has led many economists to worry that the public bailouts of private firms during the COVID-19 pandemic may have been too generous. In Chap. 11, "Financial System and Crisis Response: Theoretical Background and Policy Issues on Public Bailouts of Private Firms," Kenichi Ueda discusses the advantages and disadvantages of government bailouts of firms facing bankruptcy risk during crises. As discussed in Chap. 10, Ueda points out that financial support measures for troubled firms in Japan and other countries in the early 2020s may have been provided to zombie firms.

Ueda's paper emphasizes that the financial system is vulnerable due to the inherent functions of banks and that there are aspects of the financial system that require policy intervention. However, Ueda argues that there is a limited theoretical basis for bailing out non-financial firms and that public intervention should only be justified in the context of institutional reforms, such as the reforming insolvency legislation and procedures, which would lead to a reduction in bankruptcy costs in general. Ueda also presents an empirical analysis of the importance of banks' corporate screening function and shows that this function has been declining in Japan in recent years, using indicators that simultaneously capture the existence of zombie firms and the financial constraints faced by healthy firms in real need of funds. In Chap. 11's comment, "The Pros and Cons of Corporate Bailouts as a Crisis Response," Hiroifumi Uchida agrees with the importance of the issues raised by Ueda's paper. Uchida then points out the need to distinguish whether Ueda's arguments are based solely on theoretical models or are supported by both theory and evidence and points to keep in mind when understanding Ueda's paper.

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Part I
Payment Methods and Payment Systems

Chapter 1

Choice of Payment Method by Japanese Households



Hiroshi Fujiki

Abstract This chapter provides a careful analysis of the current situation and prospects regarding the substitutability and complementarity of cash payments and various cashless payment methods for Japanese individuals and households based on data for Japan as of 2022. Fujiki carefully examines the growth of cashless payments during the spread of COVID-19 infection and reviews relevant academic research in Japan and abroad. Based on this, Fujiki also considers the impact of policies such as the issuance of central bank digital currencies and the improvement of households' financial literacy. In his comment, Masao Nakata further points out the impact of some factors unique to Japan on households' choice of means of payment, such as differences in consumer perceptions of the safety of cashless payments and the reserve demand for cash for emergency payments due to the high incidence of natural disasters compared to other countries.

1.1 Introduction

New cashless payment methods for households are emerging amid the spread of smartphones, advancements in information technology in the financial industry, and entry into the funds transfer service providers from nonbanks. Henceforth, cashless payment refers to paying money without using cash, following the Ministry of Economy, Trade, and Industry's "ABCs of Cashless Payments."¹ The Japanese government has set a goal in its "Growth Strategy 2017" to achieve a cashless

Some of the studies cited in this chapter were supported by the JSPS KAKENHI Grants 15K03551, 18K01704, and 21K01566.

¹Ministry of Economy, Trade and Industry, Commerce and Service Group Cashless Promotion Office "The Basics of Cashless Payments." https://www.meti.go.jp/policy/mono_info_service/cashless/image_pdf_movie/cashless_iroha.pdf (Accessed January 30, 2024).

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payment ratio of about 40% by the end of 2027. Promoting cashless payments is a policy issue for advancing the financial digitalization of the Japanese economy.

To promote cashless payment, the Japanese government needs to encourage the development of new payment methods. It also needs to consider what payment methods households choose because there are payment methods, such as J-Debit, a debit card service added to cash withdrawal cards developed in the early 2000s, that households rarely use. Therefore, this chapter provides an overview of when and which payment methods have spread to Japanese households to help inform policies to promote cashless payment.

Compared to the overview papers on the choice of payment method by Japanese households by Kitamura (2005, 2018) and Nakata (2018), this chapter also provides an overview of the effects of the spread of COVID-19 infection, the use of cryptocurrencies, and the Point Reward Project for Consumers Using Cashless Payments (PRP) program on the choice of payment methods. The PRP is a Japanese government program that subsidized the use of cashless payment methods by consumers, merchants, and payment service providers from October 2019 to June 2020. However, this chapter does not provide an overview of the choice of payment method in business-to-business transactions.

The rest of this chapter has the following structure. Section 1.2 outlines the transition of the leading payment methods by Japanese households, Sect. 1.3 explains the retail payment system in Japan and the widely used payment methods used there, Sect. 1.4 provides an overview of empirical research in Japan, and Sect. 1.5 summarizes policy issues. Fujiki (2022a) provides the details of the available data on payment method choice by Japanese households and an overview of empirical research in this field abroad.

1.2 Choice of Payment Methods by Japanese Households

Since the 1970s, the leading payment methods by Japanese households have been cash for daily payments and direct debit for regular payments. With the amendment of the Foreign Exchange and Foreign Trade Act in 1980, which liberalized foreign exchange transactions, Japanese credit card companies issued international brand-affiliated credit cards such as Visa and Mastercard, and many Japanese started using credit cards during overseas travel. A debit card service called J-Debit became available in 2000. The J-Debit service allows a person with a bank cash withdrawal card to pay at a J-Debit service merchant and have the payment instantly debited from his/her bank account. In 2002, a contactless prepaid card, nicknamed electronic money, became available in convenience stores. SONY launched the first brand of electronic money, Edy, and subsequently, transportation and distribution companies entered the electronic money business one after another. After 2010, the use of credit cards for online shopping increased. With the widespread use of smartphones, credit card holders and electronic money holders can make payments by touching their

smartphone with a credit card app or electronic money app on a merchant payment terminal.

From October 1, 2019, to June 30, 2020, the Ministry of Economy, Trade, and Industry conducted the PRP. Under the PRP, consumers who make cashless payments at registered small- and medium-sized businesses get a discount. Registered retail shops and payment service providers also received a subsidy during the PRP. In anticipation of the PRP's introduction, nonbanks such as telecom, e-commerce malls, and online flea market operators entered the cashless payment business as funds transfer service providers, resulting in fierce reward program competition before the PRP began. In particular, code payments, where a user can pay by using quick response (QR) codes or barcodes in smartphone apps, spread rapidly. There are various ways to pay at merchants that accept code payments. For example, code payments work like prepaid card payments. Code payment users can pay their bills using pre-charged balances from a bank account or cash using a bank ATM. Code payments also work like credit cards or debit cards because code payment users can pay their bills with his/her registered credit card or direct debit from his/her registered bank account.

After March 2020, the spread of COVID-19 infection in Japan and the resulting need for social distancing led to the decreased use of cash payments in point-of-sale transactions. For example, the cashless payment ratio increased from 26.8% in 2019 to 32.5% in 2021. Note that the cashless payment ratio refers to the ratio of payments by credit cards, debit cards, electronic money, and code payments (after 2018) to nominal private final consumption expenditure (excluding homeowners' imputed rent) in GDP statistics.² Of the cashless payments in 2021, 85% were by credit card, 6% by electronic money, 6% by code payments, and 3% by debit card. However, despite the decreased use of cash payments in point-of-sale transactions, cash hoarding for savings has not decreased, as explained in Sect. 1.4. The following section reports Japanese households' choice of payment methods since 1991 using the "Public Opinion Survey on Household Financial Behavior" conducted by the Central Council for Financial Services Information.

Figure 1.1 shows the results of the primary payment methods in 1991–1994, 2000, and 2002–2006. The survey asked the respondents to choose up to two primary payment methods from the five options. Here, 80–90% of the respondents chose cash, and 60–70% chose direct debit. After 2000, the percentage of respondents who chose direct debit decreased, and those who chose credit cards increased from about 10% in the 1990s to about 20% in the 2000s.³

²The source of the data is the Ministry of Economy, Trade, and Industry "We have calculated the cashless payment ratio for the year 2021" June 1, 2022. <https://www.meti.go.jp/press/2022/06/20220601002/20220601002.html> (Accessed January 30, 2024).

³Until 2003, data was collected from 6000 samples of households with two or more people using a stratified two-stage random sampling method. The survey method was placement method and about 70% households responded. From 2004 to 2006, data was collected from 10,800 samples of households including single-person households using a two-stage random sampling method. The survey method was placement method and about 35% households responded. From 2007 to 2019,

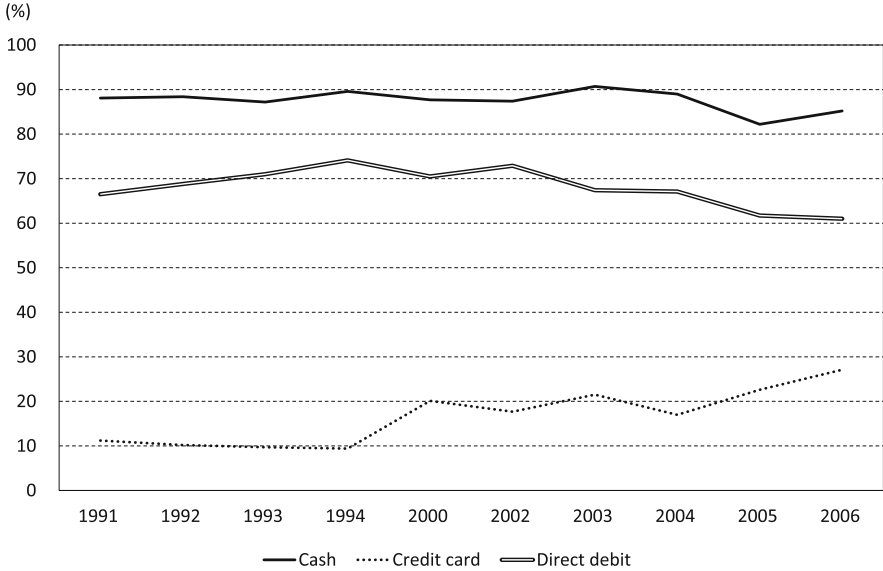


Fig. 1.1 Primary payment methods (choose up to two from five options). (Source: The Central Council for Financial Services Information, “Public Opinion Survey on Household Financial Behavior.” Various years. <https://www.shiruporuto.jp/public/document/container/yoron/>. Accessed November 8, 2021)

While the questions until 2006 did not distinguish the context of the payments, the questions from 2007 to 2020 asked the respondents about their choice of daily payment methods by the breakdown of the payment size and regular payment methods. Regarding the frequently used payment methods for daily payments (say, shopping), the survey asks by the breakdown of the following five payment sizes: (1) less than or equal to 1000 yen, (2) more than 1000 and less than or equal to 5000 yen, (3) more than 5000 and less than or equal to 10,000 yen, (4) more than 10,000 and less than or equal to 50,000 yen, and (5) more than 50,000 yen. Respondents can choose up to a maximum of two from the four options: (1) cash, (2) credit cards, (3) electronic money (including debit cards), and (4) others. Regarding the primary payment method used for regular payments (say, public utility bill payments), respondents can choose from up to a maximum of two of the five options: (1) cash, (2) credit cards, (3) electronic money (including debit cards), (4) direct debit, and (5) others.

data was collected from 8000 samples of households with two or more people. The survey method was a combination of placement method and mail survey if the respondents prefer placement method and about 40% households responded. In addition, 2500 single-person households (up to 70 years old) were surveyed via the Internet. In 2020, the survey method for households with two or more people changed to mail survey only, and about 25% households responded.

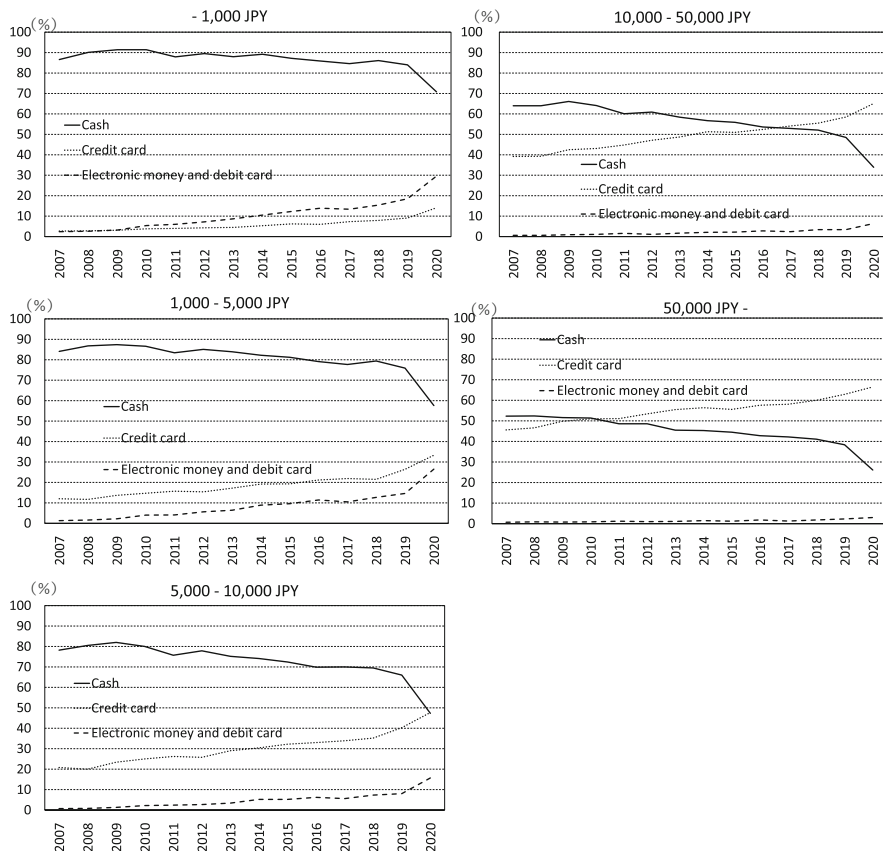


Fig. 1.2 The most frequently used payment methods for daily payments (households of two or more people, up to two payment methods). (Source: Same as Fig. 1.1)

Figure 1.2 shows the results of daily payments for households of two or more people. The percentage of respondents who chose cash is the highest for payment sizes less than or equal to 1000 yen, followed by electronic money (including debit cards). For the payment size from 1000 to 10,000 yen, the percentage of respondents who chose cash is still high, but credit cards are chosen more than electronic money (including debit cards). For amounts over 10,000 yen, the percentage of respondents who chose credit cards exceeds those who chose cash, and respondents were less likely to choose electronic money (including debit cards). The percentage of respondents who chose cash has decreased throughout the survey period for any transaction size, dropping significantly in 2020. The reasons for this could be the spread of COVID-19 infections, the introduction of the PRP in 2019, and the changes in the survey method in 2020 from a combination of placement method and a mail survey to a mail survey only, reducing the recovery rate from about 40% to 25%.

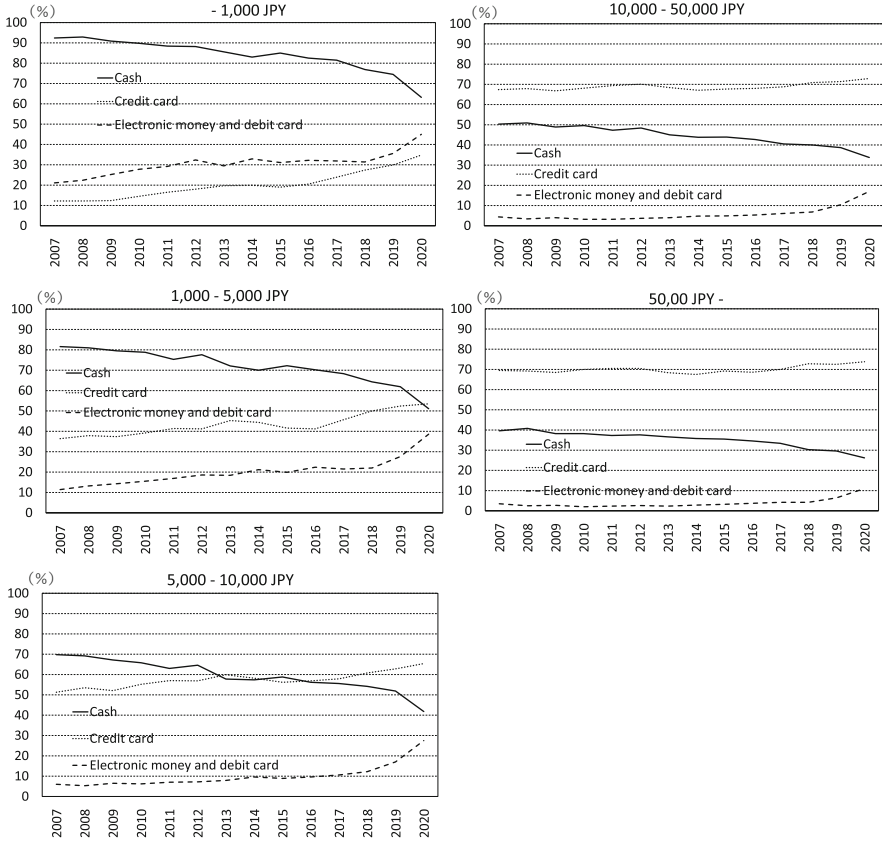


Fig. 1.3 The most frequently used payment methods for daily payments (single-person households, up to two payment methods). (Source: Same as Fig. 1.1)

Figure 1.3 shows the results of the two most frequently used payment methods for daily payments for single-person households. The results for transaction sizes less than 1000 yen are similar to those for households of two or more people. However, for transactions over 5000 yen, single-person households are more likely to choose cashless payments for the same transaction size than households of two or more people. The result might reflect that the single-person household survey does not include respondents over 70 years old who are more likely to use cash payment, while the survey for households of two or more people includes respondents over 70.

Figure 1.4 shows the results of regular payments for households of two or more people (upper panel) and single-person households (lower panel). The percentage of respondents who chose direct debit is gradually decreasing, and that of those who chose credit cards is increasing. In single-person households, the absolute values of the two percentages reversed in 2014 and after 2016. The percentage of respondents

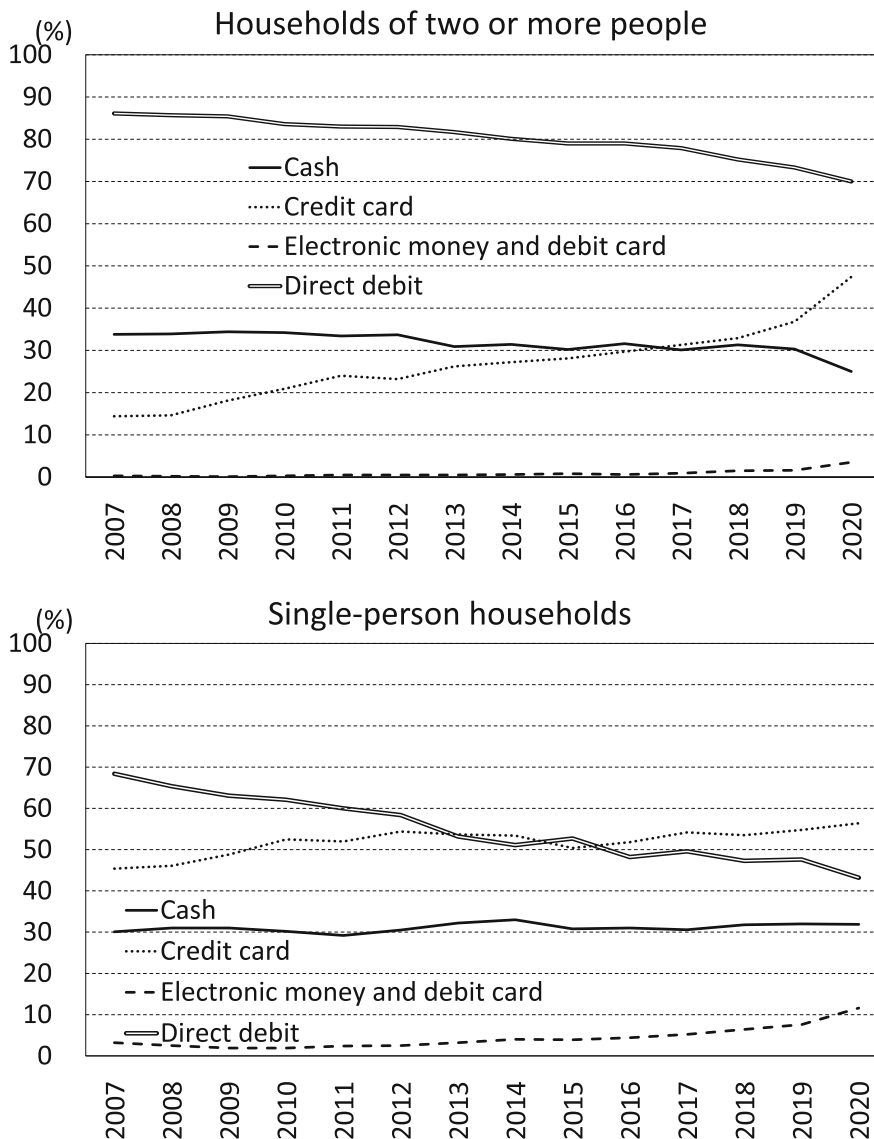


Fig. 1.4 The most frequently used payment methods for regular payments (up to two payment methods). (Source: Same as Fig. 1.1)

who chose cash slightly decreased in households of two or more people and changed little in single-person households, staying at about 30%.

The survey questions explained in Figs. 1.1, 1.2, 1.3 and 1.4 do not include code payments for one of the options to reply to these questions; we look at the “2020 Consumer Insight Survey” (September 2020) to show the increase in the use of code

payments from 2019 to 2020.⁴ Specifically, this survey shows that the ownership rate of QR code payment apps increased to 54% in September 2020 from 42% in September 2019. The credit card ownership rate is 82% (82% in September 2019), the debit card ownership rate is 24% (23% in September 2019), and the electronic money issued by transportation companies ownership rate is 58% (63% in September 2019).

Does the widespread use of cashless payment methods lead to smaller cash holdings? The solid lines in Fig. 1.5 show the average amount of cash (bills, coins) held in the home (the right axis, in units of 1000 yen) from the “Public Opinion Survey on Household Financial Behavior.” The upper panel shows results for households with two or more people, and the lower panel shows the results for single-person households. The bar charts (the left axis) show what percentage of households belong to which range of the cash holdings distribution.

The average cash holdings for households with two or more people is about 300,000 to 350,000 yen from 1998 to 2003 and about 150,000 to 200,000 yen from 2007 to 2019. The proportion of households with less than 100,000 yen and more than 1 million yen is about 30% and 8% from 1998 to 2003 and about 50% and 4% from 2007 to 2019. As explained in footnote 3, the sample design of the statistical surveys changed in 2004, 2007, and 2020, which makes the direct comparison of results beyond these years difficult.

The average cash holdings for single-person households rose from 190,000 yen in 2007 to 430,000 yen in 2020. The proportion of households with more than 1 million yen was about 7% from 2007 to 2013 and increased to about 10% after 2015. The proportion of households with less than 100,000 yen decreased from 68% in 2007 to 57% in 2020.

The average cash balance of households was stable after 2007 for households with two or more people and increased for single-person households despite the widespread use of cashless payments. The results might reflect that the survey asked for cash held in the home, including cash hoarding for savings purposes.

1.3 Japan’s Retail Payment System and Widely Used Payment Methods

This section explains the settlement institutions, intermediary institutions, clearing institutions, and widely used payment methods in the retail payment system in Japan. The retail payment system is a system that replaces payments made by various means of payment, such as bank transfers, credit cards, and debit cards, which are small in amount but very frequent, with interbank credit and debt relationships, and

⁴Cashless Promotion Council “2020 Consumer Insight Survey”. https://paymentsjapan.or.jp/wp-content/uploads/2022/02/insights_fy2020.pdf (Accessed January 30, 2024).

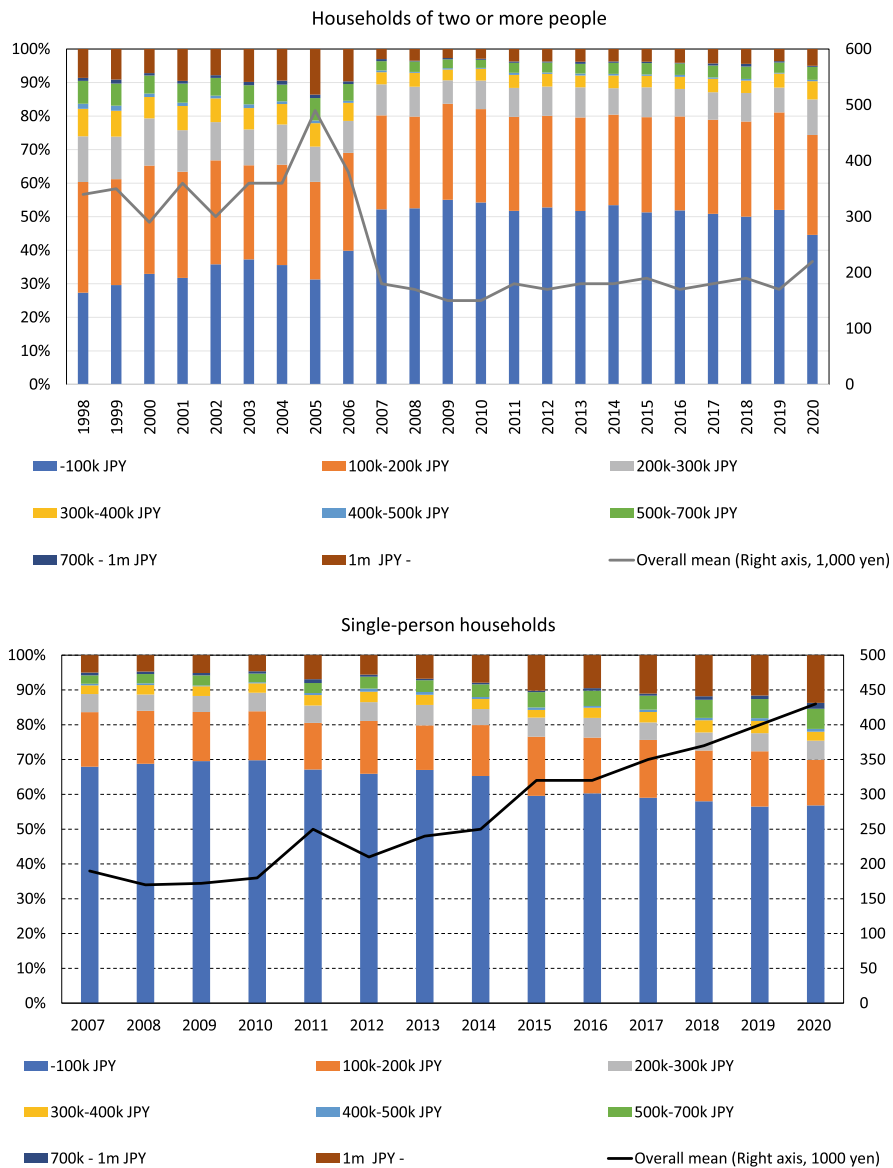


Fig. 1.5 Distribution and average value of cash holdings from the “Public Opinion Survey on Household Financial Behavior.” (Source: The same as Fig. 1.1)

Table 1.1 Japan's retail payment methods and retail payment system

Payment methods	Intermediary institutions	Clearing institutions		Settlement institutions
Cash (handover)				Cash
Bank transfer, direct debit	Banks		Zengin System	BOJ (BOJ-Net)
Pay-easy	Banks	Japan Multi-Payment Network	Zengin System	BOJ (BOJ-Net)
Credit card	Banks	Credit and Finance Information Switching System (CAFIS)	Zengin System	BOJ (BOJ-Net)
Debit card	Banks	CAFIS, clearing center	Zengin System	BOJ (BOJ-Net)
Electronic money (server or IC card)	Banks and nonbanks	Electronic money settlement institutions	Zengin System	BOJ (BOJ-Net)
Mobile payments, code payments	Banks and nonbanks	CAFIS, electronic money settlement institutions	Zengin System	BOJ (BOJ-Net)

Source: Created by the author

settles with the central bank's current account.⁵ Clearing may occur before interbank settlement with the central bank's current account. During the clearing process, a clearing institution aggregates and offsets payments between the same parties during a specific period to determine the net balance to settle finally.

Table 1.1 shows Japan's widely used retail payment methods because they are available at many stores and retail payment systems. The second row of Table 1.1 shows cash (banknotes and coins). Payment and settlement for cash handover payment do not need intermediary institutions and clearing institutions because cash (up to 20 coins) is legal tender.

The third row of Table 1.1 shows bank transfers (payment of money to financial institution deposit accounts) at bank counters, ATMs, and Internet banking, and direct debit (regular and automatic payments from accounts at the request of depositors). Direct debit has been popular since 1970, and many Japanese use it to pay utility bills, credit card payments, and insurance premiums. The sender's bank sends data on bank transfers or direct debit to a nationwide online network system for banks handling domestic funds transfers, called the Zengin System, operated by the Zengin Net. The information is processed in real time in its computer center, Zengin Center, and immediately sent to the recipient's transaction bank.

The Zengin System is an online data communication system launched in April 1973 and has been operating 24 hours a day, 365 days a year since October 9, 2018. Almost all deposit-taking financial institutions in Japan participate in the Zengin System, which handles an average of about 7.13 million transactions and 12 trillion yen in transactions in a single business day in 2020. The Zengin System settles

⁵The large-value payment system is a system that settles large-value interbank credit and debt relationships through central bank current deposits. In Japan, the Bank of Japan Financial Network System (BOJ-NET) applies.

transactions between member banks in two ways depending on whether the transaction size is less than 100 million yen. First, regarding transactions of less than 100 million yen, the Zengin System works as a clearing institution or a central counterparty. It assumes the debt of the sender's bank and obtains the credits of the recipient's bank for each transaction. It then reorganizes the original debtor–creditor relationships between banks into a debtor–creditor relationship between each member bank and the Zengin System. After the clearing, banks make a lump settlement once every business day evening at the predetermined time by decreasing or increasing the current account balance held in the Bank of Japan (BOJ) using the Bank of Japan Financial Network System (BOJ-Net). Using the BOJ-Net, the BOJ completes the settlement by changing each member bank's current account balance based on the Zengin System's settlement information. Second, regarding transactions of more than or equal to 100 million yen, the Zengin System settles every single transaction on a real-time gross basis by decreasing the sender's current account balance in the BOJ and increasing the recipient's bank's current account balance in the BOJ through the BOJ-Net.

The Pay-easy in the fourth row of Table 1.1, available since 2002, accepts payment for national and local taxes, public utility bills, insurance premiums, and online shopping bills from personal computers, smartphones, and ATMs. For example, an individual who receives bills for electricity charges prepared for payment by Pay-easy from an electric power company (called “Collection institution,” Syunou Kikan in Japanese) can instruct payment from this individual's deposit account to the financial institution's account specified in the bill (called collection financial institution) through Internet banking via Pay-easy. The payment instruction made by Internet banking is transmitted to the collection institution through the Pay-easy network from the collection financial institution. When the legitimacy of the payment information is confirmed, the individual completes the instructed bank payment. The Japan multi-payment network performs clearing operations for the payment through Pay-easy for each financial institution, and the collection financial institution pays the bill to the account of the collection institution 2–3 days later. Through Pay-easy, about 84.7 million payments totaling 29 trillion yen were paid in fiscal 2020, mainly related to payments to national and local public entities.

The credit card in the fifth row of Table 1.1 is a service where a person who has been allowed to use a credit card by a credit card issuer (hereafter referred to as a member) receives the provision of goods or services at a store that accepts the payment by the credit card (hereafter referred to as a merchant).⁶ The merchant reports sales to the credit card issuer upon each member's shopping using a specialized terminal connected to a network such as NTT Data's Credit And Finance Information System (CAFIS). The acquirer makes advance payments to merchants for members' purchases minus the fees required for merchant administration. The credit card issuer bills the member for the amount paid in advance by the next month

⁶The following explanations in this section are based on Miyai (2020), Syukuwa (2021), and Honda (2017).

or the month after the next, and the member usually pays by direct debit in a lump sum (no interest rate or handling fee, within an average of 40 days). The settlement of the credit card payments involves transfers or direct debits among the bank deposits of the credit card issuer, acquirer, member, and merchant. These payments will result in interbank claims and liabilities being transmitted to the Zengin System and settled by the BOJ, similarly to the settlement of bank transfers.

The debit card in the sixth row of Table 1.1 includes J-Debit and brand debit cards with international brand marks such as VISA or Mastercard. The payment by the J-Debit, available since 2000, works in the following way. The holder of cash withdrawal cards can make a payment by plugging their cards into a specialized terminal of merchants affiliated with the Japan Debit Card Promotion Council and entering their bank PIN. The CAFIS transmits the data on the payment by J-Debit, and the bank immediately deducts the payment amount from the cash withdrawal card holder's bank account, and the merchant receives the payment within three business days. The settlement of J-debit card payments involves transfers and direct debits among the bank deposits of the cash withdrawal cardholders and merchants. The payments result in interbank claims and liabilities to be computed by the clearing center, and the Zengin System and the BOJ will make a settlement to complete the payment by J-Debit. The settlement of payments made by a branded debit card is the same as those made by a credit card, except the member's bank deducts the payment from the member's bank account upon the member's making purchases. Unlike J-Debit, whose merchants are located only within Japan, the holder of a branded debit card can pay at overseas merchants.

Electronic money, defined as Prepaid Payment Instruments in The Payment Services Act, in the seventh row of Table 1.1 has two types: server type and IC card type. The former manages monetary values with the service provider's server, while the latter manages with IC cards. Server types include Amazon gift cards, iTunes gift cards, or Google Play gift cards. People use them for limited purposes, such as online shopping and games. Below, we focus on the IC card type issued by transportation companies or supermarket chains because many Japanese use it to make small value point-of-sale purchases. Users of IC card-type electronic money charge their balance with cash or a transfer from a bank deposit before shopping at the merchants that accept payment with the IC card-type electronic money. Upon purchasing, the merchant deducts the shopping bill from the IC card-type electronic money balance. The merchant sends payment data to the electronic money settlement institution using the specialized terminal connected to a network. The payments result in interbank claims and liabilities to be computed by the electronic money settlement institutions, and the Zengin System and the BOJ will make a settlement to complete the payment by IC card-type electronic money. The merchant receives the sales amount minus the settlement fee in the merchant's bank account at a later date.

Mobile payments and code payments in the eighth row of Table 1.1 include mobile payments for credit cards, debit cards, or electronic money on smartphone apps and mobile payments using QR code payment apps on smartphones. The flow of transaction data and the settlement process for the payment made by the apps for

credit cards, debit cards, and electronic money on smartphones are the same as those of credit cards, debit cards, and electronic money, except that the merchants accept payment through the apps on the smartphone rather than plastic IC cards.

The transaction data flow for code payments has two methods: customer display and store display. In both methods, the customer follows the instructions of the code payments app, charges the payment amount to the app account in advance by account transfer or cash, or links with a credit card or a bank account.

In the case of the customer display method, when the customer shops at a merchant, the merchant reads the barcode on the customer's smartphone screen and sends the payment information to the settlement institution via CAFIS. The settlement institution transfers the payment amount from the customer's app account to the merchant's app account and notifies the customer that the payment service provider debited the account. The settlement institution clears the payment data made by the app and organizes it as an interbank credit and debit relationship. After interbank settlement by the Zengin System and the BOJ-Net, the sales amount minus the settlement fee is paid to the merchant several times a month.

The merchant display method does not involve a specialized terminal and network, as explained below. The customer's smartphone reads the barcode the merchant displays, and the customer enters the payment amount into the app. The payment information reaches the settlement institution via the mobile phone company's communication network without using a specialized network such as CAFIS. The payment service provider contacts the merchant's smartphone or tablet with payment information. The relationship between the payment service provider and the merchant after the information for the payment is shared is the same as the customer display method.

The unique feature of code payment is that people with the same app can send each other their loaded balance. Nonbanks can do this remittance service as a funds transfer service provider, and there is an upper limit to the app account balance and the amount of loaded balance transferred. The deposit insurance system does not cover the loaded balance in the apps because it is not a bank deposit. However, Article 43 of the Payment Services Act requires a funds transfer service provider to make security deposits to provide funds transfer services to the official depository to prepare for repayment if the funds transfer service provider is closed.

As shown in Table 1.1, cashless payment in Japan is a mechanism for facilitating payment by bank deposit. It requires settlement through the Zengin System and BOJ-Net, and code payments that accept many small-value payments are not the exception. Nonbank code payment operators expressed dissatisfaction with paying a fee each time they send money through the Zengin System, which they are not eligible to join. In response to their complaint, in April 2020, the Fair Trade Commission recommended a reduction in the Zengin System fee. The Zengin Net, which operates the Zengin System, reduced the fee in October 2021, and nonbank participation in the Zengin Net was also allowed from October 2022. In addition, five large city banks have provided a cheap person-to-person bank deposit transfer app (nicknamed Kotora) since October 11, 2022, and five banks invite nonbanks to

connect their apps to the service of Kotora so that they do not have to use the Zengin Net.

1.4 Academic Research on the Choice of Payment Method by Japanese Households⁷

Research on the choice of payment method by household belongs to Payment Economics (see Kahn and Roberds [2009] for a review). Lacker (2005) defined payment economics as the intersection of financial economics, banking, and industrial organization, which includes an analysis of the endogenous choice of payment method and the institutional design to make the payment method available. Below, we will review empirical studies on the choice of payment methods by Japanese households. See Fujiki (2022a) for a review of empirical analysis in other economies.

Analysis using aggregate data, such as Saito (2005), Nakata (2007), and Kitamura, Omori, and Nishida (2009), pointed out the substitutability between electronic money and banknotes and small-value coins. Despite the widespread use of electronic money, the currency in circulation did not decrease, so researchers tend to regard most cash demand as hoarding. Ohtani and Suzuki (2008) assumed that the demand for 1000 yen bills was only for transaction purposes, and the demand for 10,000 yen bills included both transaction and hoarding purposes. They assume that the growth rate of 10,000 yen bills held for transaction purposes is the same as that of 1000 yen bills in circulation plus 0.9% (the difference between the growth rates of 10,000 yen bills and 1000 yen bills from 1991 to 1994). By subtracting the estimated outstanding amount of 10,000 yen bills held for transaction purposes from the actual 10,000 yen bills outstanding, they estimated the hoarding demand for 10,000 yen bills, which was about 5 trillion yen in 1995 and 30 trillion yen in 2007. As shown in Fig. 1.6, which extends the results of Fujiki and Nakashima (2021) applying the method of Ohtani and Suzuki (2008), as of 2020, 54 trillion yen (45%) of the 118 trillion yen in cash circulation balance is for hoarding.

There are many reasons for this high level of cash hoarding: the prolonged period of low interest rates and low inflation rates since 1995 and the resulting low opportunity cost of hoarding cash; the need for precautionary savings in situations such as power outages due to disasters that render cashless payment methods unusable; the safety and lower probability of loss of cash by criminals in Japan compared with other countries; the low rate of counterfeit banknotes; the cleanliness of banknotes; and the demand for Japanese banknotes from overseas residents. However, to the author's knowledge, no statistics would allow for the decomposition of these reasons. Also, to the author's knowledge, no statistics show the cash holding

⁷This section is based on the third and fourth sections of Fujiki (2022a).

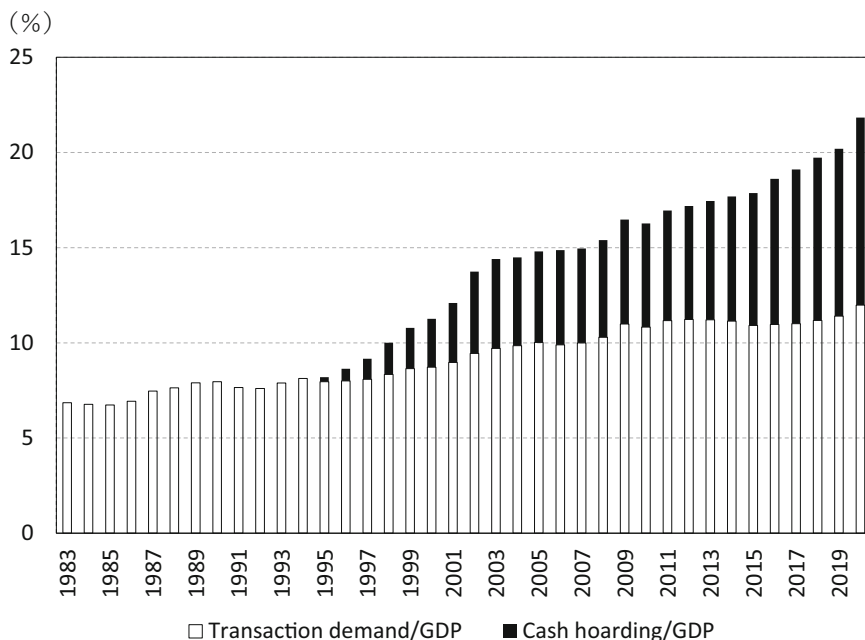


Fig. 1.6 Demand for cash for transaction and hoarding purposes. (Source: Cabinet Office, “System of National Accounts,” Bank of Japan, “Currency in Circulation”)

balance for business use by individual business owners (excluding checks). Among the above reasons, the experience of the United States, where the ratio of cash holdings to GDP has been rising since the global financial crisis, similar to Japan (see Fujiki (2022a) Figure 1), might provide some guidance for the impact of the prolonged period of low interest rates and low inflation rates, and the resulting low opportunity cost of hoarding cash. If the Federal Reserve Board continues to raise interest rates in response to rising inflation, it will be interesting to see how the cash holding changes in the United States.

Turning to an analysis using microdata, Kitamura, Omori, and Nishida (2009) used the 2007–2008 “Public Opinion Survey on Household Financial Behavior” individual data. It showed that respondents aged 25–49 with occupations tend to use electronic money for payment sizes of 5000 yen or less. Nakata (2015) used panel data of consumers and showed that respondents who frequently use electronic money tend to be older, have higher expenditures, go shopping more frequently, and can easily find stores where their electronic money is accepted.

Fujiki and Tanaka (2018) and Fujiki (2019, 2020a) compared the cash-holding balance of households that use cashless payments and households that only use cash from the “Public Opinion Survey on Household Financial Behavior” individual data. Specifically, Fujiki (2019) analyzed the choice of payment methods for daily and regular payments by households with two or more people using data from 2007 to 2017. It first analyzed the household’s choice of payment method using a

multinomial logit model and then estimated the cash demand function conditional on the choice of payment method for six groups, as explained below. It first divided the daily payment choices into three groups: people who use cash and credit cards, people who use cash and electronic money, and people who use cash only. It then divided the regular payment choices into two groups according to whether they use credit cards for regular payments. The combination of three groups for daily payments and two groups for regular payments resulted in six groups to be analyzed.

Regarding the demographic characteristics of people who use cashless payment frequently, for payment sizes over 5000 yen and up to 10,000 yen, over 10,000 yen and up to 50,000 yen, over 50,000 yen, people who use both cash and credit cards for daily payments and also use credit cards for regular payments tend to have higher incomes, higher gross financial asset balances, are younger, female, not self-employed, highly educated, live in large cities, and have accurate knowledge of the deposit insurance system compared to people who only use cash for daily payments and do not use credit cards for regular payments. The results using data on payment sizes 1000 yen or less, from over 1000 yen and up to 5000 yen, are similar.

Regarding the prediction of cash holdings by the cash demand function conditional on the choice of payment method by the six groups, the average cash holdings of people who use both cash and credit cards for daily payments and also use credit cards for regular payments were lower than the average cash holdings of people who only use cash for daily payments and do not use credit cards for regular payments irrespective of the payment sizes. The difference in average cash holdings between these two groups was statistically significantly different from zero; however, the absolute value of the difference was only 10,000–30,000 yen (in the case of payment size over 50,000 yen, a difference of 20,000 yen between 130,000 yen and 150,000 yen). To sum up, there is not much difference in the average cash holdings between people who use cashless payments and those who do not.

Using six million data points of expenditure data from the Macromill household panel survey from November 2018 to October 2019, Wakamori (2020) shows that the share of cash in the number of payments decreased from 60% to 50%, while the share of code payments increased from 0% to 7%. It also showed that similar to other countries, Japanese consumers prefer cash for low-value transactions and credit cards for high-value transactions; however, in Japan, payment by electronic money and IC card-type electronic money issued by transport companies are replacing cash payment for low-value transactions and code payments are gaining share regardless of the value of the transaction. Using Macromill household panel survey data from September 2019 to October 2020, Fujiwara (2021) reports that the share of cash payments fell from 50% to around 40% in terms of payment value and number of transactions.

Economists consider crypto assets such as Bitcoin unsuitable for daily payments due to their volatile prices. However, if crypto assets whose prices are pegged to legal tenders, such as central bank digital currencies, become popular, they could become one of the daily payment methods. Consumers who frequently use crypto assets may also use traditional cashless payment methods more often and cash less

often. Based on these considerations, the economists examined the demographics of crypto asset owners and their choice of payment methods. Fujiki (2020b) used the 2019 “Financial Literacy Survey” to show that crypto asset owners tend to be male and age below 30, use cashless payment methods, have high pre-tax income, hold a job in either the private sector, public service, or self-employment, and are likely to be graduate school graduates compared to crypto asset nonowners. It also finds that crypto asset owners tend to own at least one of the following three risky financial assets: stocks, bonds, or foreign currency-denominated financial products, and they also tend to have better financial knowledge. Among crypto asset owners, those who do not own risky financial assets such as stocks and investment trusts had lower financial knowledge than those who own such financial assets. Fujiki (2021) used data from the Financial RADAR (June 2020 survey) and showed that, on average, crypto asset owners tend to have better financial knowledge, use cashless payment methods more frequently, and have a higher probability of cash hoarding (identified by an affirmative response to questions about holding cash in safes) than crypto asset nonowners. Furthermore, crypto asset owners who do not own risky financial assets such as stocks and investment trusts tend to have lower financial knowledge and less possibility of cash hoarding than crypto asset owners and crypto asset nonowners who own such assets.

The BOJ has not issued a central bank digital currency, and there is no empirical analysis of its users. However, following Huynh et al. (2020), Fujiki (2023) estimates the extent to which a new payment method, interpreted as a central bank digital currency that combines the desirable characteristics of current cashless payment methods, would be used by Japanese consumers. First, using data from the 2019 “Financial Literacy Survey,” it estimated a rank-ordered logit model to predict the usage frequency rankings of five payment methods: cash, credit cards, electronic money, debit cards, and mobile payments. According to a counterfactual experiment assuming that a consumer can also choose a hypothetical payment method that allows mobile payments via smartphones that require a short checkout time as electronic money requires besides conventional payment methods, the probability of this hypothetical payment method being top-ranked was 70–80%, surpassing the probability of 66% where cash being top-ranked in the actual data. This result suggests that Japanese people might choose a central bank digital currency that allows mobile payments and quick checkout, if available, more frequently than cash.

Since 2020, studies on the impact of the spread of COVID-19 infection on the choice of payment methods have emerged. Konishi (2021) compared the cashless payment ratio measured by the number of transactions at convenience stores between January 2015 and February 2021 using data obtained from the software Zaim and found that the ratio increased from 22% in January 2015 to 53% in February 2021. Yoshizawa et al. (2021) used data on the BOJ’s receipts and payments of banknotes with financial institutions at the main office and branch offices from January 2020 to March 2021 to argue that the precautionary demand for cash increased due to public health considerations and self-restraint in outings. Fujiki (2022c) used the Financial RADAR (June 2020 survey) to show that those

who had been using cashless payments before the outbreak of COVID-19 and increased the use of cashless payments between the arrival of the first wave of COVID-19 in April–May 2020 and June 2020 tended to have higher financial asset balances and better financial knowledge. Those who replied that they would use cashless payments more after June 2020 also tended to have higher financial asset balances and better financial knowledge. Fujiwara (2022) reported that the cashless payment ratio increased with the spread of COVID-19 infections based on Macromill household panel survey data from November 2019 to January 2021. Sekine, Shoji, and Watanabe (2022) used JCB credit card transaction records at restaurants in Tokyo to find that the number of card users was higher by 9–12% in stores participating in the PRP than in nonparticipating stores, and the positive impact of the PRP on credit card use continued even after the PRP ended. During the first wave of COVID-19 infection in April–May 2020, about two-thirds of the positive impact of the PRP on credit card use disappeared, and consumers increased their use of credit cards even in nonparticipating stores.

1.5 Policy Issues for Promoting Cashless Payments

Recent policy issues for promoting cashless payments include personal information protection, efficient institutional arrangements to settle small value and frequent payments, and the role of funds transfer service providers considering the entry of nonbanks into funds transfer services. These policy issues include contrasting views on the future of Japan’s retail payment system (see Tomura (2023) for details). Some suggest improving the usability of bank deposits by revising the business scope regulations for banks, assuming that the current retail payment system based on bank deposits will prevail. Others advocate a radical overhaul of the current retail payment system using crypto assets issued by the private sector.⁸

From the household’s point of view, it is sufficient if a cheap and safe service with a short checkout time is available, regardless of who the funds transfer service provider is. However, Fujiki (2023) suggested that households may use multiple payment methods that offer the same attributes (e.g., mobile payments and a short checkout time) to benefit from multiple rewards programs. Also, if a single private payment method (e.g., electronic money issued by an SNS network) secures a monopolistic position, technological progress in payment methods may stop. If the coexistence of multiple payment methods is desirable, the construction of a common payment platform in the private sector or the introduction of central bank digital currency to facilitate the movement of funds between payment methods (e.g., users

⁸Historical segmentation of regulatory agency in Japan for payment service providers between banks (Financial Service Agency) and nonbanks (The Ministry of Economy, Trade, and Industry), which resulted in the coexistence of specialized networks for information transmission and terminals for each payment method might be the main source of expensive operating cost of providing small-value payment and settlement services. See Miyai (2020) for details.

cannot send PayPay balances to d-payment balances directly) would be a good policy goal.

If one takes the empirical results of Sect. 1.4 literally, it seems possible to propose a policy that spreads financial knowledge and helps promote cashless payments. However, the following three reservations are necessary for this policy proposal. First, the proxy variable of financial knowledge may not be precise. For example, Fujiki (2021, 2022c) did not control for the level of education in his regression analysis. Fujiki and Tanaka (2018) and Fujiki (2019, 2020a) measured financial knowledge by knowledge about the deposit insurance system. Second, most of the research above uses regional dummy variables to proxy the number of payment terminals or the location of merchants and thus cannot evaluate the effects from the supply side on cashless payment promotion. Thirdly, reverse causality is possible, such as wanting to use a credit card and deepening one's knowledge about credit cards. In this case, no matter how much financial education is promoted, unless consumers want to use credit cards, there will be no effect in promoting cashless payments. Related to this, it may be necessary to evaluate safety concerns, which many consumer surveys on payment methods point as barriers to using cashless payment methods. For example, it may be necessary to distinguish between general concerns about data leakage in an information society and concerns about credit card payments. It would be a good idea to test consumers' financial knowledge about the fact that the safety of credit card payments has improved by the efforts of the credit card industry and amendments to the Installment Sales Law.

Some people pointed out reducing the social cost of cash supply as an advantage of promoting cashless payments. For example, the ratio of the private cost of using cash to GDP is 0.12% in Germany (Cabinakova et al. 2019), 0.45% in Canada (Kosse et al. 2017), and 0.29% or 1.6 trillion yen in Japan.⁹ In the case of Japan, of the 1.6 trillion yen, 500 billion yen is the personnel cost of cash management, 412 billion yen is the cost of ATM equipment and installation, 146 billion yen is the operating cost of ATMs, 140 billion yen is the cost to ATM security companies, and 100 billion yen is the personnel cost of handling cash at the store. Most of these costs are fixed and will not become zero unless the demand for cash is almost zero. Can the social cost of cash supply be reduced by the spread of cashless payments, reducing the demand for cash to almost zero?

Fujiki (2022b) used the 2019 "Financial Literacy Survey" and predicted that the frequency of cash use would not decrease much even if cashless payments became widespread for two reasons. First, the frequency of cash use by people who currently make cashless payments and those who do not are once every 2.3 days and once every two days, respectively, which is not much different. Second, if all of the people who answered "yes" to the question "Are you satisfied with cash payments?" were to answer "no" to this question in a counterfactual experiment, the frequency of cash

⁹Nomura Research Institute "Heisei 29 Annual Industrial Economic Research Commissioned Project (Survey and Study on Environment Preparation for FinTech Dissemination in Our Country) Research Report". <https://dl.ndl.go.jp/pid/11222445/1/1> (Accessed July 20, 2023).

use would hardly decrease because there is not much difference in the frequency of cash use as mentioned in the first reason. These results suggest that promoting cashless payments alone may not reduce the social cost of cash supply, as pointed out by Kitamura (2018).

1.6 Conclusion

This chapter concludes by raising research issues for future studies on Japanese households' choice of payment method. Firstly, to make a welfare analysis on the coexistence of various payment methods, there should be data not only from households but also from the merchants, say, entry into and exit from the payment service providers. Such data exists in Canada, and Huynh et al. (2020) used it. Secondly, to understand the reason for the persistent demand for cash, it is necessary to estimate the transaction demand and hoarding demand for cash based on individual data.

1.7 Comment by Nakata Masao: Current Status and Prospects of Cashless Payments

1.7.1 *Outline of Fujiki's Paper*

Fujiki's paper first overviews the transition of payment method choice by Japanese households based on data such as the "Public Opinion Survey on Household Financial Behavior" (The Central Council for Financial Services Information) (Sect. 1.2), and then provides an institutional overview of the Japanese small payment system, which consists of multiple payment methods (Sect. 1.3). The paper then reviews empirical studies on households' choice of payment method (Sect. 1.4), presents the issues that should be considered in promoting the cashless payment system in Japan, and clarifies his views on each (Sect. 1.5).

The outlook of previous studies covers the latest topics of interest in this research field, including the impact of the spread of COVID-19 infection and the analysis of the potential of cryptocurrencies as a new payment method. In Sect. 1.4, Fujiki also introduces a number of his own empirical studies, all of which are based on individual data and conduct econometric analysis with as robust methods as possible. The estimation results are therefore highly reliable, and the policy implications are persuasive. In addition, Fujiki (2022d), on which this paper is based, extensively reviews previous empirical studies not only in Japan but also in other countries, and the paper is highly valuable as a perspective paper. In these respects, the contribution of Fujiki's paper is very significant.

In the following, I would like to comment on the results of Fujiki's empirical study introduced in Sect. 1.4 and on some of the policy issues presented in Sect. 1.5. The author was a discussant of the Fujiki paper at a conference held prior to the publication of this book, and many of the comments and questions raised by the author during the discussion have already been reflected in the final version of the paper published in this book. I would like to ask for your understanding on this point in advance.

1.7.2 “Preparedness for Natural Disasters” as a Reason Why Cash Holdings by Japanese Households Have Not Decreased

As shown in Figs. 1.2 and 1.3 of Fujiki's paper, the number of households that choose cash as their daily payment method has been on a declining trend, with a particularly large decrease in 2020, when the implementation of the Point Reward Project for Consumers Using Cashless Payments (PRP) and the spread of COVID-19 infection had an impact. On the other hand, according to Fujiki's empirical study presented in Sect. 1.4, there is no significant difference in cash holdings between those who use cashless payment and those who do not. This suggests that a non-negligible proportion of cash demand in Japan is for hoarding. Even if the transactions demand for cash is decreasing due to the progress of cashless transactions, the demand for hoarding may not be decreasing significantly.

In this regard, Nakata (2018b) points out that in the case of Japan, (1) interest rates remain ultra-low and there is little incentive to hold bonds and other assets, and (2) the risk of crime is small and there are few counterfeit bills in circulation, so cash is more readily preferred as a means of storing value than in other countries, and thus hoarding demand is expected to account for a substantial share of the total demand for cash. However, with regard to (1), low interest rates took hold globally in the 2010s. Nakata (2018b) shows that the “cash/nominal GDP” ratio increased not only in Japan but also in the United States and Australia when comparing 2010 and 2016, making it difficult to believe that the increase in hoarding demand for cash due to very low interest rates occurred only in Japan.

One of the factors contributing to the hoarding demand for cash unique to Japan may be “preparedness for natural disasters.”¹⁰ Natural disasters such as earthquakes and typhoons threaten the stability of the face-to-face payment infrastructure. First, in the case of cash payments, cash cannot be withdrawn from ATMs in the event of a power outage, and ATMs cannot be accessed if roads are cut off by fallen trees or landslides. However, once the road network is restored, mobile ATM vehicles can be dispatched or ATMs in unaffected areas can be accessed, and stability as a payment

¹⁰Nakata (2021) discusses how to ensure the stability of payment infrastructures in the event of a disaster when power and communication networks are expected to be disrupted.

infrastructure can be restored relatively quickly. In contrast, the damage that a natural disaster can cause to cashless payments is more serious. This is because cashless payments cannot function if the power and communication networks are interrupted. Once disrupted, it takes time for power and communication networks to recover. For example, in Chiba Prefecture, which was severely damaged by Typhoon No. 15 in 2019, it took about 16 days to restore electric power and about one month to restore wired Internet connection.¹¹ It would be possible to promote cashless payments more quickly if mobile power supply vehicles, mobile base station vehicles, and mobile ICT units could be dispatched and supplied to the affected areas, but at present such facilities are not yet widespread, and it is difficult to say that households and retailers have thoroughly secured backup power supplies.

Japan has experienced major earthquake disasters in the past decade or so, such as the Great East Japan Earthquake in 2011, the Kumamoto Earthquake in 2016, and the Hokkaido Iburi East Earthquake in 2018, and there are also concerns about the occurrence of the Tokyo Inland Earthquake and the Nankai Trough Earthquake in the future. In addition, due to the effects of climate change, in recent years, Japan has been hit by powerful typhoons such as Typhoon No. 18 in 2018 and Typhoon No. 15 and Typhoon No. 19 in 2019, causing significant damage such as flooding and house collapses. In Japan, where disaster risks are more likely to become apparent than in other countries, cash, which is a means of payment that is relatively more resistant to power outages and communication interruptions, is likely to be held as a storage motive.

1.7.3 The Essence of Consumers’ “Security Concerns” That Prevents Cashless Promotion

In his own empirical studies cited in the Fujiki’s paper, it was found that financial knowledge has a statistically significant effect on access to cashless payments. The author does not disagree with this result and believes that in addition to general financial knowledge, insufficient knowledge about the security aspects of cashless payments on the part of consumers is one of the reasons for the slow progress of the cashless payments in Japan.

In February 2022, the Consumer Affairs Agency conducted a survey of 1881 consumers on their attitudes toward cashless payments. When asked about negative aspects of cashless payment in this survey, the top response was “risk of leakage of personal information and unauthorized use” and the second was “risk of loss or theft

¹¹The source is the documents prepared by PwC Consulting LLC at the 2nd parent meeting of the study group for the FY2020 Cashless Payment Support Project in Local Communities (Cashless Payment Demonstration and Survey Project in Disasters) (held on September 24, 2020). The documents were created based on “Review of the Restoration of Power Outages due to Typhoon No. 15” (Tokyo Electric Power Company), “Service Impact due to Typhoon No. 15 Damage” (NTT East), and “Damage Situation related to Typhoon No. 15 in 2019” (Cabinet Office).

of cards,” indicating that many consumers are concerned about the security aspect of cashless payment.

However, the security of cashless payments is steadily improving.¹² First, since the enforcement of the revised Installment Sales Act in 2018, it has become mandatory to use IC cards and payment terminals for face-to-face transactions and the “non-retention” of card information by EC merchants in non-face-to-face transactions have been made mandatory. Second, the use of AI has improved the accuracy of fraud detection, and the multi-step authentication mechanism has become more sophisticated. Indeed, there have been several cases of fraudulent use and leakage of personal information related to cashless payments, and the amount of damage from fraudulent use itself has been increasing, but the ratio of the amount of damage from fraudulent use to the expanding scale of cashless payments is rather decreasing. In addition, even if a member becomes a victim of fraudulent use, the amount of damage will be compensated if the member is not at fault.

Among consumers who are concerned about the safety of cashless payment, some may continue to use cash without knowing the progress of anti-fraud measures for cashless payment. In this regard, we have already received a response from Mr. Fujiki during the discussion, and we agree with his view that “it is effective to include a separate question on the knowledge aspect in the survey in order to distinguish between lack of knowledge and intrinsic anxiety, which will allow for clarification through empirical analysis.”

1.7.4 Prospects for the Cashless Society in Japan: The Potential of the “Digital Yen”

Fujiki (2023) estimated the sequential order of the frequency of use of existing cashless payment instruments using an ordered logit model. Based on the results, Fujiki (2023) hypothesized a situation in which the “ideal cashless payment instrument” would appear and showed that the probability of its most frequent use would exceed that of cash. Here, the so-called CBDC (Central Bank Digital Currency) is in mind as the “ideal cashless payment method.”

At the time of writing this paper, it was reported that the Bank of Japan, in cooperation with private banks and other organizations, had begun to coordinate a demonstration experiment of deposits and withdrawals in bank accounts in the spring of 2023 to determine whether to issue “digital yen”.¹³ Similar demonstration experiments have already been conducted by the Federal Reserve Bank of New York and the European Central Bank. In Japan, it is expected to make a decision on

¹²Nakata (2022) discusses the current status and issues of countermeasures for fraud risk in cashless payment.

¹³“Digital Yen Demonstration with Three Mega Banks: BOJ Confirms Account Deposits and Withdrawals,” Nihon Keizai Shimbun(The Nikkei), November 23, 2022, morning edition, page 1.

whether or not to issue the “Digital Yen” after about two years of experiments. However, it will take time to amend related laws and to develop the system, so even if a decision is made to issue the “digital yen,” payments by banknotes and coins will probably be maintained for a considerable period. The issuance of the “Digital Yen” could be the trigger that accelerates Japan’s long-delayed shift to a cashless society, but there are several issues that need to be cleared before it can be realized.

The first is security measures. For example, in the case of credit card payments, efforts are being made to eliminate fraudulent use, mainly by private payment companies worldwide like VISA and Mastercard, but in reality it is difficult to reduce fraudulent use to zero. Therefore, the reliability of the payment service is ensured by establishing a customer compensation policy for damage caused by unauthorized use. In contrast, in the case of CBDC, which is a legal tender, the highest level of security measures is required to prevent any unauthorized use, including cyber-attacks, before it can be put into practical use.

The second is the management of personal information. In the case of private-sector cashless payment services, consumers consent to the recording of their personal information, such as purchase histories, by payment service providers, and register as members to use their payment services. The payment service provider also uses this personal information in return for granting rewards. In contrast, for CBDC, considering that anonymity was ensured for banknotes, it is necessary to design the system after obtaining broad agreement on the scope of recording and use of personal information.

The third is disaster response. As already mentioned, the risk of a large-scale disaster is much higher in Japan than in other countries. In order for CBDC to circulate as legal tender, it is necessary to establish an environment in which its functions will not be lost even if the power grid or communication network is interrupted. If this is difficult, leaving banknotes and coins in circulation (even after sufficient progress has been made toward a cashless society) may be an option.

Finally, the issuance of CBDCs will make it possible to replace many of the cashless payment services that have been provided by private payment providers charging fees with lower-cost or free CBDCs. This problem will be more serious in countries that have already gone cashless, but it will be necessary to study the impact on private cashless payment services in Japan as well.

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Chapter 2

Credit Economy and Payment Systems: Can a New Electronic Currency Replace Bank Deposits as a Means of Payment?



Hajime Tomura

Abstract The chapter discusses current payment systems in which the central bank issues currency and the banking system provides the means of credit transactions. The author theoretically examines the possibility of replacing this system with electronic monies, cryptocurrencies, or foreign digital currencies. Modern banking systems are equipped with efficient and demand-driven money supply mechanisms. He argues that the current banking-centered payment system is unlikely to be replaced by electronic monies, cryptocurrencies, or foreign digital currencies unless it becomes highly inefficient. This conclusion implies that it is important to make efforts to improve the usability of current payment systems, for example, by actively integrating nonbanking operators into banking systems. Such efforts are also progressing in the form of Banking as a Service (BaaS) and Embedded Finance, which integrates non-financial services with financial services. In his comment, “Future Vision on Credit Economy and Payment Systems,” Yasuo Maeda supports the conclusion of Tomura in general but points out additional problems of using cryptographic assets in payment systems, such as unstable value and difficulty in the provision of credit.

2.1 Introduction

Bank transfers have long since replaced coins and bills (“cash”) as the primary means of electronic payment. Salaries are a typical example of what was once paid in cash and is now paid by bank transfer. In addition, payments for taxes, utility bills, and various regular services are now generally made by direct debit from bank accounts. Credit and debit cards are also widely used in many countries as interfaces for bank transfer payments for purchasing goods and services in physical stores.

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In the twenty-first century, the widespread use of the Internet and smartphones has enabled people in many countries to connect to the Internet anytime, anywhere, allowing them to conduct online transactions of goods, services, and assets at any time. Credit cards have become one of the main payment methods for these online transactions. More recently, an alternative payment service to credit cards, called Buy Now Pay Later (BNPL), has emerged as a post-payment method. However, in Europe and the United States, consumers pay their bills from BNPL operators primarily with debit cards, so the final payment is still made by bank transfer.¹ In Japan, settlement by credit card and bank transfer such as direct debit is now on par with cash settlement (Table 2.1).

In this current situation, society is concerned about the evolution of future payment methods in response to the further expansion of online transactions. One answer to this question is to facilitate the connection between the computer systems of nonbank businesses, where commercial and asset transactions take place, and banks' computer systems that register bank deposit accounts, so that commercial and asset transactions can be settled seamlessly via bank transfers (Fig. 2.1). This vision can be found in the concept of "Banking as a Service (BaaS)," in which various banking services, such as account reconciliation, deposits, and loans, are attached separately to nonbank consumer services, and "Embedded Finance," in which nonfinancial services are integrated with financial services. One example of domestic developments in Japan in line with this vision is the 2017 revision of the Banking Act, which imposed on each bank the obligation to make efforts to open up

Table 2.1 Cashless ratio of consumer payments in Japan (% , 2018)

Credit card	31.4
Direct debit*	10.5
Prepaid money	5.0
Internet banking*	1.4
Remittance by cash card*	0.9
Debit card	0.8
Fintech services	0.7
Salary deductions*	0.2
Cryptocurrency	0.1
Other noncash items	0.8
Cash	48.2

Source: Nippon Institute for Research Advancement (2018)

Note: Figures in the table are calculated by multiplying the percentage of the number of persons per payment method for purchases by item category obtained from the Nippon Institute for Research Advancement's Internet survey by the amount paid by item category per household obtained from the National Survey of Family Income and Expenditure. The number for cash is 100 minus the sum of the other terms. "*" denotes items that can be classified as account-to-account payments

¹Taniguchi (2021).

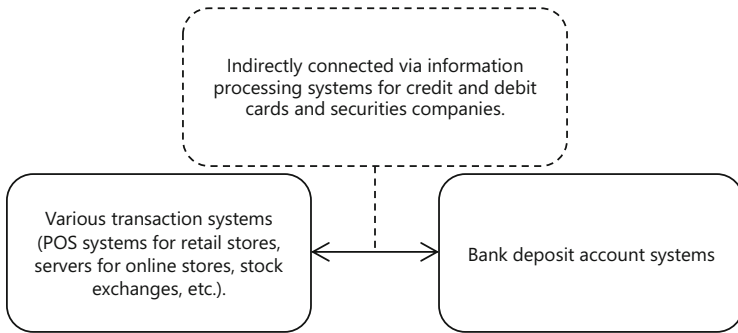


Fig. 2.1 Separation and connection of nonbank systems and bank deposit account systems at present

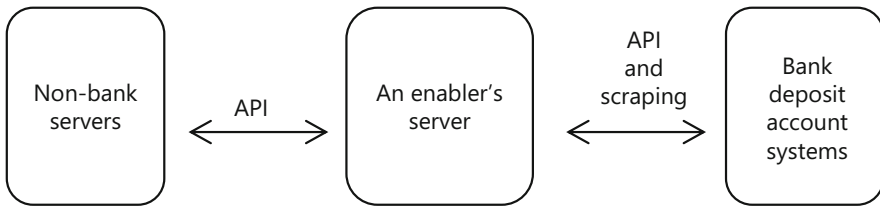


Fig. 2.2 Intermediation of connections between nonbank systems and bank deposit account systems by “enablers”. (Notes: API is an abbreviation for “Application Programming Interface” that enables communication with external software. Scraping refers to taking custody of a depositor’s Internet banking ID and password, using them to access the Internet banking site on behalf of the depositor, and sending account inquiries and bank remittance instructions to the bank)

application programming interfaces (APIs) for communication between the bank’s deposit account system and external software (a regulation called “Open API”). In addition, five large banks recently established Kotora Co., Ltd. as a joint subsidiary and began operating a wholesale payment system for smartphone applications in the fall of 2022.

Meanwhile, information processing system operators called “enablers” have emerged overseas. They relay between bank deposit account systems and nonbank systems (Fig. 2.2). A recent example that has attracted attention in the United States is Plaid, which connects smartphone financial services applications and the user’s bank account. Marqeta also offers a card issuing system connected to credit card networks, such as Visa and Mastercard, and banks as a cloud service for nonbank businesses that wish to issue credit and debit cards in their own name.² From the nonbanks’ perspective, these enablers’ intermediary services allow nonbanks to

²Forbes JAPAN Editorial Board (2021).

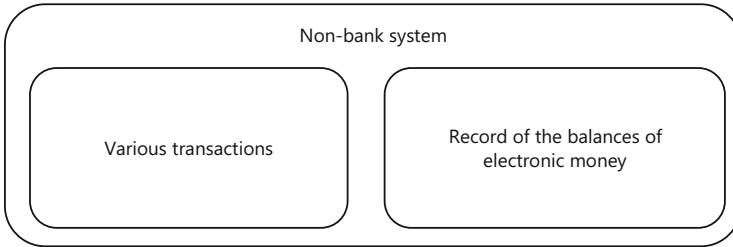


Fig. 2.3 Integration of payment systems and various transaction systems by electronic money

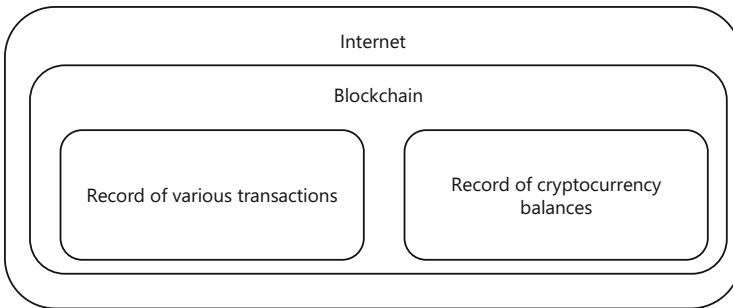


Fig. 2.4 Integration of payment systems and various transaction systems with cryptocurrency

connect to multiple banks only by meeting the enabler's system specifications, without having to deal with different system specifications across banks.

Another vision has also emerged of creating a new electronic currency to replace bank deposits and integrating the new system with various systems for business transactions. One such system is electronic money. To eliminate the inconvenience caused by the separation of nonbank systems and bank deposit account systems, as shown in Fig. 2.1, nonbanks can issue electronic monies in exchange for cash and bank deposit balances and allow consumers to use the electronic monies to pay for goods and services sold on their systems (Fig. 2.3). Furthermore, since e-commerce platforms such as Amazon and Rakuten sell various products within the same operator's system, if platform operators can make their electronic monies circulate within their platforms, they can create digital economies tied by their electronic monies.

Cryptocurrency is also a vision of a new electronic currency, represented by Bitcoin and Ethereum. If various online transactions and cryptocurrency balances are recorded in a blockchain on the Internet, it will be possible to settle those transactions with cryptocurrency balances within the blockchain (Fig. 2.4). In this case, each consumer and producer will be able to seamlessly perform various transactions and their settlements by connecting directly to the Internet without intermediaries, such as banks. This vision takes advantage of the characteristics of blockchain technology, which can build a database open for public access on the

Internet while maintaining a high level of security. In addition, since cryptocurrency balances will be circulated among blockchain participants in this vision, a digital economy will be created using cryptocurrency, similar to the aforementioned vision of electronic money.³

Both the concepts of electronic money and cryptocurrency described above envision an autonomous ecosystem of financial services that facilitate the circulation of electronic currencies, replacing the existing payment system centered on bank deposits.⁴ In the following sections, this chapter first explains how these visions of alternative electronic currencies are consistent with standard explanations of money circulation in economics. Then, the advantages and disadvantages of alternative electronic currencies and bank deposits will be compared from a payment system perspective. Finally, this chapter will conclude with a discussion of future directions for payment system innovation.

2.2 Consistency of Standard Monetary and Banking Theory with the Visions of Alternative Electronic Currencies

The standard economic theory for money circulation can be summarized as follows. In the economy, many people supply a wide variety of goods and services, but barter is rarely established because people rarely demand each other's products. However, if each seller sells goods and services in exchange for money, the seller who receives money becomes the next buyer, and money is paid to the next seller, thus making it possible for many people to exchange various goods and services via money even if barter between two parties is not possible. Thus, if each person thinks that "because I will be able to buy the goods and services I want with money, I will exchange my products for money too," money will circulate as shown in Fig. 2.5.⁵

The vision of alternative electronic currencies described in the previous section is consistent with this theory of money circulation. Since this theory is valid without identifying the issuer of money, not only existing legal currencies issued by central banks, but also alternative electronic currencies such as electronic monies and cryptocurrencies can circulate as shown in Fig. 2.5, if people collectively believe their circulation.

³If a stablecoin, i.e., a cryptocurrency backed by assets denominated in legal currencies, is issued by a private entity as a means of payment for its own services, it will be classified as an electronic money in this chapter.

⁴Because the core of the cryptocurrency concept aims to create a decentralized financial system without centralized administrators such as governments or central banks, cryptocurrency proponents are more oriented toward replacing the entire existing financial system than are electronic money issuers.

⁵A more detailed nontechnical explanation of this theory is available in Maruyama and NHK's "Desire for Capitalism" production team (2020).

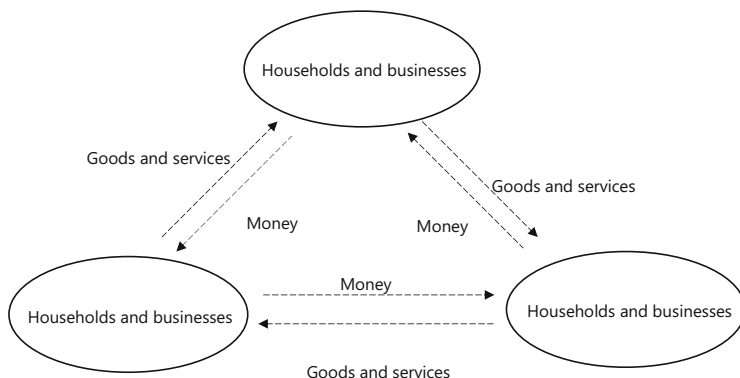


Fig. 2.5 Standard monetary theory

If an alternative electronic currency circulates in the economy as shown in Fig. 2.5, those who do not have enough currency balances on hand will need to borrow currency balances from those who have a surplus. Standard economics textbooks usually explain that a financial intermediary such as a bank intermediates the lending and borrowing of currency, taking deposits of currency from depositors and lending the deposited currency to borrowers. Following this standard definition of banks in economics, let us add banks to elaborate money circulation shown in Fig. 2.5. The result is shown in Fig. 2.6.⁶ Even though the actual form of financial intermediation for alternative electronic currencies has not yet been realized, it will likely look like Fig. 2.6 because the vision of alternative electronic currencies is consistent with the standard economic theory of money circulation shown in Fig. 2.5.

2.3 Overview of the Current Banking System

Banks depicted in Fig. 2.6 lend out deposited currency. This feature of banks, however, differs from how the current banking system works. Yokoyama (1977), Yoshida (2002), Ikee (2010), McLeay et al. (2014), and Fujiki (2022) have already discussed this point in detail. Nevertheless, in preparation for the discussion later in this chapter, a brief overview of the current banking system is provided below.

In the current banking system, commercial banks lend their deposit balances to borrowers when they extend bank loans (Fig. 2.7). Because deposit balances are liabilities owed by commercial banks, bank lending is a debt exchange between a borrower and a commercial bank. Then, when the borrower uses the borrowed

⁶Although omitted in Fig. 2.5, standard economics textbooks often explain that banks lend out only part of the deposited currency and hold the remainder as reserves against deposit liabilities. Standard economics textbooks call this process “money creation.”

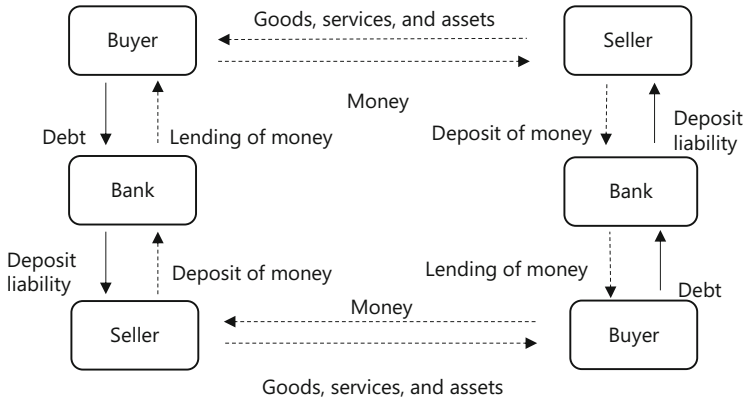


Fig. 2.6 Financial intermediation by banks in standard banking theory. (Notes: Dotted lines indicate flows; solid lines indicate receivables and payables after flow transactions)

deposit balance to pay a third party for the purchase of goods or services, the borrower’s commercial bank settles the bank transfer by transferring an equivalent amount of its cash balance on deposit at the central bank (hereafter referred to as “bank reserves”) to the commercial bank holding the third party’s deposit account.⁷ So how do commercial banks obtain bank reserves? There are two ways for the central bank to provide bank reserves to financial institutions: (1) the central bank lends bank reserves to financial institutions on a short-term basis in exchange for safe and liquid monetary claims (such as government bonds) as collateral, or (2) the central bank purchases the same type of monetary claims from financial institutions and pays bank reserves in exchange. Figure 2.7 depicts the former case.

By the way, the buyer in Fig. 2.7 could pay cash to the seller, or the seller receiving the bank transfer could withdraw cash from his or her bank. To prepare for such a case, each commercial bank could withdraw a portion of its bank reserves in cash from the central bank in advance and disburse the cash to depositors through its branches and automated teller machines (ATMs). Thus, in the current banking system, bank reserves are first issued to commercial banks in exchange for monetary claims, and commercial banks convert bank reserves into cash as needed. Even though the contractual definition of bank reserves is “the balances of cash deposited with the central bank,” actual bank reserves are first issued to commercial banks in exchange for monetary claims, not cash.

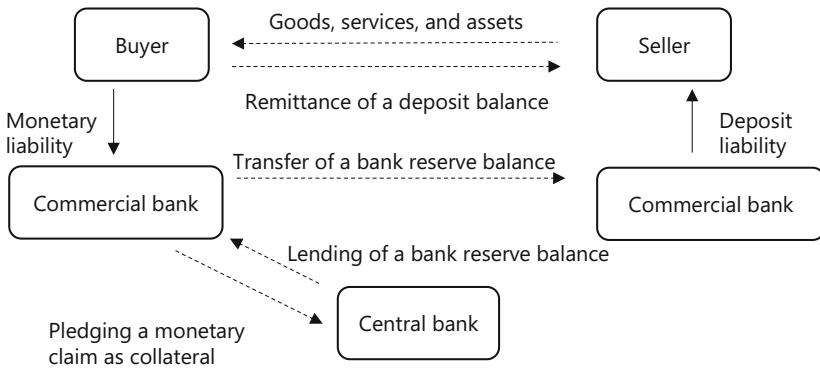
When a commercial bank borrows bank reserves from the central bank to settle bank transfers between depositors, the repayment of bank reserves to the central bank must be financed by borrowing from other banks. However, when a commercial bank is short of bank reserves because it sends more bank transfers to other banks than it receives from other banks, there is always a commercial bank that

⁷If the payee’s account is also at the remitting bank, only transfers of deposit balances within the same bank are recorded. In this case, the payment of bank reserves to another bank is not necessary.

i. Debt exchanges in bank lending



ii. Settlement of transactions by bank transfer and interbank settlement of bank transfers



iii. Interbank call loans and the repayment of borrowed bank reserves

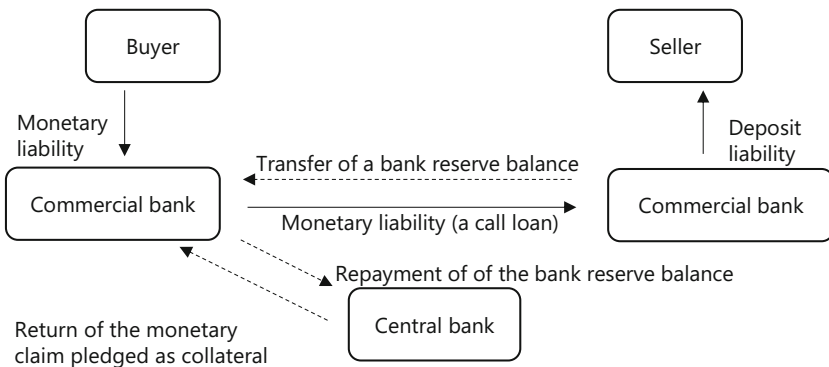


Fig. 2.7 How the current banking system works. (i) Debt exchanges in bank lending. (ii) Settlement of transactions by bank transfer and interbank settlement of bank transfers. (iii) Interbank call loans and the repayment of borrowed bank reserves. (Notes: Dotted lines indicate flows; solid lines indicate receivables and payables after flow transactions)

receives more bank transfers from other banks than it sends to other banks. Thus, if there is a commercial bank that wants to borrow bank reserves to settle interbank remittances, there will always be a commercial bank that can lend enough bank reserves to meet the need. As shown in panel iii of Fig. 2.7, the lending and borrowing of bank reserves among commercial banks completes the intermediation of credit from sellers (depositors) to buyers (borrowers) through the interbank network.

Borrowing Ikeo's (2010) expression, the above banking function can be summarized as "the function of lending funds in advance, in anticipation of the formation of savings." This function of commercial banks is the money creation in reality. As shown in Fig. 2.7, commercial banks can perform this function because they can issue bank deposits, which are their own debts, as a means of payment and exchange them for the debts of borrowers. Nonbank financial institutions such as MMFs, which issue financial assets with a guarantee of principal similar to bank deposits, cannot perform this function. Thus, money creation through debt exchanges is a function unique to commercial banks.⁸

2.4 Efficiency of the Current Banking System

Now, which is more efficient, a banking system in which banks lend money prior to accepting deposits, as in Fig. 2.7, or a banking system in which banks accept deposits of currency and then lend them, as in Fig. 2.6? As discussed in the previous section, the banking system in Fig. 2.6 can be seen as an extended version of alternative electronic currencies such as electronic monies and cryptocurrencies, so the comparison between Figs. 2.6 and 2.7 can be seen as a comparison of the current banking system and a payment system where an alternative electronic currency circulates.

The problem with the banking system shown in Fig. 2.6 is that bank lending is constrained by the amount of existing deposits. As a result, even if demand for borrowing from currency-starved households and firms increases, the amount of currency available for bank lending does not increase; instead, interest rates on bank lending must rise. Thus, the fluctuations in bank lending rates increase. In addition, as a result of each bank's lending limit being constrained by the existing volume of deposits, lending competition among banks is suppressed, and the oligopoly in the

⁸Looking back at the financial history of England, which was the center of the financial market in the early modern period, the explanation of money creation in standard economics textbooks is applicable to the period when goldsmiths issued certificates of deposit or banks issued convertible banknotes under the gold standard. Later, as discussed below, the laws of each country gave central bank notes the status of legal tender, establishing a system that allowed central bank notes to be issued and bank loans to be made without being tied to gold reserves. The banking system thus evolved into its current form, as described in this chapter. For more on the financial history of England, see Quinn (2004).

banking industry is strengthened. Therefore, the gap between bank lending rates and bank deposit rates is likely to widen. Since the widening of the interest rate spread on deposits and loans reflects a bottleneck in the circulation of currency through banks, real economic activity will contract to a corresponding degree.

Such a problem would be solved if the currency issuer could lend currency to banks with insufficient deposits. But this would require a mechanism to prevent banks from running away from their debts after borrowing currency. In the current financial system, the main measure to prevent borrowers from running away from their debts is to require borrowers to submit collateral. However, in the banking system shown in Fig. 2.6, banks can lend only after receiving deposits of currency; thus bank lending has not yet taken place at the time banks want to borrow currency from the currency issuer. Therefore, banks cannot use claims against new borrowers as collateral for borrowing currency from the currency issuer. As a result, the total amount of collateral may be insufficient for the currency issuer to meet the demand for currency loans from banks.

In contrast, in the current banking system in which commercial banks lend their deposit balances prior to accepting deposits, as shown in Fig. 2.7, commercial banks can lend their deposit balances on demand from borrowers without being constrained by existing deposit volumes. As a result, the current banking system illustrated in Fig. 2.7 stimulates the real economy more than the banking system in Fig. 2.6 because it promotes lending competition among commercial banks and reduces fluctuations in bank lending rates and the interest rate spread on deposits and loans. On this point, readers may note that the banking system in Fig. 2.7 still requires bank reserves for interbank settlement of deposit transfers between depositors. However, because bank lending takes place before the interbank settlement of deposit transfers, commercial banks can raise bank reserves from the central bank submitting their lending claims as collateral. Thus, the banking system in Fig. 2.7 makes it less likely that banks will run short of collateral than the banking system in Fig. 2.6.⁹

For these reasons, the banking system in Fig. 2.7 is more efficient than the banking system in Fig. 2.6. By the way, while the concept of cryptocurrency is oriented toward building a financial system that does not require intermediation by financial institutions, the amount of currency held by lenders remains a constraint on lending even if currency lending and borrowing take place directly without the need for financial intermediaries in Fig. 2.6.

⁹In reality, the central bank accepts as collateral only safe claims that are highly liquid and have low credit risk, such as government bonds, among monetary claims held by commercial banks. Nevertheless, theoretically, if commercial banks alternate between borrowing bank reserves from the central bank as in panel ii of Fig. 2.7 and returning bank reserves through interbank call loans as in panel iii, they can settle any amount of bank transfers with an arbitrarily small amount of safe claims that they can submit as collateral to the central bank. The reason for this is that interbank call loans in panel iii can be unsecured transactions in normal times. The availability of unsecured interbank call loans is evidenced by the fact that the Federal Funds Rate, the policy rate of the Federal Reserve System, is defined as the unsecured overnight interbank call rate.

2.5 Theoretical Analysis of the Functioning of the Current Banking System in a Credit Economy

Even if the banking system shown in Fig. 2.7 is efficient for the reasons discussed above, the question still remains as to whether an alternative electronic currency system, such as a cryptocurrency or electronic money, can replace the current banking system by simply replicating its key features. To answer this question, this section first explains theoretically how the current banking system with nominal currency can prevent a moral hazard problem in an economy involving credit transactions, such as trade credit and deferred payments. The next section then examines whether alternative electronic currencies can fulfill the function of nominal currency in the current banking system. The following part of this section is based on the results of Tomura's (2021) theoretical analysis.

2.5.1 *Simplest Credit Economy*

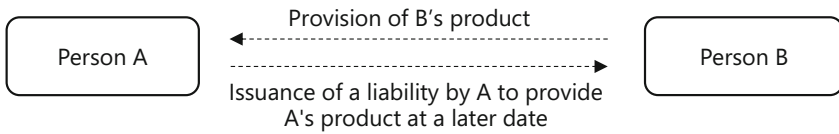
As the simplest credit economy, consider the case where barter between two parties takes place at different points in time. As shown in Fig. 2.8, suppose there are two parties, Persons A and B. Person A demands goods and services provided by Person B, and then Person B demands goods and services provided by Person A. As an allegorical example, this can be interpreted as a case where A is a woolen fabric manufacturer and B is a woolen yarn supplier, and the supplier demands the manufacturer's woolen fabric, or A is a landowner and B is a small farmer, and the landowner demands the small farmer's labor to grow his or her crops, and the small farmer demands a portion of harvested crops.

In the credit transaction shown in Fig. 2.8, once A provides B with the promised goods, that is the end of the story. Even if A tries to ignore his or her liability to B, if a court has the ability to enforce the contract between A and B, B can force A to perform his or her liability by suing A in court for default. Thus, there would be no incentive for A to default.

However, it is unrealistic to assume that a court can fully enforce a contract of any description. In the following, I assume that a court can identify the type of product that A provided to B, but not the quality of the product.¹⁰ For example, a court can identify whether A provided B with an "apple" but cannot identify whether that apple has the level of good taste that A and B agreed upon in their contract in advance. Under this assumption, if A and B enter into a contract for a credit transaction, as in panel i of Fig. 2.8, and then A provides B with an inferior product in order to save the production cost, a court cannot find A in breach of contract. When this moral hazard problem occurs, the credit transaction between A and B will

¹⁰In economic terms, this assumption can be stated as "the quality of A's product is nonverifiable."

i. Credit purchase of goods and services



ii. Fulfillment of A's liability to B by the provision of goods and services



Fig. 2.8 Example of a credit transaction. (i) Credit purchase of goods and services. (ii) Fulfillment of A's liability to B by the provision of goods and services

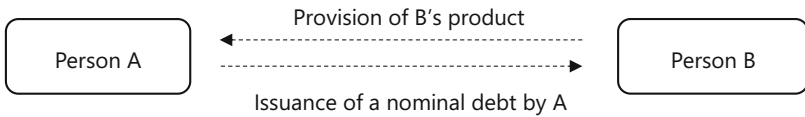
cease to exist except in the case where B provides A with a product of a quality commensurate with B's expectation of receiving the most inferior product that A can provide to B.

2.5.2 *Role of a Nominal Currency as a Means of Debt Repayment to Remedy a Court's Imperfect Ability to Enforce Contracts*

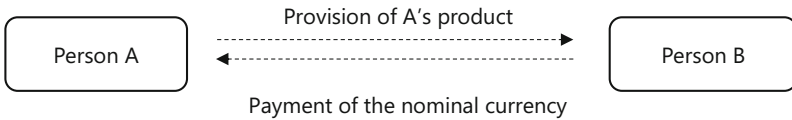
The problem caused by A's moral hazard can be solved by introducing a nominal currency (i.e., an inconvertible currency in which only the face value is indicated numerically, like banknotes). To illustrate this, let us consider a series of transactions as shown in Fig. 2.9. First, suppose that A purchases B's product with a promise to pay a certain amount of the nominal currency at a later date. Then, in order to fulfill his or her nominal debt to B, A must sell his or her product in the spot market for goods and services to obtain the amount of the nominal currency equal to the face value of his or her debt. Finally, A must fulfill his or her nominal debt by paying B the nominal currency he or she acquired in the spot market. For now, we assume that B has a sufficiently large amount of the nominal currency in advance and can purchase A's product with the nominal currency. This assumption will be relaxed later. We also assume that the spot market for goods and services is competitive so that A and B take as given the nominal price of A's product.¹¹

¹¹To justify this assumption, consider an economy in which there are countless pairs like A and B, and thus numerous sellers and buyers participating in the spot market for goods and services.

- i. Purchase of goods and services through issuance of a nominal debt



- ii. Sale of goods and services in the spot market



- iii. Fulfillment of the nominal debt

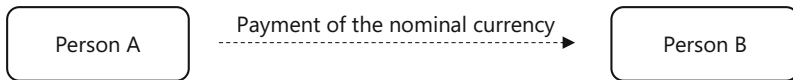


Fig. 2.9 Credit transaction with a nominal debt as a solution to the moral hazard problem. (i) Purchase of goods and services through issuance of a nominal debt. (ii) Sale of goods and services in the spot market. (iii) Fulfillment of the nominal debt

For now, assume that A is willing to fulfill his or her nominal debt as promised to B. Also suppose that in panel i of Fig. 2.9, the face value of A's nominal debt is set to the nominal market price (i.e., the price expressed in the unit of a nominal currency) for the quality of A's product that B wants to obtain in return for providing A with B's product. In this case, unless A sells a product of the quality expected by B, A cannot obtain a sufficient amount of the nominal currency in the spot market to fulfill his or her nominal debt to B. Therefore, A has an incentive to supply in the spot market a product of the quality expected by B. Thus, in the series of transactions in Fig. 2.9, the nominal currency functions like a proof that the buyer in a credit transaction (i.e., A) has supplied to the market a product of the quality expected by the seller in a credit transaction (i.e., B).¹² In the credit transaction in Fig. 2.8, this certification had to be made by a court itself. In Fig. 2.9, instead of a court, market participants in the spot market determine the quality of each product sold in the market and pay an amount of the nominal currency corresponding to the quality.

¹²If nominal market prices in the spot market for goods and services are unstable, it will be difficult to predict nominal prices for the qualities of products that sellers in credit transactions (i.e., B in Fig. 2.9) expect in return for providing their products to their buyers (i.e., A in Fig. 2.9). In this case, it will be difficult to set a reasonable amount of nominal debt for a credit transaction such as the one shown in Fig. 2.9. Thus, the stability of nominal price level is a crucial condition for a nominal currency to function as described here.

This use of a spot market and a nominal currency allows B to avoid the moral hazard problem caused by a court's imperfect ability to enforce contracts.

The question remains as to whether A would have an incentive to fulfill his or her nominal debt to B in panel iii of Fig. 2.9. Let us assume that there are many pairs like A and B in the economy and that a competitive spot market is open by market participants other than A and B even after the maturity of A's nominal debt. Under this assumption, consider the case in which A chooses to default on his or her nominal debt without selling a product to obtain a sufficient amount of the nominal currency in panel ii of Fig. 2.9. First of all, a court will be able to recognize the value of the nominal currency paid by A to B in this case because, unlike the quality of goods and services, the face value of a nominal currency is merely a number. Thus, a court will be able to determine whether A has fulfilled his or her nominal debt.¹³ Therefore, if B sues A in court, the court can determine A's default on the nominal debt, seize A's properties, and sell them on the spot market to convert them into the nominal currency. In this case, under the assumption that the spot market is competitive, the court can sell A's properties at competitive nominal market prices as a result of arbitrage by buyers, despite that the court does not have prior knowledge of the quality of A's properties. This assumption is consistent with the fact that in an actual bankruptcy proceeding, a court cashes in a bankrupt's properties by auction and distributes the proceeds to creditors. Overall, if A chooses to default on his or her nominal debt, a court will either sell A's properties on the spot market and enforce A's nominal debt to B, or it will sell all of A's properties.¹⁴ In either case, A gains nothing. So A has no incentive to choose to default on his or her nominal debt.

The above results are consistent with the reality that existing nominal currencies, such as banknotes issued by each country's central bank, are used not only as a means of payment for the purchase of goods and services, but also as a means of debt repayment in each country. Thus, the theoretical analysis described in this chapter demonstrates that this duality of a nominal currency is a necessary consequence of a court's imperfect ability to enforce contracts.

2.5.3 Role of the Central Bank as an Elastic Supplier of a Nominal Currency in a Credit Economy

In the credit transaction in Fig. 2.9, it has been assumed that B holds a sufficiently large amount of the nominal currency in advance. But where can B obtain the

¹³In practice, if A obtains a receipt from B or a bank makes a nominal currency payment to B by bank transfer on A's behalf, A will be able to submit the receipt or the bank transfer record to a court as evidence that A has fulfilled his or her nominal debt to B.

¹⁴If A can hide some of his properties, then a borrowing constraint will arise ex ante. In this chapter, such an additional moral hazard problem is omitted to explain the role of a nominal currency for credit transactions in a simple setting.

nominal currency? This question can be resolved if a central bank is introduced as the issuer of the nominal currency and B can obtain from the central bank an amount of the nominal currency equal to the face value of B's nominal claim against A, as shown in Fig. 2.10.¹⁵ This will clarify the starting and ending points of the circulation of the nominal currency resulting from credit transactions.

This assumption about the central bank in Fig. 2.10 is consistent with the fact that historically the central bank has been supplying a nominal currency by discounting nominal claims in each country. This historical function of the central bank is often referred to as an "elastic supply of currency." For example, the official name of the U.S. Federal Reserve Act of 1913 is as follows:

An Act to provide for the establishment of Federal reserve banks, to furnish an elastic currency, to afford means of rediscounting commercial paper, to establish a more effective supervision of banking in the United States, and for other purposes.

A reference to an elastic supply of currency ("to furnish an elastic currency") can be found in the name of the act.

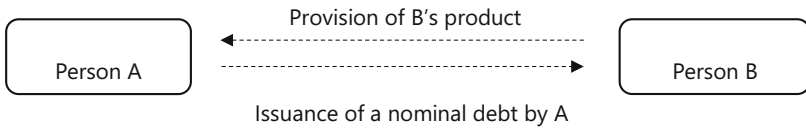
Why is the supply of the nominal currency like the one illustrated in Fig. 2.10 called an "elastic supply of currency"? This is because the nominal currency supply passively accommodates the demand for the nominal currency from households and firms that lack the nominal currency on hand. If the nominal currency supply from the central bank is too small, it will be difficult for buyers in credit transactions (i.e., A in Fig. 2.10) to fully repay their nominal debts. In anticipation of this, credit transactions will shrink ex ante. Therefore, it is optimal for the central bank to passively adjust the nominal currency supply in response to the nominal currency demand.¹⁶ This is consistent with commentaries on standard central bank practices by those with practical experience in central banking.¹⁷

¹⁵As already noted, a court is assumed to have the ability to enforce a debt denominated in the nominal currency. Thus, the assumption about the imperfection of a court's ability to enforce contracts is consistent with the assumption that B can borrow the nominal currency from the central bank.

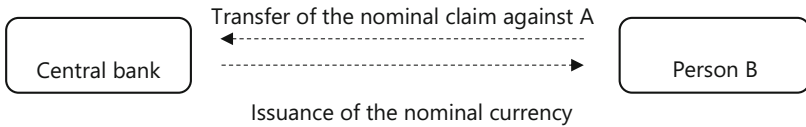
¹⁶Related to this point, Freeman (1996b) analyzes the role of elastic money supply by the central bank in a theoretical model based on standard monetary theory in economics. His model derives the need for a central bank by introducing the assumption that the timing of transactions in the goods market precedes the timing of debt repayment. However, because it is based on the standard monetary theory in economics illustrated in Fig. 2.5, it is not possible to replicate the current banking system by extending the model as described in Sects. 2.5.4 and 2.5.5.

¹⁷See Shirakawa (2008, Chap. 8) and Okina (2013, Chap. 4) for an overview of the operations in practice to adjust the supply of bank reserves in Japan.

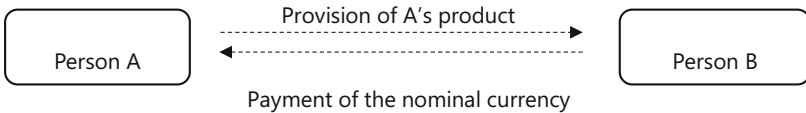
i. Purchase of goods and services through issuance of a nominal debt



ii. Discounting of the nominal claim by the central bank



iii. Sale of goods and services in the spot market



iv. Fulfillment of the nominal debt

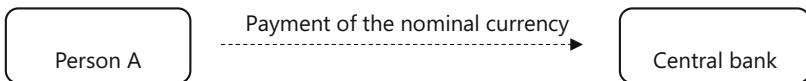


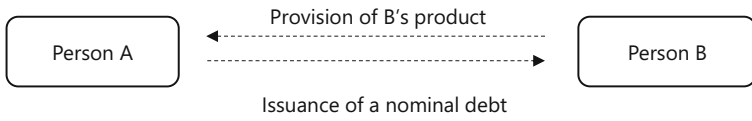
Fig. 2.10 Role of the central bank in a credit transaction with a nominal debt. (i) Purchase of goods and services through issuance of a nominal debt. (ii) Discounting of the nominal claim by the central bank. (iii) Sale of goods and services in the spot market. (iv) Fulfillment of the nominal debt

2.5.4 Role of Commercial Banks as Agents of the Central Bank in a Credit Economy

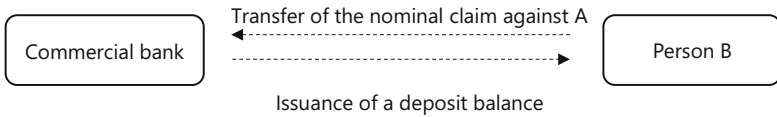
Figure 2.10 assumes that the central bank can transact directly with households and firms. However, current central banks do not have sufficient managerial resources to deal with a large number of households and firms. If commercial banks are introduced as intermediaries for transactions between households and firms and the central bank, a two-tier structure of a central bank and commercial banks, similar to the current banking system, will emerge, as shown in Fig. 2.11.

The transactions between commercial banks and households and firms in panel ii of Fig. 2.11 correspond to bill discounting in the real economy. In addition, the

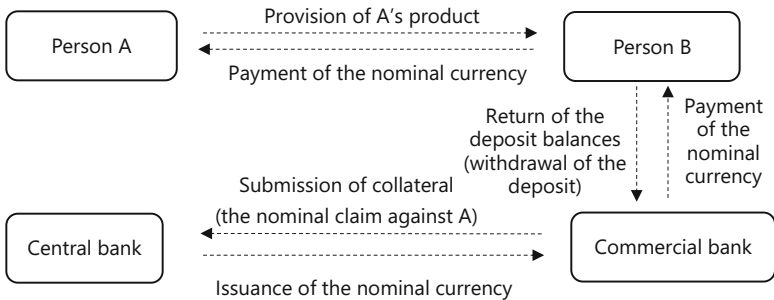
i. Purchase of goods and services through issuance of a nominal debt



ii. Discounting of nominal claims by a commercial bank



iii. Sale of goods and services in the spot market



iv. Fulfillment of the nominal debt and return of the nominal currency to the central bank

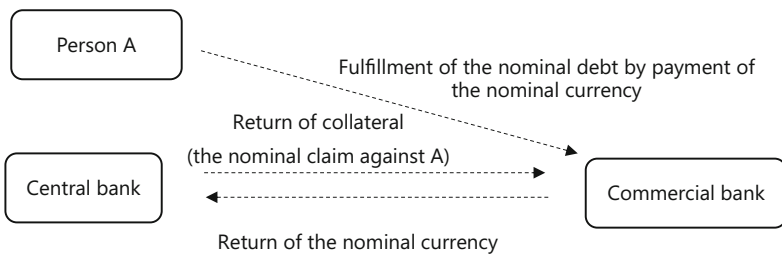


Fig. 2.11 Role of a commercial bank in a credit transaction with a nominal debt. (i) Purchase of goods and services through issuance of a nominal debt. (ii) Discounting of nominal claims by a commercial bank. (iii) Sale of goods and services in the spot market. (iv) Fulfillment of the nominal debt and return of the nominal currency to the central bank

lending of the nominal currency by the central bank in panel iii can be interpreted as the rediscounting of bills held by commercial banks.¹⁸

2.5.5 Replication of the Current Banking System

Furthermore, if bank lending by a commercial bank takes place before panel i in Fig. 2.11, the resulting banking system replicates the characteristics of the current banking system in each country, as shown in Fig. 2.12.

Why should bank lending precede the transaction in the spot market for goods and services in panel i of Fig. 2.12? Tomura (2019) provides an explanation. Assume that idiosyncratic credit (default) risk exists on the nominal debt issued by the buyer in each credit transaction (i.e., A in Fig. 2.12). If a commercial bank exchanges its deposit balances for the nominal debts of a large number of borrowers prior to the spot market, the bank's deposit balances will be backed by a large number of nominal debts when the buyers pay them to the sellers in credit transactions (i.e., B in Fig. 2.12). Therefore, the sellers can diversify idiosyncratic credit risk on nominal debts by receiving the bank's deposit balances rather than each buyer's nominal debt directly. As a result, even if a buyer owes a seller the same amount of nominal debt, the buyer can purchase more goods and services from the seller if he or she pays the bank's deposit balance. Because of these advantages for both sellers and buyers of credit transactions, Tomura (2019) shows that bank lending precedes transactions in the spot market for goods and services endogenously.

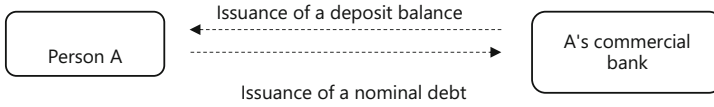
2.6 Can Alternative Electronic Currencies Replace the Current Banking System?

Is it possible to replace the current banking system with a nominal currency by an alternative electronic currency system, such as a cryptocurrency or an electronic money, without compromising the functions of the current banking system described in the previous section? This question can be reduced to whether an alternative electronic currency can assume the role of the nominal currency currently issued by each country's central bank. If this is possible, then it will suffice to replicate the other functions of the current banking system on the alternative electronic currency system.

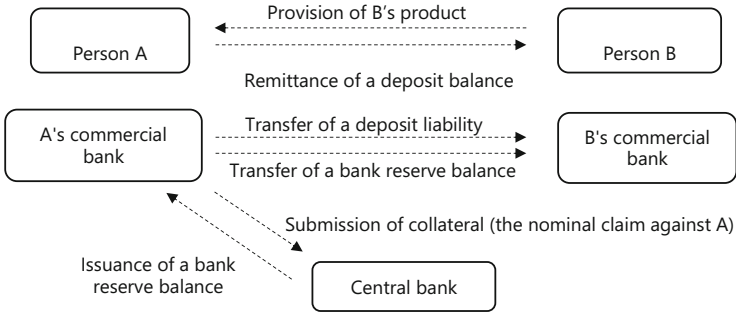
Summarizing the results of the analysis up to the previous section, the conditions that the nominal currency must satisfy in order for the current banking system to

¹⁸These features of Fig. 2.11 are similar to the banking system established in England in the nineteenth century. In this system, the Bank of England was placed at the center as the sole issuer of banknotes. See Quinn (2004) for a discussion of the banking system in nineteenth-century England.

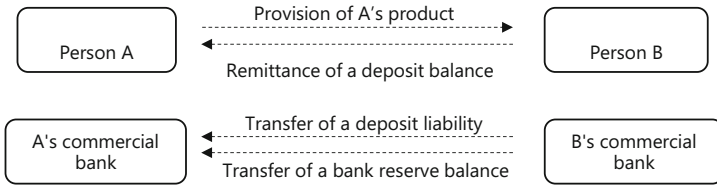
i. Bank lending by a commercial bank



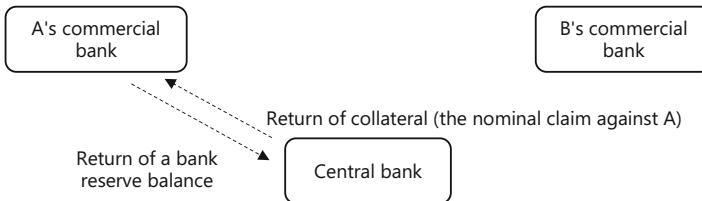
ii. Purchase of goods and services in the spot market by the bank-loan borrower and payment by bank transfer



iii. Sale of goods and services in the spot market by the bank-loan borrower and payment by bank transfer



iv. Return of the bank reserve to the central bank



v. Fulfillment of the nominal debt

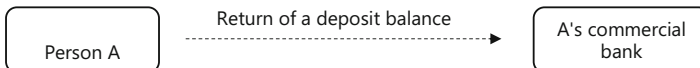


Fig. 2.12 When bank lending occurs first in a credit transaction with a nominal debt (the replication of the current banking system). (i) Bank lending by a commercial bank. (ii) Purchase of goods and services in the spot market by the bank-loan borrower and payment by bank transfer. (iii) Sale of goods and services in the spot market by the bank-loan borrower and payment by bank transfer. (iv) Return of the bank reserve to the central bank. (v) Fulfillment of the nominal debt

Table 2.2 Conditions that the nominal currency must meet for the current banking system to function

1. A spot market exists where goods and services can be exchanged for the nominal currency
2. A court can recognize the amount of the nominal currency paid by a borrower to a creditor to fulfill a nominal debt
3. If a borrower defaults on a nominal debt, a court can seize the borrower's properties, exchange the borrower's properties for the nominal currency through a competitive market mechanism such as an auction, and distribute the acquired balances of the nominal currency to the creditors of the nominal debt
4. The issuer of the nominal currency provides an elastic supply of the nominal currency in response to demand in exchange for nominal claims denominated in the nominal currency

function are listed in Table 2.2. Theoretically, if an asset has some value, it can be exchanged for goods and services. Thus, any asset with some value should be able to satisfy condition 1 in Table 2.2. Assuming that this condition is already satisfied, let us consider whether alternative electronic currencies can satisfy the remaining conditions in Table 2.2. It will be discussed at the end of this section why in practice it is difficult for alternative electronic currencies to satisfy condition 1.

2.6.1 Cryptocurrencies Without the Verification of Holder Identities

The current major cryptocurrencies, such as Bitcoin and Ethereum, can be held anonymously. Therefore, it is difficult to prove to a court who has paid how much cryptocurrency to whom. Therefore, condition 2 of Table 2.2 cannot be met. This is in contrast to commercial banks, which verify the identity of each depositor and record the amounts of deposit balances transferred among verified depositors.

Nevertheless, one might argue that if the programming code of a cryptocurrency entails a court's function as the enforcer of contracts, such as a smart contract, then condition 2 of Table 2.2 can be satisfied. However, a cryptocurrency program still cannot seize the physical properties of defaulting borrowers. Even if one attempts to rely on a court to physically seize the non-cryptocurrency properties of borrowers who default on a cryptocurrency-denominated debt, the court will not be able to determine default on the cryptocurrency-denominated debt because, as mentioned above, it is not easy to prove to a court who has, or has not, made the transfer of a cryptocurrency balance to whom. Thus, the ability of a cryptocurrency program to enforce contracts will be insufficient to satisfy condition 3 in Table 2.2.

With regard to condition 4 in Table 2.2, the current major cryptocurrencies are designed so that a new balance is issued to a user if the user completes some action that contributes to the circulation of the cryptocurrencies, such as a calculation to authenticate a transaction. Thus, they are not supplied on demand to those who do not have sufficient balances on hand to make payments. Therefore, condition 4 is not satisfied. Overall, the conclusion is that cryptocurrencies are not likely to circulate as

a means of payment for the purchase of goods and services or as a means of debt repayment.

2.6.2 Electronic Monies with the Verification of Holder Identities

In contrast to cryptocurrencies, electronic monies issued by private companies are issued with the verification of holder identities.¹⁹ Thus, they can satisfy conditions 2 through 4 in Table 2.2, as in the case of bank deposits. The question that remains is which is more efficient as the nominal currency issuer: a private electronic money issuer or the current public central bank?

Payment systems have economies of scale due to the fixed cost of system construction and network externality, such that it is the most convenient if households and firms use the same payment instrument. Therefore, when the nominal currency issuer is a private firm, the adverse effects of oligopoly are likely to occur. Thus, if a private electronic money issuer lends an electronic money instead of the central bank in panel ii of Fig. 2.12, an oligopolistic interest rate or fee may be imposed on the borrowers. In such a case, the elastic supply of a nominal currency described in condition 4 of Table 2.2 may become insufficient.²⁰ Furthermore, if the entry of electronic money issuers is competitive, electronic money issuers may simply issue new balances of electronic monies to earn a seigniorage (i.e., the difference between the economic value of newly issued currency balances and the cost of issuing those balances), rather than issuing electronic monies in exchange for electronic money-denominated claims. To prevent this, the government will need to continuously monitor whether the outstanding balance of an electronic money is adequately backed by electronic money-denominated claims held by each electronic money issuer.

In contrast, since a public central bank is a nonprofit organization, it does not cause the adverse effects of oligopoly or the maximization of seigniorage resulting from the pursuit of profit. On the other hand, since a public central bank has no private owners, the corporate governance of a public central bank may be less efficient than that of private electronic money issuers. In particular, maintaining independence from the government, which is currently the principle of the central bank in a developed country, is an important issue for a public central bank. If the independence of the central bank were breached, the central bank could be forced to finance the government's budget deficits by issuing the nominal currency passively,

¹⁹Stablecoins with the verification of holder identities are classified as electronic monies referred to here.

²⁰For a theoretical analysis of this point, see Freeman (1996a).

leading to hyperinflation and a significant slowdown in the country's economic activity.

Another important point of comparison between private electronic money issuers and a public central bank is the legal tender system. Legal tender is an instrument legally guaranteed to be accepted at par in court as a means of fulfilling a nominal debt.²¹ This definition of legal tender is consistent with the theoretical analysis of the current banking system in Sect. 2.5, which positions the nominal currency issued by the central bank as a means of fulfilling nominal debts in credit transactions. In Japan, the Bank of Japan Act and the Currency Act confer legal tender status on Bank of Japan notes and coins, respectively.

The convenience of the legal tender system lies in the fact that central bank instruments, such as central bank notes and coins, designated as legal tender are accepted at par as a means of debt repayment, regardless of the financial condition of the central bank, that is, the issuer of the nominal currency. As a result, the central bank can satisfy condition 4 in Table 2.2 by supplying the nominal currency in an elastic manner as shown in panel ii of Fig. 2.12 without financial constraints. This characteristic of the central bank allows the central bank to act as the "lender of last resort" to provide a stable supply of a means of debt repayment and prevent an increase in the credit risk of nominal debt, even when the financial condition of many households, firms, and commercial banks deteriorates during an economic crisis. With this ability, the central bank can mitigate the contraction of credit transactions, which are the basis of economic activity.

If an electronic money issued by a private electronic money issuer were designated as legal tender, that electronic money issuer would be able to issue the electronic money without financial constraints and thus would not go bankrupt. As a result, the usual corporate governance of private companies through financial constraints would no longer be in effect for that electronic money issuer. Therefore, as in the case of a public central bank, government monitoring of the electronic money issuer would be necessary. Then, it would be easier to create a single public central bank and have it supervised by supervisors (equivalent to the Bank of Japan's Policy Board) appointed by the government, as is common in many countries today, than to have the government supervise multiple private electronic money issuers. Thus, from the perspective of using the legal tender system to satisfy condition 4 in Table 2.2, it would be more efficient if a public central bank issues a nominal currency than private electronic money issuers.

²¹ For example, a buyer who enters into a sales contract to buy something worth a million yen and owes the seller a million yen will be recognized as a court as fulfilling the debt if he or she delivers to the seller legal tender notes equivalent to the face value of a million yen. If the seller refuses to accept the legal tender notes, the buyer may deposit the legal tender notes equivalent to the amount of the debt with a court. Under Japanese law, this has the same legal effect as the repayment of the debt.

2.6.3 Why Is It Difficult to Create a Market for Goods and Services in Which an Alternative Electronic Currency Circulates?

Finally, let us consider condition 1 in Table 2.2. In the previous section, it is explained that the nominal currency issued by the central bank circulates as a means of payment for goods and services because it is the means by which households and firms repay the debts that they issue for credit transactions. Thus, sellers of goods and services who owe nominal debts (e.g., for working capital) demand payment from buyers in the currency that denominates their debts. Therefore, trying to introduce an alternative electronic currency out of the blue as a means of payment in the goods and services market will not work. For an alternative currency to circulate in the economy, the means of debt repayment and the means of payment for goods and services must be simultaneously changed to the alternative currency. However, if there are already many nominal debts denominated in an existing currency, it is difficult to achieve such a change all at once unless the newly introduced currency is perfectly convertible with the existing currency.

2.7 National Sovereignty and Currency

2.7.1 Can a Foreign Sovereign Digital Currency Circulate Domestically?

The previous section compares the advantages and disadvantages of private electronic currencies and public central bank currencies. In light of this comparison, nominal currencies issued by foreign central banks should have the same characteristics as the nominal currency issued by the domestic central bank. If foreign currencies are digitized and can be held easily across borders, can foreign sovereign digital currencies replace the domestic currency in a country?

Foreign sovereign digital currencies satisfy conditions 2 and 3 in Table 2.2 immediately. For condition 2, the face value of a foreign sovereign digital currency is simply a number, just like the domestic nominal currency. For condition 3, the government can open a foreign sovereign digital currency account on behalf of courts and receive the proceeds from the auction of a defaulter's properties in that account.

On the other hand, as noted at the end of the previous section, it is difficult for alternative currencies, including foreign sovereign digital currencies, to satisfy condition 1 in Table 2.2 in countries where a local currency is already in circulation. Condition 4 in Table 2.2 is also difficult to satisfy. Normally, each country's central bank does not provide an elastic currency supply as depicted in panel ii of Fig. 2.12 to anyone other than domestic financial institutions. In addition, it rarely accepts nominal claims denominated in foreign currencies on a large scale as collateral or for

purchase. This is partly because it is difficult for the central bank of one country to inspect the safety of nominal debts issued by foreign borrowers, and also because if the central bank of one country gets involved in the banking system of another country, its government may be asked to bear the burden of bailing out that foreign country's banking system in the event of a financial crisis. Such a request could lead to a dispute between sovereign nations. Therefore, households and firms in each country will find that interest rates and fees can be minimized if they borrow bank deposit balances denominated in their own currency than borrow bank deposit balances denominated in a foreign currency, because domestic banks can receive an elastic supply of the domestic currency from the central bank in their country. In this light, even if a digital currency were issued in some foreign country, it would be unlikely to be used as the primary means of payment outside that country's territory. An exception is the possibility that a foreign sovereign digital currency with a stable value may be used in a country where the price level is unstable due to over-issuance of currency by the country's central bank.

2.7.2 Why Do Currencies in Circulation Differ from Country to Country?

The analysis described above also provides an explanation for the question of why nominal currencies in circulation in reality differ from country to country and are issued by the central bank of each country. As mentioned above, the central bank of a foreign country normally does not provide an elastic currency supply to anyone other than domestic financial institutions in the country. Therefore, to implement an elastic currency supply without financial constraints in a country, the country's government must set up a central bank and designate it as the issuer of legal tender by law based on national sovereignty. The foundation of a public central bank would make the local currency convenient for domestic households and firms to use, as they would benefit from the central bank's elastic supply of currency to the country's commercial banks. As a result, a phenomenon occurs in which a nation and its currency are paired in many countries.²²

On the connection between a nation and its currency, some economic theories argue that the national currency circulates domestically as a means of payment because the government can force its citizens to pay taxes in the national currency.²³ A counterexample to this explanation, however, is the recent situation in Cambodia. In the late 1970s, the use of the national currency, the riel, was suspended by the Pol Pot regime, which was oriented toward a proto-communist system. In 1980, the National Bank of Cambodia started issuing the riel again. But the riel did not

²²This point can be also drawn as an implication from Freeman's (1996b) model.

²³For an explanation of this kind in standard economic theory, see Starr (1974). For an explanation of this kind in post-Keynesian economic theory, see Wray (2015).

circulate. Instead, the use of US dollars spread in the country. The dollarization of the Cambodian economy was also spurred by the large influx of US dollars into Cambodia as a result of the massive aid provided by the United Nations Transitional Authority in Cambodia from 1992 to 1993, after the end of the Cambodian Civil War.²⁴ Today in Cambodia, most high-value payments are made in US dollars, but tax payments can only be made in riel. Taxpayers must convert US dollars into riel at the rate published by the National Bank of Cambodia and pay the tax amount in riel to the government.²⁵ This fact clearly demonstrates that even if the means of tax payment is limited to the national currency only, the government cannot make the national currency the primary means of payment in the country. In contrast, the nation–currency linkage described in this chapter has nothing to do with whether a country’s currency is designated as its sole means of tax payment.²⁶

The explanation in this chapter can also be extended to answer why in countries with inadequate government governance, such as countries with civil wars, domestic nominal currencies do not circulate. The utility of a nominal currency, which is not backed by precious metals or foreign currencies, assumes that the country’s courts have the ability to enforce the repayments of nominal debts. However, this condition cannot be met in a country where the government is not capable of governing. In such a country, credit transactions using nominal debts denominated in the country’s nominal currency are not feasible, and as a result, the country’s nominal currency will not circulate as a means of payment for goods and services. Such a country would need to either import and use a foreign currency, such as the US dollar or the currency of a neighboring powerful country, or issue a domestic currency that is convertible at a fixed rate with such a foreign currency.

2.8 Conclusion

This chapter explains that the current banking system with a nominal currency issued by the central bank plays a crucial role in credit transactions. It then examines whether alternative electronic currency systems, such as cryptocurrencies and electronic monies, and foreign sovereign digital currency systems would be able to replace the current banking system in each country. The conclusion is that the current banking system with an efficient elastic supply of a nominal currency is superior to the alternative currency systems, unless the governance of the public central bank is significantly inefficient.

²⁴See Hattori (2012) and Okuda (2015).

²⁵See Japan External Trade Organization (2021).

²⁶The explanation in Sect. 2.6.3 applies as to why the riel, which was reintroduced after the Cambodian economy was dollarized, has not been adopted as the primary means of payment by people in Cambodia.

This conclusion implies that improving the interfaces to send bank transfers in line with the BaaS and Embedded Finance concepts will be the main direction of future payment system innovation. On the other hand, if the interfaces of the current banking system in a country are not improved in a manner compatible with the Internet and smartphones, alternative electronic or foreign sovereign digital currency systems could replace the current banking system in the country due to their engineering advantages, despite the lack of an efficient elastic currency supply in the systems.

2.9 Comment by Yasuo Maeda: Future Vision on Credit Economy and Payment Systems

In Tomura's discussion, in response to the question of "How will payment methods will change in the future?," three visions are presented at the beginning. These visions are (1) "Bank transfers will continue to be the main means of payment, but their compatibility with the Internet will improve, making them more convenient for commercial transactions and asset transactions," (2) "creating a new electronic money separate from bank transfers and integrating its system with various transaction systems to enhance their interactivity," and (3) "building an 'economic zone' of cryptocurrencies represented by Bitcoin and Ethereum."

It is true that problems have arisen regarding the inconvenience caused by the separation of non-bank operators' systems and bank systems in the current payment system centered on bank transfers. Therefore, by promoting the provision of services such as *Banking as a Service*, which opens up connections to the bank deposit account system to non-bank operators, and *Embedded Finance*, which integrates non-bank services with financial services, it is likely that various transaction systems and the bank deposit account system will be integrated. In addition, regarding the vision for electronic money, Tomura suggests that if non-bank operators issue electronic money in exchange for cash or bank deposits, and use this electronic money to make payments for their own services provided on their system, the inconvenience caused by the separation of various transaction systems and bank deposit account system can be eliminated.

Regarding these first and second visions, it is thought that this will be the direction of financial services in the future, and some have already been realized. Also, there is no doubt that the finality of the settlement is supported by current deposits, so it can be naturally perceived as an extension of the existing financial system. From the perspective of the development of financial services, it is considered to be a recommended direction. In fact, "COTRA" has been promoted by the joint investment of five mega banks as a small payment infrastructure. And the service started on October 11, 2022. "COTRA" is designed for personal transfers of less than 100,000 yen, but it is a payment system to replace the all-bank system, and it also considers cooperation with non-bank payment service providers.

Third vision presented by Tomura considers the creation of an “economic zone” using cryptocurrencies such as Bitcoin and Ethereum. This vision envisages the creation of a new system outside the existing payment system, thus eliminating the monopoly of the existing system. However, unlike the first and second visions, when cryptocurrencies are involved, another external currency will appear in or around the existing financial system in addition to the existing legal currency. This makes the problem theoretically quite complex.²⁷ In his discussion, Tomura compares the strengths and weaknesses of a payment system using alternative electronic money and a payment system based on bank deposits, and discusses the direction of future payment system innovation. But I will focus my comments on the issue of cryptocurrency.

When considering the financial system, it is important to separate the financial intermediation function and the financial settlement function as functions of the financial system and organize the discussion accordingly.²⁸ These two functions can be theoretically separated and considered. When considering the financial system centered on banks, there are several basic theoretical models. A representative model is the Diamond–Dybvig model (Diamond and Dybvig 1983). This model clearly demonstrates the function of demand deposits in banks to share liquidity risk, and theoretically proves that bank deposit contracts allocate resources efficiently. Since the timing of each economic agent’s use of money as a medium of exchange is not certain in advance, if they find themselves in a situation where they want to use money at a relatively early point in time, they will want to obtain money immediately and carry out transactions smoothly. The fact that the timing of use of money is not clear in advance is called *liquidity risk*, and by depositing it in a bank as a demand deposit, money can be used when needed, and liquidity risk is insured. For this insurance function to work properly, a large number of agents need to deposit with the bank, and the overall liquidity risk needs to be pooled. Also, Freeman’s model (Freeman 1996a, 1996b) introduces uncertainty about the timing of spatial movement, creates a risk similar to the liquidity risk in the Diamond–Dybvig model (the risk that the timing of settlement varies across economic agents), and focuses on the liquidity supply function of the central bank²⁹ to deal with this risk.³⁰ A similar

²⁷In the Tomura paper, it is stated that “The concept of electronic money and cryptocurrency is ultimately that these electronic currencies circulate within the economy, and a financial services ecosystem that enhances their circulation autonomously emerges, replacing the existing payment system centered on bank deposits,” but I think that current deposits and cryptocurrencies, which are completely independent assets behind electronic money, should be considered separately.

²⁸For the functions of the financial system, see Sakai and Maeda (2003), Sakai and Maeda (2004), Sakai and Maeda (2011).

²⁹In the Tomura paper, it is referred to as “elastic supply of currency” and explained as a function of the central bank.

³⁰For Freeman’s model, see Maeda (2021). In Tomura (2021), the existence of monetary equilibrium is proven assuming that the court lacks the ability to distinguish the quality of goods, but the role of the central bank’s currency supply function is analyzed in the process of the discussion. In the main argument of the Tomura paper, an explanation is given about the theoretical mechanism of Tomura (2021).

analysis is also made in Allen and Gale (2007). These theoretical models allow us to address the issue of economic efficiency in a clear way.

These papers (in particular, Diamond and Dybvig) explicitly model the pooling effect of the liquidity risk of demand deposits as mentioned above.³¹ However, the pooling effect, which enhances the efficiency of resource allocation, is accompanied by structural vulnerabilities in the banking system. Economic agents that want to use money early withdraw their deposits in exchange for goods, while those that do not need money for the time being wait to withdraw their deposits until necessary. This ensures an adequate supply of investment funds to the economy and at the same time insures the liquidity risk of economic entities. However, in a situation where demand deposits are required and each individual's need for money is private information, if it is predicted that a bank will fail, even economic agents that do not need money for the time being will rationally withdraw their deposits, resulting in the bank's failure. Furthermore, the failure of a bank can spread to other financial institutions, and there is a need to consider systemic risk, where the entire financial system becomes dysfunctional.³²

The pooled funds are lent out as long-term funds such as capital for investment to facilities to other economic entities, so if depositors who do not need short-term funds withdraw their deposits early, the capital will run out. The loaned funds cannot be redeemed, either contractually or realistically. In other words, two equilibria, a truly efficient one and an inefficient one where a bank run occurs, will emerge as Nash equilibria. The Diamond–Dybvig paper shows that the bank run equilibrium disappears due to systems such as deposit insurance, and it evaluates such a safety net positively. To deal with this problem on the private side alone, it is necessary to adopt a 100% reserve, or so-called narrow banking system, but in this case, as discussed in Wallace (1996), the pooling function cannot be fully utilized, resulting in inefficient resource allocation.³³

³¹ In Freeman's model, banks are not explicitly introduced, but it is possible to assume a bank in the model as a centralized institution that discounts bonds. In Freeman's model, the function of the central bank is more emphasized. Also, in Freeman's model, economic agents accept bonds issued by other economic agents and deliver consumer goods. This settlement of bonds is being discussed.

³² In the Tomura paper, the credit function is described as "the modern banking system where each bank makes bank loans preceding the formation of savings" and the discussion is proceeding assuming credit to depositors. However, regarding the theoretical structure and its theoretical consequences, the details of the credit recipient are not particularly problematic.

³³ In the Tomura paper, the issue of efficiency is discussed using the terms "system where loans are made preceding the formation of savings" and "system where the received currency is lent out." The "system where the received currency is lent out" corresponds to the "narrow bank system" mentioned here. As a problem of the "system where the received currency is lent out," it is pointed out that "bank lending is constrained by the existing amount of deposits." In the Tomura paper, the conclusion of this discussion is tied to the interest rate. In the actual economy, the impact on interest rates occurs and this change greatly affects the real economy, but introducing interest rates into the existing settlement theory model tends to complicate the model, and since the issue of efficiency can be discussed without introducing interest rate fluctuations, this aspect is simplified.

Let's go back to the question that was the starting point of Tomura's discussions. That is whether the current payment system could be replaced by cryptocurrency payment system, and how to think about efficiency at that time if it could be done. First of all, as a problem with cryptocurrencies, I would like to point out the uncertainty of value here. Cash as legal tender has a mechanism to stabilize its value, with the central bank conducting financial regulation and adjusting supply and demand. For example, there is a mechanism to prevent the value from fluctuating greatly in the short term, such as increasing the supply to meet the increased demand for cash at the end of the year. On the other hand, it is difficult to construct a mechanism to stabilize the value of cryptocurrencies, because it is not possible to fine-tune the supply.

If the value of cryptoassets is not stable, the only entities that will hold cryptoassets in the long term will be those with speculative motives seeking capital gains. Ordinary economic entities, even if they settle in cryptoassets, will convert cash into cryptoassets just before settlement and transfer it. Similarly, the entities receiving cryptoassets will immediately convert the received cryptoassets into cash, avoiding the risk of value fluctuations. The price instability due to the narrowness (thinness) of the range of cryptoasset holders is difficult to escape easily. Generally, when it is recognized that the value is stable, the layer of long-term holders will expand, and it is thought that it will be widely used as a means of storage, but at the same time, considering that the value stabilizes in the process of such layer expansion, it is something like two locally stable equilibria exist, and without institutional backing, it is difficult to move to a stable equilibrium. Next, I would like to point out that it is difficult to lend cryptoassets, and this undermines the efficiency of the financial system. The obligation to maintain the soundness of a country's payment system (domestic exchange system) lies with the central bank and financial authorities of that country, and in Japan, the Bank of Japan and the Financial Services Agency maintain the soundness of the payment system in yen, which is Japan's legal currency, on a daily basis. In addition, institutional frameworks such as deposit insurance systems and emergency loans from the Bank of Japan are also in place. In the case of crypto assets, they do not belong to a specific country due to their characteristics, so they cannot guarantee the soundness of their payment system with national power. Therefore, it is necessary to maintain stability as a private system, but designing such a system would not be easy. Institutions that hold cryptoassets and lend in cryptoassets have vulnerabilities as mentioned above when they pool risks, making the system itself unstable. Also, if a narrow bank holds 100% reserves in cryptoassets and lends within that range, the stability of the institution is ensured, but credit creation is not possible, sacrificing the efficiency of the system. In any case, I would like to support Tomura's conclusion, "the current banking system with an efficient elastic supply of a nominal currency is superior to the alternative currency systems, unless the governance of the public central bank is significantly inefficient." I believe that payments using cryptoassets will continue to develop in the future, but it is unlikely that cryptoassets will replace the current means of payments, except in exceptional cases where a country's economy is in crisis.

Acknowledgments This work was supported by the JSPS Grant-in-Aid for Scientific Research JP20K01780.

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Part II
Transformation and Challenges
of the Banking Industry

Chapter 3

The Transformation of Japan's Banking Industry: Analysis Based on Income Data



Arito Ono

Abstract This chapter carefully computes the value added (income) generated by the Japan's financial and insurance industry, particularly the banking industry, over a long period starting from the interwar period, while the primary focus of the analysis is the post-WWII period. Specifically, this chapter outlines the evolution of the Japanese banking industry's business model and its prospects with reference to the developments in the United States. Although similar studies exist overseas, to our knowledge, Ono's work is the first to examine the evolution of the banking industry in Japan over such a long period. The study shows that the share of the banking industry in Japan's economic activity increased from the mid-1950s to the late 1980s but has been declining since the 1990s. During this transition, net interest income from deposit and loan operations, the largest source of income for banks, has declined significantly, while fees and net trading profits have increased. In contrast, in the United States, income related to securitization businesses declined after the global financial crisis, but income from traditional banking operations remained stable. In addition, Mitsuru Sawada's commentary for Ono's study, "Recent Trends in Banking Business Models Through Insights from Consolidated Financial Statements," highlights the conglomeration (diversification of business) in the banking industry through financial subsidiaries as a result of the deregulation of business activities since the 1990s. He argues that by focusing on consolidated financial statements, the shift from deposit and loan operations to other forms of banking operations has progressed even more rapidly than Ono's study indicates.

The analysis in this chapter is based in part on Gunji et al. (2021, 2023). I am grateful to my co-authors, Hiroshi Gunji, Masato Shizume, Hirofumi Uchida, and Yukihiro Yasuda for their permission to use the results of our joint research. I am solely responsible for any remaining errors in this chapter.

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3.1 Introduction

This chapter investigates the transformation of Japan's banking industry after World War II using income data and envisions what the future may hold. Since the 1990s, Japanese banks have exhibited poor performance against the backdrop of the financial crisis and the unconventional monetary policies accompanied with ultra-low interest rates. The ongoing rise of big tech and fintech firms and the declining birthrate and aging society in Japan raise concerns that Japan's banking industry's future is dismal. This chapter evaluates the growth of Japan's banking industry from a long-term perspective and compares it with the growth of the banking industry in the United States.

Specifically, I analyze two issues. First, I measure the share of the financial sector and banking industry income to GDP to examine the long-term growth of Japan's financial sector and the banking industry.¹ Philippon and Reshef (2013) pointed out that the GDP share of the financial sector increased in most advanced countries in the 1970s, but polarized since the 1980s; it continued to rise in the United States, the Netherlands, the United Kingdom, Canada, and Japan, while it remained flat or slightly declined in other European countries such as France and Germany. However, it should be noted that the growth of the financial sector may vary depending on the method and period of measuring financial sector income (Bazot 2018). Meanwhile, Greenwood and Scharfstein (2013) pointed out that the increase in the GDP share of the financial sector in the United States since the 1980s was largely driven by the growth of securities firms including asset management firms and credit intermediaries including banks. In this chapter, I measure the GDP share of Japan's financial sector and banking industry using the value added (VA) of the financial sector in the System of National Account (SNA) and the industry-level income statements based on hand-collected data from various sources.

Second, by utilizing the industry-level income data, I measure the GDP share of the banking industry by income components, including those that are not captured in the current SNA, to shed light on the transformation of Japanese banks' business model. This analysis is similar to that in Greenwood and Scharfstein (2013), who estimated the breakdown of the US credit intermediaries' income since the 1980s. They showed that the GDP share of US credit intermediaries increased despite the decrease in income from traditional banking businesses because fee income from household credits and income from securitization businesses increased. These changes in the income components of credit intermediaries were associated with the growing importance of "shadow banking system" in the United States, where shadow banking institutions such as structured investment vehicles held loans and asset-backed securities and were funded by short-term wholesale financial instruments, and with the transformation of US banks' business model from traditional

¹In this chapter, the banking industry is defined as private deposit-taking financial institutions. While Japan Post Bank, government-affiliated financial institutions, and securities firms (investment banks) are part of the financial industry, they are not included in the banking industry.

banking toward an “originate-and-distribute” model. Meanwhile, Bazot (2018) measured the “corrected” financial income in European countries by including interest income and dividends and capital gains/losses from securities, which are not captured in the VA of the financial sector in the SNA. He found that the GDP share of the financial sector in France and Germany has declined since the 1990s on an SNA basis, but when income from securities is included, it has continued to increase since the 1990s. His findings suggest the growing importance of securities management activity for banks amid the development of capital markets. While the analysis of which activities of banks contributed to their growth is essential to understand the transformation of the banking industry, to the best of my knowledge, little is known about Japan. In this chapter, I examine how the income composition of Japanese banks has changed over the long run.

This chapter is related to the following two strands of literature. The first strand is the recent literature on the growth of the finance industry, which has received renewed interest after the Global Financial Crisis (GFC hereinafter) (Greenwood and Scharfstein 2013; Philippon and Reshef 2013; Zingales 2015). This chapter uses the analytical methods developed by these studies. In addition, given that the growth of Japan's banking industry since the 1990s has been sluggish, this chapter is also related to the debate in the United States in the 1990s regarding whether the commercial banking is a declining industry (see, e.g., Takagi 1995, Edwards 1996 for a survey). On the one hand, the view and evidence that commercial banks are declining in importance came from analyzing the ratio of bank assets to financial sector assets, the ratio of bank deposits to household financial assets, and the ratio of bank loans to nonfinancial corporations' liabilities, all of which had been declining in the United States at that time. On the other hand, some studies pointed out that these measures failed to account for the growth of banks' off-balance sheet activities and that the GDP share of the banking industry income, which accounted for these activities, was gradually increasing (Boyd and Gertler 1994; Kaufman and Mote 1994; Wheelock 1993). As mentioned, there is a paucity of research that examines the development of the financial sector and the banking industry income in Japan from a long-term perspective. This chapter aims to fill this gap.

The second strand is literature on the measurement of bank income or VA. While the measurement of the banking industry income entails many conceptual issues, most empirical studies on the growth of finance have used the VA of SNA to measure banking industry's income. The income of the banking industry in Japan's current SNA includes “financial intermediation services indirectly measured (FISIM)” and fee income. FISIM is a measure of VA for financial intermediation by banks, and basically corresponds to banks' net interest income from taking deposits and originating loans. However, there is a discrepancy between the FISIM in the SNA and the net interest income in banks' income statement because interests and dividends on securities are not included in the former but included in the latter (Stauffer 2004). In addition, capital gains/losses on securities are not included in the SNA. Against these backgrounds, Bazot (2018) measures the income of the banking industry including income and capital gains/losses from securities. Furthermore, there is another discrepancy between Japan's current SNA and banks'

income statement, which relates to banks' credit costs. That is, credit costs are not explicitly taken into account when measuring FISIM in Japan's SNA (Sakuragawa and Watanabe 2009; Yamazaki 2016). In contrast, in the United States, as part of the 2013 comprehensive revision of the national income and product accounts, the methods for measuring FISIM were changed to consider credit costs as a part of intermediate consumption for banks' production of loans (Hood 2013). In this chapter, I measure banking income, including income and capital gains/losses from securities and credit costs, referring to the empirical methods of Bazot (2018) and Hood (2013).

The main findings of this chapter are threefold. First, the GDP share of the banking industry income gradually increased from the mid-1950s to the late 1980s, but has been declining since the 1990s, showing little growth in the long run. Second, looking at the income components of the banking industry, the net interest income from loans and deposits has been decreasing, which indicates the decline in income from traditional banking businesses. This decrease has been offset by an increase in trading gains and fees and commissions. The decrease in income from loans and deposits was mainly due to the decrease in the interest rate differential between loans and deposits, which can be decomposed into loan interest spread and deposit interest spread. The deposit spread, which is the difference between the risk-free reference rate and the deposit rate, has been declining since the 1960s and has been around zero or negative since the late 1980s. The lending spread, which is the difference between the loan rate and the reference rate, has also been declining since the mid-1990s. Third, the GDP share of the banking industry in the United States after the GFC is higher than that in Japan, due to the difference in net interest income from loans and deposits and fees and commissions. In the United States, income from securitization businesses decreased after the GFC, but income from traditional banking businesses did not decrease. Overall, the analyses in this chapter suggest that the Japanese banking industry needs to restructure the traditional banking businesses.

The rest of this chapter is organized as follows. Sections 3.2 and 3.3 respectively explains the method and data used. Section 3.4 presents empirical results. Sections 3.5 and 3.6 respectively discusses the transformation and future of the banking industry in Japan. Comments on this chapter by Mitsuru Sawada are provided in Sect. 3.7.

3.2 Methodology

I employ two approaches to measure the GDP share of the financial sector and banking industry income. First, I use VA of the finance and insurance industry ("financial VA" hereinafter) in the SNA. Due to national accounting principles, financial VA can be measured in two ways: either revenues received by the financial sector minus intermediate consumptions for the production of financial services or the sum of compensations to workers (wages), suppliers of capital (profits), and

governments (net taxes). The current Japanese SNA estimates financial VA as the difference between revenues and intermediate consumptions, which is specifically composed of FISIM, financial fees, life insurance, and non-life insurance (Yamazaki 2016).

The SNA is the most basic statistic for measuring financial sector income, but it has several limitations. The first is that the period that can be traced back in time with the same criteria is limited. The latest Japanese SNA used in this chapter is the “National Accounts for 2020 (2008SNA, benchmark year=2015)” published by the Economic and Social Research Institute of the Cabinet Office, but the GDP classified by economic activities, which includes financial VA, in this series is available only from 1994 to 2020. Therefore, to construct time-series data for the period before 1994, I have to rely on other series with different SNA standards and benchmark years. The second limitation is that the breakdown of financial VA by industries (i.e., banks, securities firms, and insurance firms) is not publicly available. Therefore, it is impossible to measure the GDP share of the banking industry using the SNA. The third limitation is that VA of the banking industry in the SNA does not include several items that are regarded as income on banks' income statements. Specifically, these are interest and dividends on securities (bonds and stocks), capital gains/losses associated with the sale and purchase of securities (“trading gains/losses” hereinafter), and credit costs. In light of the Japanese banks' decrease in loan-to-deposit ratio and increase in investment in and trading of securities, as well as the fact that Japanese banks experienced a massive nonperforming loans problem from the 1990s to the early 2000s, it is important to consider these income items when measuring banking industry income.

Given the limitations of the SNA, I employ the second approach utilizing semi-aggregated income statements for various types of banks published by industry associations. The banks' income statements are useful to understand the development of income components and analyze the changes in banks' business model. Specifically, I measure the following components: (i) net interest income from loans and deposits, (ii) fees and commissions, (iii) net income from investment in securities and money held in trust, (iv) trading gains/losses, and (v) credit costs.

The measurement of items (i)–(iv) is straightforward, and I will explain in detail in the next section. Regarding item (v), credit costs, I apply the methodology by Hood (2013). As mentioned, FISIM corresponds to the financial income accruing from banks' lending and deposit-taking activities, and it is measured by the following equations:

$$FISIM_LOANS = L \times (r_L - r_{RF}), \quad (3.1)$$

$$FISIM_DEPOSITS = D \times (r_{RF} - r_D), \quad (3.2)$$

where L and D respectively represent loans and deposits outstanding and r_L and r_D respectively represent the interest rates on loans and deposits. r_{RF} is the risk-free reference rate. The margins of providing loans and deposits services are calculated as the difference between the loan rate and the reference rate, $(r_L - r_{RF})$, and the

difference between the reference rate and the deposit rate, $(r_{RF}-r_D)$, respectively. I call the former the loan rate spread and the latter the deposit rate spread.

Hood (2013) argues that measuring income from loans by Eq. (3.1) is inconsistent with the national accounting principles in that the financial income does not match with VA. Some of the interest that banks charge on loans is used to cover expected credit costs. Because funds that are used to cover expected credit costs are not available to cover the costs of the labor and capital needed for producing loans, expected credit costs should be subtracted when measuring VA. To exclude expected credit costs, Hood (2013) modifies Eq. (3.1) as follows:

$$FISIM_LOANS = L \times (r_L - d - r_{RF}), \quad (3.3)$$

where the default margin d represents the expected credit costs. Equation (3.3) assumes that a bank sets loan interest rates by incorporating the expected losses as intermediate consumption for producing loans.

3.3 Data

Table 3.1 shows data sources used in this chapter. As noted above, I use two types of data sources to measure financial income: the SNA and semi-aggregated income statements for various types of private banks. When using the SNA, I use the data for financial VA taken from the website of the Economic and Social Research Institute of the Cabinet Office. Specifically, I use the “National Accounts for 2020 (2008SNA, benchmark year=2015)” for the period 1994–2020. In addition, to construct time-series data for the period before 1994, I use the “Long-Term Time-Series of the SNA: 1955–1998 (1968SNA, benchmark year = 1990)” and the “1963

Table 3.1 Data sources

Sector	Data source
<i>Financial VA</i>	Economic and Social Research Institute of the Cabinet Office, National Accounts for 2020 (2008SNA, benchmark year = 2015); Long-Term Time-Series of the SNA: 1955–1998 (1968SNA, benchmark year = 1990) (<i>Choki sokyū shūyo keiretsu kokumin keizai keisan hokoku: Heisei 2 nen kijun</i>); 1963 White Paper on National Income (<i>Showa 38 nendo-ban kokumin shotoku hakusho</i>)
<i>Zenkoku banks</i>	Japanese Bankers Association, Financial statements of all banks (<i>Zenkoku ginko zaimu shohyo bunseki</i>)
<i>Sogo banks</i>	Sogo Banks Association, Financial statements of all Sogo banks (<i>Zenkoku Sogo ginko zaimu shohyo bunseki</i>) The Second Association of Regional Banks, Annual statistics of all banks in the Second Association of Regional Banks (<i>Dainichiginkyo chigin tokei nenpo</i>)
<i>Shinkin banks</i>	National Association of Shinkin Banks, Financial statements of all Shinkin banks (<i>Zenkoku Shinyo kinko zaimu shohyo bunseki</i>) Ministry of Finance Banking Bureau, Annual Report of Banking Bureau (<i>Ginkokyoku kinyu nenpo</i>)

White Paper on National Income.” The latter contains information on the gross national income (GNI) of finance, insurance, and real estate industry. Because it includes real estate industry while financial VA obtained from the other two series does not include real estate, I estimate financial VA, which excludes VA of the real estate industry, before 1955.²

When using semi-aggregated income statements, I focus on *zenkoku* banks, *sogo* banks (until 1988 after which *sogo* banks became members of *zenkoku* banks as second-tier regional banks), and *shinkin* banks. *Zenkoku* banks are private commercial banks that include city, regional, and second-tier regional banks. *Sogo* banks were mutual companies and distinct from *zenkoku* banks, which were limited companies. *Shinkin* banks are private cooperative banks that specifically provide commercial banking services to SMEs and individuals in their local areas. Using semi-aggregated income statements on a nonconsolidated basis, I measure the following components: (i) net interest income from loans and deposits, (ii) fees and commissions, (iii) net income from investment in securities and money held in trust, (iv) trading gains/losses, and (v) credit costs.

I explain how I construct each item using the “Financial Statements of All Banks (FY2020)” compiled by the Japanese Bankers Association as an example. (i) Net interest income from loans and deposits is measured as the difference between *interest income* and *interest expenses*. In addition, I exclude *interest and dividends on securities*, which form part of interest income in banks’ income statements but are not included in FISIM, to measure net interest income in a way that is consistent with FISIM. While interest income and expenses include those from transactions among financial institutions, these will cancel each other in the semi-aggregated income statements of all financial institutions, since the interest income of one financial institution corresponds to the interest expense of another financial institution. Therefore, the net interest income that I measure roughly corresponds to FISIM.³

(ii) Fees and commissions are measured as the difference between *fees and commissions* and *fees and commissions payments*. In addition, I include *trust fees*. (iii) Net income from investment in securities and money held in trust corresponds to income related to investments in assets other than loans, and is measured as the sum of *interest and dividends on securities*, which I mentioned above, and the net gains on money held in trust (i.e., the difference between *gains on money held in trust* and *losses on money held in trust*).

(iv) Trading gains/losses, which is the income from the sales and purchase of stocks, bonds, foreign exchanges, etc., are constructed from the following three items. The first is the difference between *other ordinary income* and *other ordinary expenses*. Other ordinary income (expenses) includes gains (losses) on foreign

²Specifically, we multiply the VA of the finance, insurance and real estate industry by 0.371, which represents the ratio of financial VA to the VA of the finance, insurance and real estate industry during the period from 1955 to 1959.

³Net interest income from loans and deposits does not align with FISIM when loan and deposit balances differ. For details, See Gunji et al. (2021), Appendix 1.

exchange transactions, gains (losses) on trading account securities transactions for banks do not set up “specified transaction accounts,” and gains (losses) on sales on bonds. The second is the difference between *gains on trading account transactions* and *losses on trading account transactions*. These are accounting items for the banks that have been permitted to set up “specified transaction accounts” for their trading business since March 1998. The third is the difference between *gains on the sale of equity securities* and *losses on the sale of equity securities*, both of which are not included in the first and second components. For periods before 1964, account items that specifically represent trading gains/losses did not exist. Therefore, I assume that they are 20% of “*other ordinary income—other ordinary expenses*” for *zenkoku* banks, and zero for *sogo* and *shinkin* banks.

Finally, (v) credit costs are the sum of net loan-loss provisions and net write-offs, and I use the 3-year moving average of actual credit costs to measure expected credit costs, since banks’ loan-loss provisions in their books are usually based on the average loan losses during the past 3 years (Ginko Keiri Mondai Kenkyu-kai 2016). Credit costs usually take a negative value. For periods where credit costs are not available, I use the estimates in Gunji et al. (2021).

3.4 Results

3.4.1 Financial Sector Income

Figure 3.1 shows the GDP share of financial VA using SNA. The broken lines in the figure show that there is divergence among three different time-series data taken from different sources. Therefore, I construct a single time series, which is shown as the solid line in Fig. 3.1, where I use financial VA in the earliest year of the newer series and the year-on-year growth rate in the older series.

The share of the financial sector dropped significantly during World War II, recovered rapidly after the war, and gradually increased from 1955 to 1989, in which it was 6.6%. Following the collapse of the bubble economy in 1990, it declined until 2020, except for the period 2002–2004, during which the share rose temporarily. The GDP share of financial VA in 2020 was 4.3%, which is almost the same level as that in 1955, 4.2%. Philippon and Reshef (2013; Fig. 3) compare the GDP share of the financial sector in advanced countries from 1970 to 2006 and classify Japan as one of the countries that exhibit an increasing trend in the financial sector share. In contrast, Fig. 3.1 indicates that Japan is classified as a group of countries that exhibit relatively flat growth if the period to be examined is extended to 2020.

Next, to measure the GDP share of the banking industry as well as that of the securities and insurance industry, I use semi-aggregated income statements. To this end, I use the results in Gunji et al. (2021; Fig. 3), who measure the GDP share of various financial industries’ income in line with the definition of their VA in SNA, and reconfigure the share of banks, securities firms, and insurance firms by the

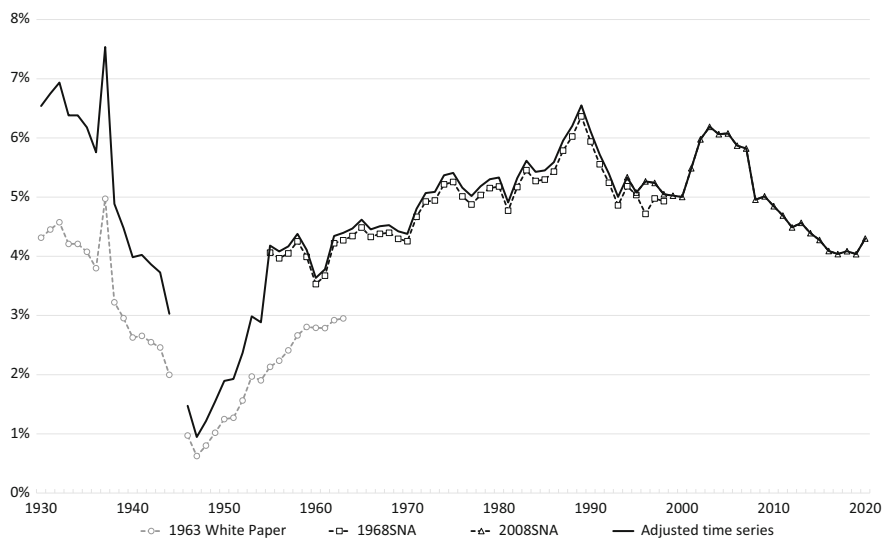


Fig. 3.1 GDP share of financial sector income on an SNA basis. Note: This figure shows the share of finance and insurance income in nominal GDP from 1930 to 2020 based on SNA data. Data are on a calendar year basis, except for 1946–1950, for which they are on a fiscal year basis. For the period 1946–1950, I use GNI instead of GDP. The three broken lines with markers are based on the 2008 SNA for 1994–2020, the 1968 SNA for 1995–1998, and the 1963 White Paper for 1930–1963. Because finance and insurance income is not available in the 1963 White Paper, I estimate it by multiplying the finance, insurance, and real estate income in the 1963 White Paper by 0.371, which is the average share of finance and insurance industry income in finance, insurance, and real estate income in 1955–1959. The black solid line shows the adjusted time series, which is constructed by using the finance and insurance industry income in the earliest year of the newer series and the year-on-year growth rate in the older series. For example, I calculate the finance and insurance income for 1993 by calculating the year-on-year growth rate for 1994 from the 1968 SNA and dividing the 1994 finance and insurance income in the 2008 SNA by 1 plus this growth rate. (Sources: Data sources listed in Table 3.1)

following periods: high growth period (1954–1970), stable growth period (1971–1984), bubble period (1985–1989), post-bubble period (1990–2004), and post-2005 period (2005 and onward).

The share of the banking industry was, on average, 2.0% during the high growth period, while it was 1.9% during the post-2005 period, showing that the share slightly decreased. Interestingly, the share of the banking industry during the bubble period was 1.2% and lower than that during other periods. The share of the securities industry increased from 0.4% during the high growth period to 1.0% during the bubble period, and decreased to 0.4% during the post-2005 period. The share of the insurance industry increased from 1.4% during the high growth period to 2.6% during the bubble period, and also decreased to 1.9% during the post-2005 period. Note, however, that the share of insurance in the post-2005 period is higher than that during the high growth period. Taken together, the share of Japan's financial sector

was on an increasing trend until the bubble period, which is mainly due to the growth of insurance and securities industries.

Comparing the above results for Japan with the results for the United States by Greenwood and Scharfstein (2013), there are similarities and differences. The share of the insurance industry exhibited an increasing trend for both countries, although the increase in Japan during the bubble period was somewhat temporary. On the other hand, the share of the securities industry including asset management firms and credit intermediaries including banks has increased in the United States since the 1980s, whereas the share of the securities industry and banking in Japan was largely flat except for the bubble period.

3.4.2 Banking Industry Income

Next, using semi-aggregated income statements of banks, I investigate the GDP share of the banking industry that additionally consider income items not captured in financial VA of the current SNA. The solid line in Fig. 3.2 shows that the GDP share of this “corrected” banking industry income increased from 1954 (2.3%) to 1988 (3.5%), but after the burst of the bubble, it decreased until 2002 (0.8%) due to the increase in credit costs associated with nonperforming loans. From 2002 to 2015, the

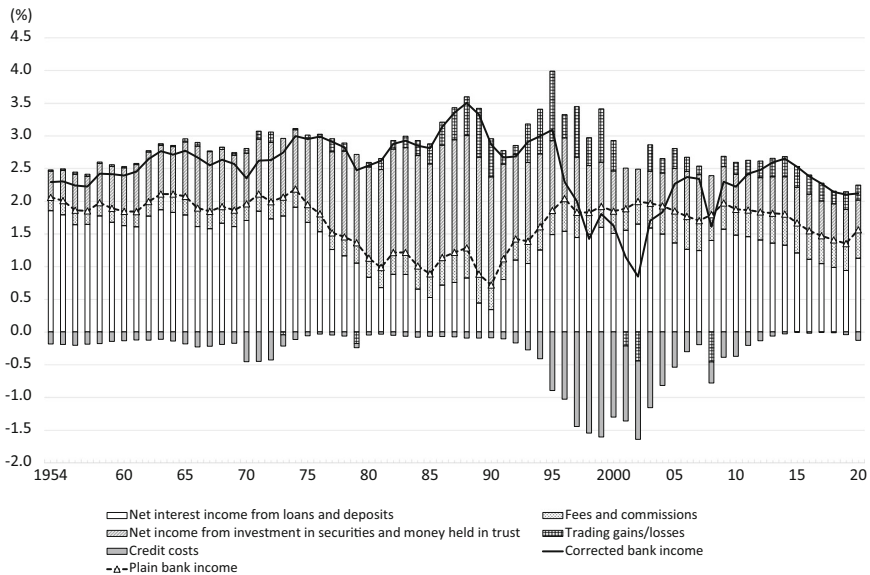


Fig. 3.2 GDP share of banking industry income using semi-aggregated income statements. Note: All items are expressed as a percentage share of GDP. Corrected bank income represents the sum of all income components, whereas plain bank income represents the sum of net interest income from loans and deposits and fees and commissions. (Sources: Data sources listed in Table 3.1)

share of corrected income gradually increased except for 2008 when the GFC hit. However, it has been declining since 2015 when the Bank of Japan introduced the negative interest rate policy. The share of the banking industry in 2020 is merely 2.1%, which is lower than the share in 1954 (2.3%).

The broken line in Fig. 3.2 shows the development of the “plain” banking industry income that conceptually corresponds to the financial VA in the current SNA, that is, the sum of net interest income from loans and deposits and fees and commissions. It differs from the “corrected” income shown by the solid line in that it declined in the 1980s, including the bubble period, and increased in the early 1990s after the burst of the bubble. For the 1980s, the difference between the two was due to an increase in net income from investment in securities and money held in trust, which is not considered in the plain income. As for the 1990s, the difference is due to an increase in credit costs, which is also not considered in the plain income. These results indicate that the share of the banking industry income depends on the measurement method employed.

The bar in Fig. 3.2 shows the development of each income component. Net interest income from loans and deposits significantly decreased from the high growth period (1.7%) to the stable growth period (1.3%) and the bubble period (0.7%). After the burst of the bubble, it recovered slightly but remained stagnant; the average share of net interest income from loans and deposits during 1990–2020 was 1.3%. Overall, I observe that the income from traditional banking businesses has been declining. Net income from investment in securities and money held in trust increased during the stable growth period and the bubble period. After the end of the high growth period, demand for corporate borrowing decreased substantially while the demand for bank deposits did not decrease so much. As a result, banks’ loans-to-deposit ratio declined and banks increased investment in securities (see Fig. 3.4), which led to the increase in net income from investment in securities and money held in trust during the stable growth period and the bubble period. The higher market interest rates during these periods also contributed to the increase. After the burst of the bubble, however, net income from investment in securities and money held in trust decreased against a backdrop of lower market interest rates. The average share of net income from investment in securities and money held in trust during the post-2005 period is 0.6%, which is lower than that during the high growth period (0.7%).

In contrast, the GDP share of fees and commissions and trading gains/losses have slightly increased, offsetting to some extent the decrease in net interest income from loans and deposits and net income from investment in securities and money held in trust. The average share of fees and commissions was 0.2% during the high growth period, but has been around 0.4% since the bubble period. The share of trading gains/losses was almost zero during the high growth period, but has increased since the stable growth period amid the liberalization of interest rates, which increased the volatility of market interest rates.⁴ Specifically, the share increased to 0.5% during

⁴During the post-bubble period, many banks sold cross-held shares to realize unrealized gains, which also contributed to the increase in trading gains/losses.

the bubble period and 0.4% during the post-bubble period, respectively. The share decreased to 0.2% during the post-2005 period, presumably because market interest rates were stable at a low level. Finally, the GDP share of credit costs was -0.9% during the post-bubble period, but it was stable at a level of -0.1 or -0.2% during the other periods.

Overall, the GDP share of the banking industry slightly decreased from 2.5% during the high growth period to 2.3% during the post-2005 period. Looking into income components, the share of net interest income from loans and deposits and net income from investment in securities and money held in trust decreased, while the fees and commissions and trading gains/losses increased.⁵ Below, I investigate further the development of traditional banking businesses, that is, net interest income from loans and deposits and fees and commissions, for *zenkoku* banks.

Lending and Deposit-Taking Activities

To investigate reasons for the decrease in net interest income from loans and deposits, Fig. 3.3 shows developments in interest rate differential between loans and deposits (solid line), the loan rate spread (black bar), and the deposit rate spread (white bar). The interest rate differential between loans and deposits was more than 5% in the early 1950s, but it decreased to just over 1% by the late 1980s. Decomposing this interest rate differential into the loan and deposit rate spread shows that the decrease in the deposit spread was the main reason for the decrease during the period until 1990. In particular, the deposit spread was about -1% during the bubble period. A likely reason for the negative deposit spread is a gradual deregulation of deposit interest rates, which intensified competition among financial institutions for deposit-taking. From the 1990s to the mid-2000s, interest rate differential between loans and deposits hovered around 1.5%. Then, from mid-2000s to 2020, it decreased again and reached around 1%, which is the lowest in the past 70 years. The deposit rate spread remained negative or around 0% due to the monetary easing by the Bank of Japan and the zero lower bound on deposit interest rates. At the same time, loan spread also started to decrease from the early 2000s onward. Specifically, the loan rate spread decreased by 0.8 percentage points from an average of 2.2% during the post-bubble period to an average of 1.4% during the post-2005 period. To examine whether the term premium or other factors (e.g., increase in the competition in lending market) contributed to the decrease in loan spread, I conduct a back-of-envelope calculation by assuming that the term premium is equal to the difference between the 3-year Japanese government yield and the reference rate. The result shows that, of the 0.8 percentage point decrease, the decrease in the term premium is 0.5 percentage points, whereas the decrease due

⁵By business type, large banks, including city banks, long-term credit banks, and trust banks, partially offset the decline in net interest income from loans and deposits and net income from investment in securities and money held in trust by increasing fees and commissions and trading gains/losses. Among regional financial institutions, the decline in net interest income from loans and deposits was particularly pronounced for the second-tier regional banks. For details, see Ono (2022).

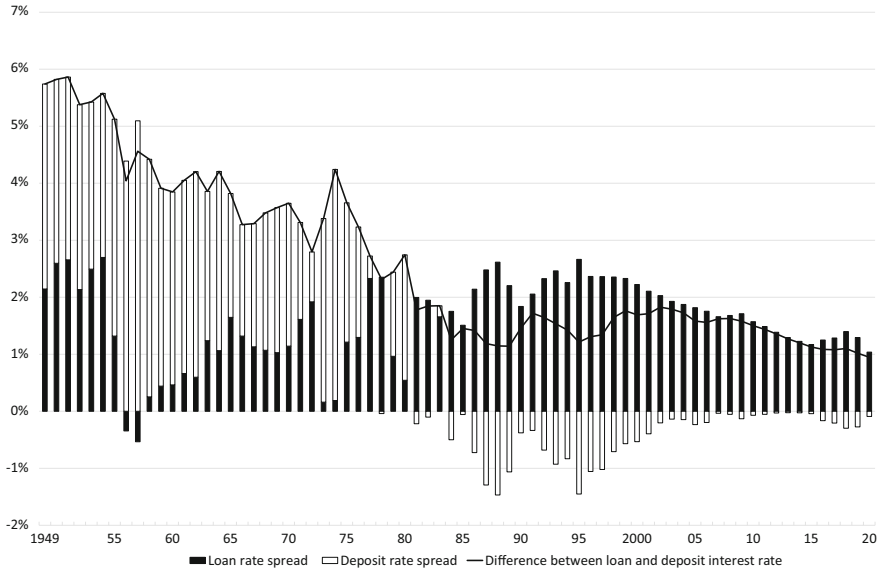


Fig. 3.3 Loan and deposit rate spread. Note: This figure shows the difference between the loan and the deposit interest rate (black solid line), the loan rate spread (black bar), and the deposit rate spread (white bar) for *zenkoku* banks. Second-tier regional banks are not included in *zenkoku* banks prior to 1989. The loan interest rate is calculated as the ratio of interest income from loans to loans outstanding. The deposit interest rate is calculated as the ratio of interest expenses for deposits and bank debenture bonds to deposits and bank debentures outstanding. For the reference rate, I use the Bank of Japan's discount rate until 1995 and the overnight uncollateralized call rate from 1996. (Sources: Japanese Bankers Association, Financial statements of all banks, Bank of Japan website)

to other factors is 0.3 percentage points, suggesting that both the monetary easing and other factors contributed to the decrease in loan spreads since the early 2000s.

Next, I investigate the development of the ratio of bank loans and deposits outstanding to GDP. If the loan rate spread is positive, an increase in the loan ratio increases the net interest income from loans and deposits. Similarly, if the deposit rate spread is positive, an increase in the deposit ratio also increases the net interest income. Finally, an increase in the loan-to-deposit ratio increases the net interest income from loans and deposits if the loan and deposit rate spread are both positive.

Figure 3.4 shows the development of these figures. During the high growth period during which loan and deposit spreads are both positive, the loan and deposit ratio exhibited an increasing trend while the loan-to-deposit ratio was stable at around 80%. Therefore, the increase in these ratios positively contributed to banks' net interest income from loans and deposits, and offset the decrease in interest rate differential between loans and deposits as shown in Fig. 3.3. However, from the late 1970s to the late 1980s, the loan-to-deposit ratio decreased significantly, which led to a decrease in the net interest income from loans and deposits. In addition, during the bubble period, an increase in the deposit ratio also pushed down the net interest

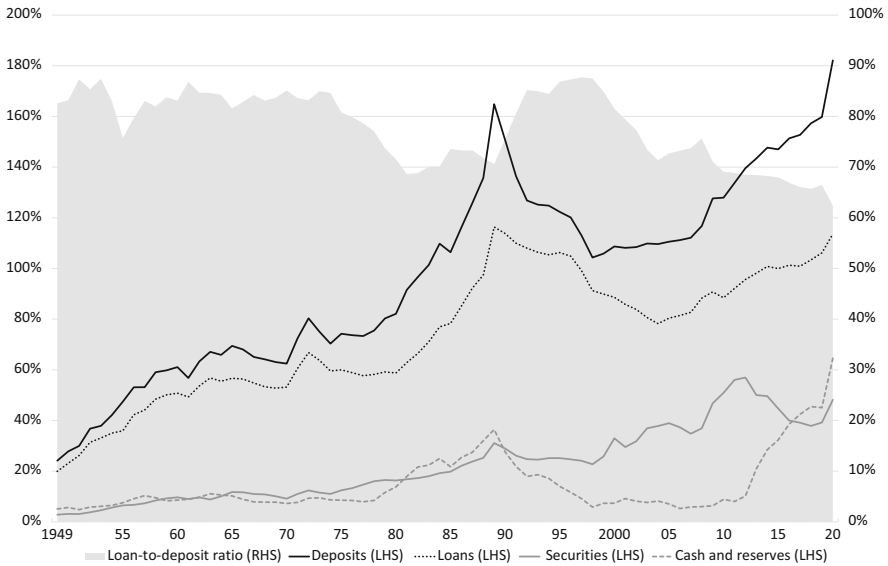


Fig. 3.4 Deposits, loans, securities, cash and reserves, and loan-to-deposit ratio. Note: This figure shows the loan-to-deposit ratio (right-hand-side axis) and deposits, loans, securities, and cash and reserves as a percentage share of GDP (left-hand-side axis) for *zenkoku* banks. Second-tier regional banks are not included in *zenkoku* banks prior to 1989. (Sources: Data sources listed in Table 3.1)

income from loans and deposits because deposit spread was negative. After the burst of the bubble in the 1990s, the decrease in the deposit ratio was larger than the decrease in the loan ratio and the loan-to-deposit ratio rose to more than 80%, resulting in a slight recovery in the net interest income. However, since the 2000s, the loan-to-deposit ratio has been declining again. The loan-to-deposit ratio in 2020 is 62%, which is the lowest level in the past 70 years.

Note that when banks' loan-to-deposit ratio decreases, banks likely increase the outstanding of financial assets other than loans. Figure 3.4 shows that both securities and cash and reserves (as a percentage of GDP) have been increasing since the latter half of the 1970s in parallel with the decrease in loan-to-deposit ratio. If I sum the GDP share of net interest income from loans and deposits and net income from investment in securities and money held in trust in Fig. 3.2, the combined income was stable from 1954 to 1990; it was on average 2.4% during the high growth period, 2.5% during the stable growth period, and 2.4% during the bubble period. In contrast, the combined income during the post-2005 period was 1.8%, which is lower than that in the other periods. One likely reason for the decrease in the combined income is a significant decrease in market interest rates, which led to the decrease in net income from investment in securities and money held in trust. Another reason is a significant increase in banks' cash and reserves after the GFC due to the strengthening of unconventional monetary easing.

To summarize, the decrease in net interest income from loans and deposits is mainly due to the decrease in deposit rate spread. In addition, since the latter half of

the 1980s, the increase in deposit to GDP ratio has led to the decrease in net interest income as the deposit rate spread has been negative. For loans, from 1954 to 1990 and the post-2005 period, the increase in loan to GDP ratio contributed to increase the net interest income. However, the loan spread has been declining since the 2000s, pushing down the net interest income.

Fee Business

Which specific fees contributed to the increase in fees and commissions in recent years shown in Fig. 3.2? The breakdown of fees is available after 1989, and fees and commissions are composed of net remittance fees, trust fees, and others.⁶ While net remittance fees have been stable and trust fees have been decreasing, the other fees have increased since the 2000s, which has contributed to the increase in overall fees and commissions. The breakdown of the other fees is not publicly available, but the Bank of Japan Financial System and Bank Examination Department (2021; Fig. II-A-10) shows that fees from the arrangement of syndicated loans, securitization of claims, and M&A transactions are the major components of the other fees for large banks, whereas fees associated with sales of insurance products and investment trusts are the major components for regional banks.

3.4.3 Comparison of Bank Income Between Japan and the United States

In this section, I compare the GDP share of the banking industry income between Japan and the United States after the GFC by income components to shed light on the factors that account for the difference between them. Greenwood and Scharfstein (2013) report that the GDP share of the US credit intermediaries' income increased from 1980 to 2007, that is, before the GFC, due to the increase in income associated with household credits and securitization. While the share of the US credit intermediaries after the GFC is not reported in Greenwood and Scharfstein's study, their finding is in sharp contrast to the share of Japan's banking industry, which has been on a downward trend since the late 1980s. To measure the GDP share of the US banking industry, I use data from the FDIC Quarterly Banking Profile. The sample is commercial banks and savings institutions that are members of the FDIC.

Figure 3.5 compares the average GDP share of the banking industry income in Japan and the United States averaged over the period 2012–2020 by income components. The share of total income of the US banking industry is 3.2%, which is 0.8 percentage points higher than that of Japan (2.4%). This difference is mainly due to net interest income from loans and deposits and fees and commissions. There is not much difference between Japan and the United States in terms of net income

⁶See Ono (2022) Figure 6.

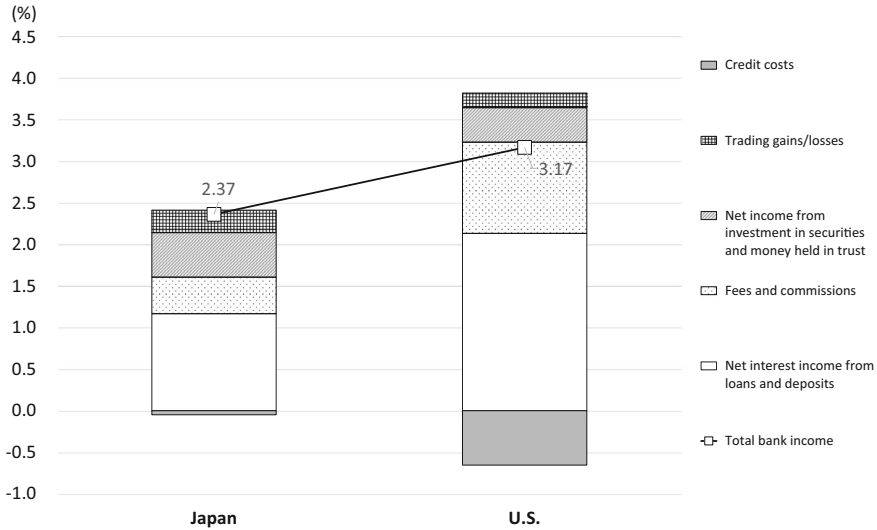


Fig. 3.5 GDP share of banking industry income in Japan and the United States, 2012–2020. Note: This figure shows the average GDP share of banking industry income in Japan and the United States during 2012–2020. Japanese banks include *zenkoku* and *shinkin* banks, whereas US banks include commercial banks and saving institutions that are members of the FDIC. (Sources: Data sources listed in Table 3.1 for Japan. FDIC, Quarterly Banking Profile, Federal Reserve Bank of St. Louis, FRED Economic Data for the U.S.)

from investment in securities and money held in trust and trading gains/losses. Credit costs are higher in the United States.

To investigate further the reasons for the difference in net interest income from loans and deposits between Japan and the United States, Table 3.2 compares the indicators related to net interest income from loans and deposits. The table shows that the disparity between Japan and the United States is mainly due to the interest rate differential between loans and deposits. The interest rate differential between loans and deposits of US banks is 3.2 percentage points higher than that of Japanese banks, of which the difference in the loan rate spread is 2.8 percentage points and the difference in the deposit rate spread is 0.4 percentage points. Table 3.2 also shows that both the ratio of loans and deposits to GDP for Japanese banks are larger than those for US banks. The fact that the loans outstanding of Japanese banks are larger than that of US banks contributes to narrowing the difference in net interest income from loans and deposits between them, whereas larger deposits outstanding of Japanese banks contribute to widening the difference since Japanese banks’ deposit rate spread is negative.

Examining the breakdown of loans outstanding by borrowers and the use of proceeds, more than half of US bank loans are directed toward households, with residential mortgages and other uses (mainly consumer credit) comprising roughly the same share. In contrast, more than half of Japanese bank loans are directed toward nonfinancial corporations. In addition, residential mortgages are about 1.8

Table 3.2 Indicators related to net interest income from loans and deposits for Japanese and US banks

		Japan	U.S.
Difference between loan and deposit interest rate (%)		1.13	4.32
Breakdown by loan and deposit rate spreads	Loan rate spread	1.26	4.02
	Deposit rate spread	-0.13	0.30
	cf. Reference interest rate	0.01	0.69
Loans outstanding (% , relative to GDP)		102.2	49.0
Breakdown by borrowers and use of proceeds	Households, residential mortgages	32.0	12.6
	Households, the others	18.1	10.7
	Non-financial corporations	56.9	18.7
Deposits outstanding (% , relative to GDP)		153.4	69.5
Loans-to-deposits ratio (%)		66.8	70.7

Sources: Data sources listed in Table 3.1 and Bank of Japan, Flow of Funds for Japan. FDIC, Quarterly Banking Profile, Federal Reserve Bank of St. Louis, FRED Economic Data for the U.S. Note: All items are the average over the period 2012–2020. Japanese banks include *zenkoku* and *shinkin* banks, whereas US banks include commercial banks and saving institutions that are members of the FDIC. Reference interest rate is the overnight uncollateralized call rate for Japan and the federal funds rate for the United States

times larger than that of the other loans to households. These differences in the composition of loans likely contribute to the difference in the loan rate spread between Japanese and US banks as the loan interest rates on consumer credits are higher than those on residential mortgages and loans to nonfinancial corporations.

Next, I compare the breakdown of fees and commissions (Table 3.3). It is not straightforward to make a direct comparison between Japan and the United States because the breakdown items for fees and commissions differ. However, as far as items that are comparable are concerned, they are higher for US banks. For example, if I compare the GDP share of Japanese banks' net remittance fees and the share of US banks' service charges on deposit accounts, both of which are fees related to deposits, they are respectively 0.1% and 0.2%. Considering that the ratio of US bank deposits outstanding to GDP is less than half of that of Japanese banks (see Table 3.2), the difference in fees per unit of deposit becomes even larger. Similarly, trust fees, which are fees associated with fiduciary services, for US banks (0.2%) are also higher than those for Japanese banks (0.1%).

In addition, I find that the GDP share of "others" for Japanese banks is 0.3%, whereas it is 0.7% for US banks. The "others" of US banks include net servicing fees, net securitization income, insurance commission fees and income, and other noninterest income, with other noninterest income comprising the highest ratio among them. Although I do not know the relative importance of various breakdown components in the other noninterest income category, FDIC (2020) notes that it include fees related to traditional banking services such as wire transfers, ATM

Table 3.3 Breakdown of fees and commissions for Japanese and US banks

	Japan	U.S.
Total fees and commissions	0.43	1.10
Net remittance fees	0.10	n.a.
Service charges on deposit account	n.a.	0.18
Trust fees	0.05	0.18
Others	0.28	0.73
Net servicing fees	n.a.	0.05
Net securitization income	n.a.	0.01
Insurance commission fees and income	n.a.	0.02
Other non-interest income	n.a.	0.65

Sources: Data sources listed in Table 3.1 for Japan. FDIC, Quarterly Banking Profile, Federal Reserve Bank of St. Louis, FRED Economic Data for the U.S.

Note: All items are expressed as the average share of GDP over the period 2012–2020. Japanese banks include *zenkoku* and *shinkin* banks, whereas US banks include commercial banks and saving institutions that are members of the FDIC. Net remittance fees for US banks are included in other noninterest income

usage, and credit card fees and interchange fees. The GDP share of net servicing fees and net securitization income in the United States, which are associated with the growth of the shadow banking system, were respectively 0.17% and 0.11% before the GFC but have dropped significantly to 0.05% and 0.01% after the crisis.

Taken together, the difference in the GDP share of the banking industry income between Japan and the United States after the GFC is due to the difference in income related to traditional banking businesses such as net interest income from loans and fees related to deposits, fiduciary services, and credit cards. Regarding the income related to securitization business for US banks, it declined after the GFC.

3.5 Discussion

What implications can we draw from the analyses above about the transformation of the banking industry in Japan and the United States? To address this question, I build on Edwards's (1996) discussion on whether and why the commercial banking is declining.

Edwards (1996) presented three hypotheses explaining the decline of the banking industry: the excess capacity theory, the regulatory burden theory, and the declining bank uniqueness theory. The excess capacity theory argues that the decline of the banking industry is a natural consequence of the relaxation of various regulations that have protected banks. The regulatory burden theory argues that the decline of the banking industry is due to banks being subject to heavier regulations than nonbank financial institutions. The declining bank uniqueness theory argues that the banking industry is declining because banks lose their comparative advantages in

lending and deposit-taking due to financial innovation. The excess capacity theory and the regulatory burden theory attribute the decline of the banking industry to deregulations that removed barriers to banking or regulations imposed on banks, whereas the declining bank uniqueness theory attributes to financial innovation as a cause.

In the case of the United States, the number of banks has significantly decreased, which is consistent with the hypothesis that the banking industry is declining. However, the GDP share of US banking industry income has not declined, and the ratio of loans and deposits outstanding to GDP has remained stable, both of which are inconsistent with the hypothesis. It is true the share of the banking industry in the total financial sector is declining as the growth of nonbank financial institutions is higher than that of banks. However, the fact that the GDP share of income from traditional banking business has not declined suggests that demand for traditional banking services has been solid despite the intensifying competition among banks and nonbanks due to deregulations and financial innovations.

In contrast, in the case of Japan, not only has the number of banks decreased but also banking income has declined, making the hypothesis that banking is a declining industry more valid. However, the ratio of loans and deposits outstanding to GDP has continued to rise despite a temporary decrease in the 1990s, which is inconsistent with the hypothesis. It should also be noted that the extent of the so-called financial disintermediation in Japan has been smaller than that in the United States, that is, the ratio of deposits to Japan's household financial assets and the ratio of nonfinancial corporations' borrowings from financial institutions has been high and stable, both of which are contrary to the same figures in the United States.

As shown in Fig. 3.3, the decline in Japan's banking income share is mainly due to the decline in the net interest margin between loans and deposits. The fact that the price of loans and deposits has fallen while the quantity has increased is consistent with Edwards' excess capacity theory, in the sense that part of the income earned by banks in the past was regulatory rents resulting from prices being above market equilibrium, and that deregulation has reduced regulatory rents over time. However, it is doubtful whether banks are able to supply deposits under zero or negative spreads in the future. Another concern is that Japanese banks' loans outstanding to GDP may have been excessively large due to policy responses to the financial crisis in the late 1990s, the GFC in the late 2000s, and the COVID-19 pandemic in recent years, such as the expansion of credit guarantees to SMEs and the relaxation in financial supervision. Previous studies have pointed out the possibility that "too much finance," where bank loans to GDP being above the threshold, distorts resource allocation in the real economy, hinders economic growth, or increases the likelihood of a financial crisis in the future (Arcand et al. 2015; Pagano et al. 2014; Sakuragawa 2005). Examining whether the decline in Japan's banking industry income is beneficial for society is an important issue to be addressed in the future.

3.6 The Future of Banking in Japan

The GDP share of Japan's banking industry income has been declining since the 1990s. How can Japanese banks restructure their businesses to enhance their growth potential in the future?

The analysis in Sect. 3.4.3 showed that the difference in the share of the banking industry between Japan and the United States is due to the income from traditional banking businesses such as net interest income from loans and deposits and fees associated with deposits, remittance, fiduciary services, and credit cards. Among these, how to increase the income associated with deposit, a unique financial product that distinguishes banks from nonbank financial institutions, is an important issue. In Japan, the ratio of deposits outstanding to GDP has continued to increase amid the deposit rate spread being zero or negative for more than 20 years. The likely reasons for the increase in deposits include the low opportunity cost of holding deposits for households and corporations due to low interest rates and the preference for safe and liquid assets by households and corporate executives. In addition, there may be pricing strategy issues, such as the fact that Japanese banks have not set service charges for deposit account and that there are little variations in remittance fees among banks. Using bank-level data for Japan and the United States, Ono et al. (2012) show that the variance of net remittance fees of Japanese banks is smaller than the variance of service charges on deposit accounts of US banks. In addition, they show that while the number of bank branches and the degree of competitiveness for deposit markets significantly affect a bank's service charge on deposit accounts in the United States, they do not have a significant effect on net remittance fees in Japan. These findings suggest that Japanese banks have not set net remittance fees based on the location and convenience of bank branches for depositors and the competitiveness in deposit markets. Recently, Japanese banks have established a new payment infrastructure called *Kotora*, which is dedicated for transferring small amounts and is different from the existing payment system, *Zengin System*. *Kotora* aims to reduce cash transactions among depositors. Banks have also started to set different remittance fees based on whether the remittance request is made online or by bank tellers. These moves can be evaluated as the first step by banks to improve the profitability of deposits, as they aim to reduce the handling cost of cash through bank counters and revise the structure of fees in accordance with the transaction cost of deposits and remittance. Whether the fees associated with deposits and remittance will be further differentiated depending on each bank's business environment and strategy is yet to be seen.

Looking at the lending business, one of the underdeveloped areas for Japanese banks compared to US banks is consumer credit, including credit cards. However, consumer credit is an area where fintech/big tech companies likely have a comparative advantage in terms of better user experience and more efficient screening and

monitoring of prospective borrowers' hard information (Stulz 2019; Berg et al. 2022). In addition, unlike the United States where several commercial banks are large card issuers, Japanese banks' involvement in the credit card business has been limited due to regulations. It is not clear whether banks will have a comparative advantage in consumer credit.

Banks are likely to have a comparative advantage in areas where borrowers are heterogeneous and their soft information plays a crucial role in the screening and monitoring. Hanson et al. (2015) argue that a distinguishing features of banks, as opposed to market-based intermediaries such as shadow banks, is their stable source of funding, deposits, enabling them to hold illiquid financial assets. Borrowers for whom soft information is important and whose financial claims are illiquid include small- and medium-sized enterprises (SMEs), which have difficulty in issuing marketable debts and equities, start-ups lacking tangible assets for collateral, and firms engaging in R&D with significant uncertainty. Having said that, there are several challenges that Japanese banks should overcome. Japanese banks have tried to increase lending to so-called middle-risk SMEs, but it has not led to an improvement in loan rate spreads. Instead, it has led to an increase in lending to "low-return borrower" (Bank of Japan 2018) firms for which the loan interest rate is not commensurate with their credit risk. Traditional bank loans may not be well-suited for financing start-ups and R&D-intensive firms, given the high levels of uncertainty and risk involved in their businesses (Kerr et al. 2014). Therefore, banks need to explore alternative financing methods for such firms. In this vein, the investment approaches by venture capital firms offer valuable insights. For example, venture capital firms provide equities instead of debts, allowing them to benefit from upside gains if the project of invested firms succeeds. Venture capital firms also provide funds in stages and select firms or projects based on intermediate outcomes (Gompers 1995; Sahlman 1990).

The declining share of the banking industry in Japan likely reflects the deterioration in the quality of services and products that banks have provided to customers. It is essential for Japanese banks to identify their own comparative advantage and restructure their business model.

There are several important issues regarding the growth and business model of Japanese banks that I did not address in this chapter. I used banks' nonconsolidated income statement to gain insights into the transformation of their business model from a historical perspective. However, in response to decline in income from traditional businesses, Japanese banks have expanded their business areas through subsidiaries in recent years. To examine whether and how such expansion in business areas has led to the growth of Japanese banks, I need to analyze consolidated income statement. In addition, I need to examine the possible benefits and drawbacks of such expansion. For example, while it is possible that banks' effort to expand nontraditional businesses increase their income due to economies of scope, it

may also increase systemic risk (Brunnermeier et al. 2020; De Jonghe 2010; DeYoung and Torna 2013). Another example is a recent movement by Japanese banks to strengthen asset management business through securities and asset management subsidiaries. The Japanese government also set the policy initiative to promote Japan as a leading asset management center. But whether the growth of asset management is beneficial for society is a matter of debate. Greenwood and Scharfstein (2013) point out that the expansion of asset management in the United States brought significant benefits by increasing households' financial market participation and facilitating diversification. At the same time, however, they also raise a question about whether the information produced by asset management firms is socially valuable, as there is some evidence that asset managers tend to cater to unsophisticated investors' preferences to earn their trust, leading to inaccurate securities prices and inefficient resource allocation. These issues should be addressed in future studies.

3.7 Comment by Michiru Sawada: Recent Trends in Banking Business Models Through Insights from Consolidated Financial Statements

3.7.1 Introduction

Ono's paper quantitatively clarified the evolution of the banking business model by analyzing the banking industry's net income by item over the long term. It confirms that the banks' core business, as represented by net interest income, has declined significantly, while net income from fees and commissions and trading gains/losses have increased. By focusing on banks' nonconsolidated financial statements, it provides a consistent analysis over time. Since the 1990s, the Japanese banking industry has experienced a deregulation of business activities, leading to increased financial conglomeration (diversification of business activities). Banks and bank holding companies now offer a range of financial services beyond traditional banking through their financial subsidiaries. The activities of these financial subsidiaries cannot be fully captured by nonconsolidated (stand-alone) financial statements. In this comment, I attempt to complement Ono's paper by examining recent trends in the business models of the banking industry as a whole based on consolidated financial statements that also encompass the broader activities of these bank-owned financial subsidiaries. Specifically, I will provide an overview of recent trend surrounding the diversification of banking business and analyze the shifts in the income structure of the banking industry using consolidated financial statements. Additionally, utilizing the latest data, I will provide a brief snapshot of the positioning of bank holding companies.

3.7.2 Institutional Background of Business Diversification in Japanese Banking Industry

The turning point in business activities in Japan's banking industry occurred in the period following the 1980s. During this time, the Japanese corporate sector transitioned from being financial deficit units to surplus units, leading to a significant and sustained decline in their demand for funds. Moreover, the liberalization of financial markets, which commenced in earnest during this period, heightened competition among financial institutions. Consequently, banks experienced a notable decline in income from their traditional business such as lending and deposit-based operations, as evidenced by the decrease in net interest income (see Fig. 3.2 in this chapter).

While banks initially compensated for the decline in interest income by leaning toward real estate loans during the bubble period, these loans subsequently became a primary factor contributing to a significant increase in credit costs following the collapse of the bubble. Therefore, diversifying revenue sources beyond interest income became an important management challenge for the banking industry.

On the other hand, the Japanese banking industry had been strictly regulated to enter other financial business since the end of World War II. Faced with a difficult situation in its core business based on deposit and loan business, it actively lobbied the government to relax regulations governing the scope of banking business. As a result, when the Financial System Reform Related Law of 1992 allowed mutual cross-sectoral entries through subsidiaries, major banks began to establish securities subsidiaries and trust bank subsidiaries to enter new financial business. In 1996, the cabinet of Ryutaro Hashimoto announced its intention to push forward with comprehensive reforms of the financial system (the Japanese Big Bang), leading to a rapid pace of deregulation in financial markets and transactions. As a part of these reforms, the Antimonopoly Act was amended in July 1997 to permit the establishment of pure holding companies for general business companies. Furthermore, two laws related to financial holding companies were enacted in December 1997, enabling the establishment of financial holding companies, including bank holding companies, from March 1998. Following these reforms, major city banks founded financial holding companies (bank holding companies), which included not only commercial banks but also securities companies, trust banks, and nonbanks under their umbrella, thereby establishing themselves as financial conglomerates. Since the mid-2000s, regional banks have also been increasingly engaging in the securities business through the establishment of securities subsidiaries and the acquisition of local securities firms. In April 2001, several insurance products, such as group credit life insurance, were allowed to be sold over the counter at banks for the first time. Afterward, the scope of over-the-counter sales of insurance at banks was gradually expanded until 2007, when the ban was lifted completely. This deregulation facilitated a rapid increase in insurance sales through banks (Inaba and Hattori 2006). In recent years, the banking industry has been eager to shift from a stagnant business model based on deposit and loan operations.

3.7.3 *Bank Diversification from a Perspective of Consolidated Financial Statements*

In this section, I review the progress of income (revenue) diversification in the banking industry based on consolidated financial statements. Specifically, I obtain the aggregated financial statement of all banks on a consolidated accounting basis from the Japanese Bankers Association and develop indicators related to income diversification. The first indicator is the noninterest income ratio (noninterest income/total operating income) used by Stiroh (2006) and Baele et al. (2007). Noninterest income is defined as total operating income minus interest income. We use “ordinary income” in Japanese bank accounting as total operating income, following the definition of the Japanese Bankers Association. The interest income used here is considered to capture the scope of traditional banking business more broadly than that of Ono’s paper since the former includes not only interest on loans but also interest and dividends from investment in securities.⁷ It should be noted that the noninterest income ratio includes items such as trading income, which fluctuates widely depending on the condition of financial market when interpreting the movement of this ratio.⁸ The second indicator is the fee-based income ratio (fees and commissions/total operating income), covering a narrower range of nontraditional business among the noninterest income ratio. Since the fee-based income is not as strongly affected by financial market trends as the trading income, this indicator is relatively easy to interpret in terms of the long-term attitude of the banking industry toward nontraditional business. Since the availability of consolidated financial statements is limited to fiscal 1998 (ended March 31, 1999) and later, these two indicators in the following figure are based on data from FY1998 to FY2021.

Figure 3.6 shows the changes in these two indicators during the period. First, the solid line indicates the noninterest income ratio, which rose significantly from 1998 to 1999 (from 32.8% to 42.7%). It indicates the possibility that banks might have entered into other financial business following a series of deregulations mentioned above. Although it temporarily dropped to about 35% around 2008 due to a decrease in trading income accompanied by the Global Financial Crisis, it gradually recovered afterward, with a particularly notable increase in recent years. The dashed line indicates that the fee-based income ratio rose from 6.8% in 1998 to the 20% level in the mid-2010s, indicating that banks were placing more weight on fee-based financial services during this period. This trend is consistent with Ono’s paper using net-income data from nonconsolidated financial statements. Therefore, it can be said that the banking industry as a whole has greatly increased its emphasis on nontraditional business over the past two decades.

⁷I focus on gross income structure to capture bank business model, while Ono’s paper does on net-income (income–cost) structure.

⁸In addition, there is a possibility that the noninterest income ratio in a bank might decrease regardless of the change in profits of its subsidiaries, when bank holding company established by the bank takes over its subsidiaries.

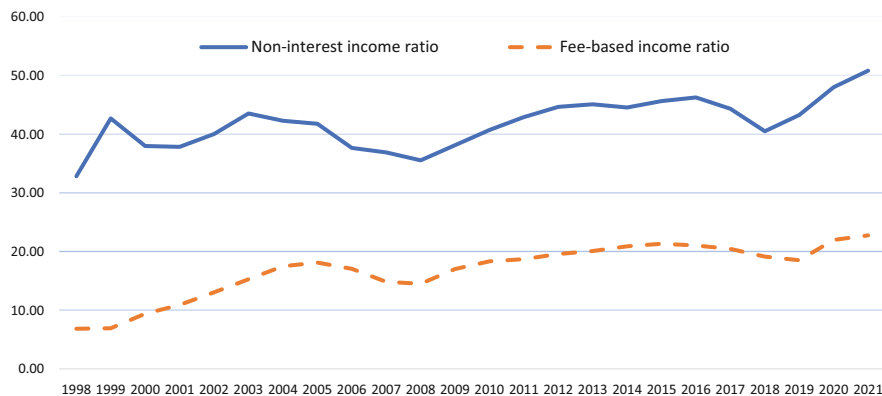


Fig. 3.6 Changes in the income structure of the banking industry based on consolidated financial statements. (Source: Japanese Bankers Association, “Financial Statements of All Banks” (each fiscal year))

3.7.4 Bank Holding Companies

Since the early 2000s, the major banks have pursued greater diversification by incorporating financial subsidiaries and operating nonbanking business under the umbrella of bank holding companies. Since the aforementioned data derived from consolidated financial statements do not include information on bank holding companies, it is valuable to provide an overview of the presence of bank holding companies in Japan. Table 3.4 displays the market capitalization values of listed banks and bank holding companies at the end of March 2022, providing insight into how the market evaluates these entities.⁹ Based on columns 1 and 2 of the table, the aggregate market capitalization of all banks and bank holding companies amounts to approximately 30 trillion yen. Remarkably, the market capitalization of bank holding companies alone reaches around 25 trillion yen, representing approximately 83% of the total. Of these, the share of market capitalization of the three megabank groups is over 60%, which suggests the large presence of bank holding companies, operating as financial conglomerates, in the banking industry.

Columns 3–5 of Table 3.4 present the consolidated profits of bank holding companies (Profits attributable to owners of parents) and the profits of commercial banks owned by them on a nonconsolidated basis. In cases where there are multiple commercial banks under the bank holding company, their nonconsolidated profits are added together. I focus on profits (net earnings) rather than total operating income. This approach enables us to take into account not only the profits of consolidated subsidiaries but also those of equity-method affiliates, providing a

⁹Japan Post is actually a listed bank holding company; however, it remains partially privatized, and its subsidiary, Japan Post Bank, is subject to more stringent regulations compared to other commercial banks. Consequently, I have excluded it from our samples.

Table 3.4 Market Capitalization and Profits of Bank Holding Companies: Year Ended March 2022 (FY2021)

	Market capitalization	Share (%)	Profits attributable to owners of parents	Profits from core banks	Share of core banks (%)
Mega bank groups (3)	194469.4	64.63	23679.5	9112.2	38.5
Bank holding companies (23)	249652.6	82.97	29696.52	14437.1	48.6
All banks and bank holding companies (84)	300877.04	100			

Source: Nikkei Financial Quest

Notes: Figures in parentheses indicates the number of listed banks and bank companies. The units of the figures are 100 million yen each

comprehensive perspective on the profit-earning activities of bank holding companies. In particular, there are many cases in which Japanese banks' investment in overseas financial institutions do not become consolidated subsidiaries due to restrictions on foreign investment in recipient countries. First, for the three major megabank groups, the contribution of the banks on a nonconsolidated basis is less than 40%, indicating a greater dependence on profits other than those of domestic commercial banks. This aspect is particularly noticeable in the case of Mitsubishi UFJ Financial Group (MUFG). Although not shown in the table, the figure for the fiscal year ending March 31, 2022 (FY2021), shows that nonconsolidated profits of MUFG Bank were 188.3 billion yen out of consolidated profits of MUFG of 1130.8 billion yen, representing only a 17% share of the total. With respect to the total values of bank holding companies, the contribution of the core commercial banks to total profits rises to 48% since the bank holding companies established by regional banks are more dependent on banking business than megabank groups. Nevertheless, it should be noted that the contribution of domestic commercial banks to the profits of bank holding companies as a whole is only about half, suggesting that the business model of the banking industry is likely to become more complex through the bank holding companies.

3.7.5 Conclusion

Ono's paper quantitatively uncovers the evolution of the banking business model by examining the banking industry's net income by item over a long period based on nonconsolidated financial statements. To complement One's paper, I also examine it from a broader perspective by utilizing the data on consolidated financial statements and bank holding companies, which enable us to capture banks' behaviors to diversify business through financial subsidiaries since the late 1990s. I overview

recent trends in the profit structure based on consolidated financial statements. The results show that the ratios of noninterest income and fee-based income have increased significantly, indicating that the banking industry as a whole is becoming more inclined toward nontraditional business. Furthermore, recent data reveal that the share of profits of commercial banks owned by bank holding companies among the total profits of bank holding companies on a consolidated basis is less than half, and for megabank groups, it is less than 40%. This suggests that bank holding companies are more likely to play an important role in the bank diversification. One of the reasons for the banking industry's increasing inclination toward nontraditional business is, as pointed out in Ono's paper, the large decline in interest income that has accompanied the decline in the interest margins between loans and deposits. Therefore, unless there is an overall improvement in the performance of the Japanese corporate sector, the trend toward nontraditional business is unlikely to change. In this sense, the extent to which and how the banking industry should engage in nontraditional business is an important issue not only for bank managers but also for policymakers. Previous studies have not reached a consensus on whether such diversification, particularly toward nontraditional business, enhances the performance of the banking industry or the stability of the financial system (Sawada 2013; Stiroh 2006; Baele et al. 2007; Brunnermeier et al. 2020). Further research in this area is anticipated to accumulate in the future, thereby contributing to the development of more appropriate designs for banking regulation and supervision systems.

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Chapter 4

The Role of Regional Financial Institutions in the Post-COVID-19 Era: Challenges for Corporate Support Beyond Finance



Nobuyoshi Yamori, Yoshihiro Asai, Tomoko Aizawa, Masao Ojima, Shingo Umino, and Masahiro Hashimoto

Abstract This chapter takes up regional trading company (“Shosha” in Japanese) function and personnel placement business as initiatives by regional financial institutions to support the core businesses of their client companies. The authors examine what should be addressed for these operations to be appreciated by client companies based on their corporate questionnaire survey. These new services are attracting the attention of borrower firms as their main concerns have shifted from cash management in the post-domestic banking crisis era to their core business—developing customers and sales channels or recruiting and training employees. As a result, regional financial institutions cannot survive through traditional deposits or lending services alone. This is consistent with the decline in profits from deposits and loan operations in the Japanese banking industry, as Ono (Chap. 3) points out. The analysis in this chapter reveals that client firms’ intentions and expectations regarding the use of both regional trading companies and recruitment services are generally low. However, the more highly a company rated the response of its main bank to the

This research was supported by the Joint Usage/Research Center, Institute of Economic Research, Hitotsubashi University (grant ID: IERPK2118).

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Covid 19 disaster, the higher its intention and expectation of using such services. The authors point out that the key to gaining acceptance of regional trading company businesses and recruitment services is to properly understand the challenges faced by borrower companies and build a business model that increases their corporate value. In his comment, “Transition to Problem-Solving Finance in Regional Financial Institutions,” Yoshiaki Ogura discusses the conditions for the success of a regional trading company’s business and recruitment services based on the findings of academic research on venture capital and relationship banking.

4.1 Introduction

Many small- and medium-sized enterprises (SMEs) experienced a significant drop in their main business revenues due to the COVID-19 disaster, leading to a critical shortage of funds. However, through borrowing, they managed their finances effectively, resulting in a low number of corporate bankruptcies. According to Tokyo Shoko Research, corporate bankruptcies in 2020 decreased by 7.2% from the previous year to 7773, marking the lowest level since 1991, and further declined to 6030 in 2021. This reflects the success of the government’s policy intention to prevent a surge in corporate bankruptcies during the COVID-19 crisis, and the financial institutions’ support for cash flow during the COVID-19 disaster has been given high marks (Small and Medium Enterprise Policy Council Financial Subcommittee 2022). However, the challenge in the post-COVID-19 era is to enhance the value of the business itself. Without such enhancement, the financial support during the COVID-19 crisis merely postpones inevitable bankruptcies.

Furthermore, as the economy globalizes, the population ages, and the economy becomes more IT-oriented, regional economies are declining and the demand for funds from financial institutions is decreasing. In response, many financial institutions have tried to maintain or increase their loan volumes, leading to intense competition for fewer borrowers and a continued decline in lending rates. As the scarcity of funds has been lost, the profitability of traditional deposit and loan businesses alone is no longer sufficient to sustain the management of financial institutions. From this perspective, supporting the core business of client companies, which differentiates them from other banks, emerges as a critical focus area for financial institutions moving forward.

Consequently, we decided to conduct a web-based questionnaire survey in October 2021, focusing on what financial institutions can do as support for the core business of client companies (the core business support). Although many surveys have already been conducted, the feature of our survey is that it focuses on the way financial institutions should support to rebuild the core business of companies in the post-COVID-19 era.

The most important point of our results is that in order for regional financial institutions to support their clients, it is essential to first deeply understand the business nature of their clients (business evaluation), and if a trust relationship

with the client is not built on a daily basis, new support measures will not be effective^{1,2}.

The structure of this chapter is as follows: Section 4.2 explains the survey method and an overview of the respondents, while Sect. 4.3 clarifies that the support companies seek in the post-COVID-19 era is nonfinancial and describes how financial institutions provide nonfinancial supports to clients. Section 4.4 discusses regional trading company functions, Sect. 4.5 is an analysis of management personnel introduction services, and Sect. 4.6 analyzes whether firms expect nonfinancial supports provided by financial institutions. Section 4.7 is a summary of the whole.

4.2 Survey Method and Overview of Respondents

We commissioned Rakuten Insight to conduct a web survey titled “Corporate Awareness of Financial Institution Support and Business Evaluation in the Post-COVID-19 Era” for small- and medium-sized enterprises from October 9 to 12, 2021. As a result, we received responses from 2500 people. Our survey was conducted after the panic situation immediately after the outbreak of the COVID-19 disaster had calmed down and the so-called zero-zero lending (interest-free and no guarantee fee) had ended in March 2021.

In this survey, in order to focus on smaller firms, the survey limited respondents to firms with up to 300 employees. Also, because we believe that those with a certain business size are more likely to have meaningful relationships with financial institutions, and because we wanted to gather as many opinions as possible from companies with management personnel needs, we decided not to include companies, including sole proprietorships, that do not employ anyone.

As a result, companies with “1 employee” (excluding respondents) accounted for 10.8%, “2–5 employees” accounted for 38.7%, “6–10 employees” accounted for 15.1%, “11–20 employees” accounted for 11.5%, while “21 or more employees” also accounted for 23.9%, making it a meaningful sample for the survey on personnel introduction business.

When asked about the current profit situation for the most recent fiscal year, 37.0% were in red, 59.8% were in black, 1.9% did not know, and 1.4% did not declare their earnings. Even amidst the spread of the COVID-19 disaster, 60% of the respondents were in the black in the most recent period.

¹Due to the space constraints of this chapter, other interesting results are omitted, but for those, please refer to Yamori et al. (2022) and Yamori (2022).

²Financial Services Agency “Explanation materials for bills submitted to the Diet (204th Diet)” March 2021. <https://www.fsa.go.jp/common/diet/204/01/setsumeij.pdf>

4.3 Corporate Challenges and Broad Support Beyond Finance

4.3.1 *Management Challenges of Small- and Medium-Sized Enterprises*

Table 4.1 shows the results of a question asking about the current struggles as a manager. While money-related issues (cash flow, fundraising) are challenges, it is clear that performance-related issues (poor performance due to changes in the business environment, securing and developing customers and sales channels, formulating sustainable business strategies) and people-related issues (securing nonmanagement employees, personnel development, absence or undecided successors) are more severe challenges.

Financial support such as loans can be effective for money-related issues, but if financial institutions only provide financial support, they can only address a small part of the company's problems. For example, for performance-related issues, support to expand sales channels and suppliers through regional trading company operations is possible, and for human-related issues, personnel introduction services can be utilized. To address the issues of companies, the use of such new operations is required.

4.3.2 *Relationship and Trust with the Main Bank*

In this survey, respondents were asked to rate on a four-point scale whether they agreed with the content of the text about regional financial institutions and small- and medium-sized enterprises. Table 4.2 shows the results for matters closely related to the theme of this chapter. The level of agreement for "Financial institutions should support companies in distress beyond providing funds" (the total of "strongly agree" and "somewhat agree") is high at 70.1%, showing that many companies believe that

Table 4.1 Current struggles as a manager

Securing and developing nonmanagement employees	38.8%
Securing and developing customers and sales channels	34.7%
Poor performance due to changes in the business environment	28.4%
Absence or undetermined successor	23.4%
Formulation of sustainable business strategy	20.5%
Cash management, fund procurement	18.1%
Lack of management-level human resources	14.0%
None in particular	11.8%
Number of responses	2500

Source: Web survey "Corporate Attitudes towards Financial Institution Support and Business Evaluation in the Post-COVID-19 Era."

Table 4.2 Level of agreement for a statement regarding regional financial institutions and small- and medium-sized enterprises

	Strongly agree	Somewhat agree	Mostly disagree	Do not agree at all	Don't know
Financial institutions should support companies in distress beyond providing funds	17.4%	52.7%	15.7%	3.5%	10.7%
Your company trusts the main bank	6.7%	46.2%	24.1%	10.5%	12.4%
The role of the main bank for your company is not just providing funds	8.4%	42.9%	24.3%	10.8%	13.7%
Your company is willing to pay for nonfinancial services from financial institutions	3.5%	38.3%	28.9%	12.6%	16.6%

Note: Questions about the main bank are based on the responses of 2439 companies with a main bank, and other questions are based on the responses of 2500 companies.

Source: Web survey “Corporate Attitudes towards Financial Institution Support and Business Evaluation in the Post-COVID-19 Era.”

financial institutions should not only provide funds but also have an attitude to support companies and regions.

Also, according to Table 4.2, the level of agreement for “Your company is willing to pay for nonfinancial services from financial institutions” was 41.8%. Although not high in absolute terms, there has been a strong opinion in Japan that services cannot be charged, but this shows that there are a certain number of companies that are positive about paying for good services.

On the other hand, the level of agreement for “The role of the main bank for your company is not just providing funds” is only 51.3%. This is probably because there are a certain number of companies that have given up on expecting broad support from their main bank in reality. In fact, the level of agreement for “Your company trusts the main bank” is also only 52.9%.

Therefore, the cross-tabulation of these two responses is shown in Table 4.3. Of the 163 companies that chose “strongly agree” for “Your company trusts the main bank,” the level of agreement for “The role of the main bank is not just providing funds” reaches 93.3%. On the contrary, for the 257 companies that chose “do not agree at all” for “Your company trusts the main bank,” only 19.8% agree that “the role of the main bank is not just providing funds.”

The far right of Table 4.3 organizes the responses to “Your company is willing to pay for nonfinancial services from financial institutions” by the responses to “Your company trusts its main bank.” For example, 77.9% of the 163 companies that strongly trust their main bank agree that they have no resistance to paying for nonfinancial services. As trust decreases, the rate of agreement also decreases. It can be said that for a main bank, in order to achieve results in fee business, it is first necessary to build a trustworthy relationship with the company.

Table 4.3 Expectations for nonfinancial roles by trust level regarding the main bank

		No. of responses	The role of the main bank for your company is not just providing funds	Your company is willing to pay for nonfinancial services from financial institutions
Trust level regarding the main bank	Strongly agree	163	93.3%	77.9%
	Somewhat agree	1127	73.7%	57.6%
	Little agree	589	31.2%	27.5%
	Not agree at all	257	19.8%	22.6%

Note: Selection rate of “strongly agree” and “somewhat agree.” The denominator includes “I don’t know.”

Source: Web survey “Corporate Awareness of Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

4.3.3 Awareness of Regional Trading Company Business and Personnel Introduction Business of Financial Institutions

In this survey, we asked about the awareness and experience of use of regional trading company business and personnel introduction business. Here, a regional trading company is explained as “a subsidiary of a bank that aims to revitalize the region by helping the sales activities of client companies through the purchase and sale of regional products, and branding regional products.” According to the appendix of the Financial Services Agency (2021), as of June 2021, 12 subsidiaries and affiliated companies are conducting “regional trading company business.” Also, according to the Financial Services Agency (2022), three new subsidiaries conducting the regional trading company business were established from July 2021 to May 2022.

For “personnel introduction business of financial institutions,” we added the explanation that “In March 2018, the supervisory guidelines of the Financial Services Agency were revised, and financial institutions such as banks and Shinkin banks can now offer personnel introduction services for a fee.” Currently, most regional banks are conducting personnel introduction business. For example, as of February 2021, out of 100 local banks (i.e., regional banks and second regional banks), 69 banks have received permission for fee-charging personnel introduction services, 16 banks plan to obtain permission, and 11 banks do not plan to obtain it (Financial Services Agency 2021). Since our survey was conducted in October 2021, it can be assumed that almost 90% of regional banks have received permission for fee-charging personnel introduction services.

Now, according to the results of our survey, for “regional trading companies operated by financial institutions,” 1.3% have used it, 8.3% have not used it but

Table 4.4 Ratio of “unknown” for regional trading companies business and personnel introduction business of financial institutions (by employee size)

	Company size (number of employees)					
	One person	2–5	6–10	11–20	21–50	51 or more
Regional trading companies business	82.2%	76.5%	72.9%	66.6%	63.5%	67.2%
Personnel introduction business	76.3%	65.1%	59.2%	48.8%	38.9%	41.1%
No. of responses	270	968	377	287	296	302

Source: Web survey “Corporate Awareness of Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

know it well, 17.6% have heard the name but do not know the details, and 72.8% do not know it. It was confirmed that while regional financial institutions are making progress in their efforts toward regional trading company businesses, awareness among small- and medium-sized business owners is not widespread. Regarding the “personnel introduction business of financial institutions,” 1.9% have used it, 13.3% have not used it but know it well, 27.3% have heard of it but do not know the details, and 57.5% do not know it. Table 4.4 shows the “unknown” ratio for each item by employee size. For example, 82.2% of “one-person” companies do not know about “regional trading companies.” Notably, even in companies with “51 or more” employees, 67.2% responded that they do not know, and the difference by company size is not significant.

On the other hand, the “unknown” ratio for the “personnel introduction business of financial institutions” varies greatly depending on the size of the company. About 70% of “one-person” or “2–5 person” companies responded that they “do not know,” while the “unknown” ratio for “21–50 person” or “51 or more” companies is around 40%. It can be considered that the personnel introduction business is somewhat recognized by larger companies.

4.4 Current Status and Issues Regarding Support by Regional Trading Company Business

4.4.1 Experience of Using Regional Trading Company Business Offered by Main Bank

Table 4.5 shows the results to the question of whether they have used the regional trading company business offered by the main bank. Looking at the overall response in the first line, 1.8% have used it, 16.0% have not used it but want to use it, and 50.2% have not used it and do not want to use it.

Only a few companies view the regional trading company business by financial institutions favorably. However, as 32.0% responded that they “don’t know,” there

Table 4.5 Experience of using regional trading company business offered by main bank (by employee size)

	No. of responses	Have used it	Have not used but want to use it	Have not used and do not want to use it	Don't know
Total	2439	1.8%	16.0%	50.2%	32.0%
One person	252	0.4%	8.3%	56.7%	34.5%
2–5	947	1.0%	14.5%	52.4%	32.2%
6–10	369	1.9%	23.0%	42.5%	32.5%
11–20	284	2.1%	15.5%	46.8%	35.6%
21–50	292	3.8%	17.1%	51.7%	27.4%
51 or more	295	3.1%	18.3%	49.2%	29.5%

Source: Web survey “Corporate Awareness of Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

is a possibility of expanding customers by raising awareness of the regional trading company business. The second and lower rows of Table 4.5 show the response results by employee size. Suppose the total of “have used it” and “have not used but want to use it” is considered as “having an intention to use.” In that case, the usage intention rate is low at less than 10% for “one-person” companies, but the rest is at a certain level of 15.5–24.9%, and it is considered that there is a certain need for the regional trading company business.

4.4.2 Effect of Business Improvement by Regional Trading Companies

When asked about the effects of management improvement on small- and medium-sized business owners that have used the regional trading company business (43 companies), 27.9% responded that it “led to management improvement,” and 30.2% responded that “it is still unknown, but improvement can be expected in the future.” Thus, 58.1% of respondents positively evaluated the regional trading company business. On the other hand, the proportion of clearly negative responses, such as “it did not lead to management improvement,” was 20.9%, and the proportion of responses, such as “it is still unknown, but it does not seem that improvement can be expected in the future” was 9.3%. Although the number of users is still tiny, the currently implemented regional trading company business appears to have a certain effect on improving corporate management. Yet, improvement in the capabilities of financial institutions is necessary to strengthen this effect further.

4.4.3 *Reasons for Avoiding the Use of Regional Trading Companies*

Why are so many companies not interested in using the regional trading company business, which is expected to have a certain level of effectiveness? Table 4.6 shows the results of the answer to that question.

“I don’t understand the services offered” is the most common, indicating that the biggest obstacle is that the regional trading company business conducted by financial institutions is not known. Also, 32.9% think that “I don’t believe it will lead to increased sales or other business improvements,” and there is a skeptical view of the support ability of regional financial institutions. Furthermore, 25.0% of the respondents answered, “I don’t see anything in my business that would benefit from the support of a regional trading company.” Clearly, conveying the function of the regional trading company business to the customer firms is necessary.

Table 4.7 is a survey of the reasons for not wanting to use a regional trading company, separately for respondents who selected “strongly agree” for two questions about the main bank (“Your company is willing to pay for nonfinancial services from financial institutions” and “Your company trusts the main bank”).

53.3% of 30 companies that “strongly agree” with “Your company is willing to pay for nonfinancial services from financial institutions” have chosen “I don’t think it will lead to improvements in management such as increased sales,” and “Fees and other burdens seem too high” also has a high selection rate. In other words, they may feel that the fees are high compared to the quality of the service. Notably, companies willing to pay for nonfinancial services from financial institutions if they receive good service have a weak expectation for the improvement effect of regional trading company business. Conversely, if the achievements of the regional trading company business can be adequately demonstrated, this could open up avenues for financial institutions to monetize their regional-trading-company operations at an early stage.

On the other hand, nearly 50% of the 53 companies that “strongly agree” with “Your company trusts the main bank” have chosen “I don’t understand the services

Table 4.6 Reasons for not wanting to use regional trading company services

I don’t understand the services offered	38.9%
I don’t believe it will lead to increased sales or other business improvements	32.9%
I don’t see anything in my business that would benefit from the support of a regional trading company	25.0%
I don’t think financial institutions will be friendly and supportive	22.2%
Fees and other burdens seem too high	22.1%
Specialized companies provide a better quality of service than financial institution subsidiaries.	7.4%
Other reasons	2.7%
Number of responses	1225

Source: From the web survey “Corporate Awareness on Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

Table 4.7 Reasons for not wanting to use (by evaluation of the main bank)

	Number of responses	I don't understand the services offered	I don't believe it will lead to increased sales or other business improvements	I don't see anything in my business that would benefit from the support of a regional trading company	I don't think financial institutions will be friendly and supportive	Fees and other burdens seem too high	Specialized companies provide a better quality of service than financial institution subsidiaries.	Other reasons
Your company is willing to pay for nonfinancial services from financial institutions	30	20.0%	53.3%	20.0%	30.0%	40.0%	16.7%	3.3%
Your company trusts the main bank	53	47.2%	22.6%	22.6%	5.7%	20.8%	3.8%	1.9%

Note: Figures for companies that answered: "strongly agree."

Source: From the web survey "Corporate Awareness on Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era."

offered.” This is the most common reason why they firmly trust their main bank but do not consider using a regional trading company. It can be said that explaining the content and benefits of new services to a group of companies that have already built a good relationship is effective in spreading these services.

4.5 Current Status and Issues of Support Through the Introduction of Management Personnel

4.5.1 Presence or Absence of Intention to Hire External Management Personnel

Table 4.8 summarizes the responses to whether they want to hire management-level personnel from outside. The most common answer, “Do not want to hire,” was 52.0%, and about half of the respondents did not want to hire outside management personnel.

On the other hand, the second most common answer, “Would like to hire if there are good candidates,” was 19.4%, and about 20% of the respondents showed a desire to hire management personnel from outside. Also, the answer, “Not at present, but may need one in the near future,” is 17.2%. Still, if these are interpreted as a potential for future hiring, 34.9% (adjusting for those who selected both) are interested in hiring management personnel from outside.

Looking at the ratio of “Do not want to hire” by employee size (the table is not posted), “one-person” companies are 71.9%, “2–5 people” companies are 63.7%, “6–10 people” companies are 48.3%, “11–20 people” companies are 40.8%, “21–50 people” companies are 34.8%, and “51 or more people” companies are 28.8%. As the company size increases, the ratio decreases. In other words, it can be interpreted that the target of the management personnel introduction business is companies of a certain size or larger. This trend is consistent with the results of Yamori and Yoneda (2022), which summarized the outline of the survey results in “Survey on Personnel Support by Financial Institutions for Small and Medium-sized Enterprises.”

Table 4.8 Desire to hire management personnel from outside

Recently hired	Currently recruiting/ requesting a recruiter	Would like to hire if there are good candidates	Not at present, but may need one in the near future	Do not want to hire	Don't know
1.7%	2.8%	19.4%	17.2%	52.0%	9.9%

Source: Web survey “Corporate consciousness regarding corporate support by financial institutions and business evaluation in the post-COVID-19 era.”

4.5.2 Proposal for Personnel Introduction Services from Main Banks

When asked whether they had received proposals or explanations for personnel introduction services from main banks, as shown in Table 4.9, the most common response was “no explanation” at 67.2%. In comparison, the response “There was a specific proposal for assistance” was only 2.9%. The second and subsequent lines of Table 4.9 summarize the responses to this question from companies that selected personnel-related issues as their management challenges. If financial institutions accurately understood the needs of these companies, it is believed that they would be particularly proactive in proposing personnel introduction services.

Indeed, compared to the overall, it is confirmed that proposals and explanations are made more frequently to companies facing challenges such as “securing employees (nonmanagement level) and human resource development” and “shortage of management-level personnel.” However, even in companies with such challenges, more than 70% responded with “no explanation,” which suggests that financial institutions are not able to perceive the needs of the companies.

Table 4.9 Presence or absence of proposals or explanations for personnel introduction services (overall and by management challenge)

	Number of responses	There was a specific proposal for assistance	No specific proposal was made, but there was an explanation of personnel introduction services	No explanation	No relationship with financial institutions
Overall	2500	2.9%	11.4%	67.2%	18.6%
Securing employees (nonmanagement level), and human resource development	970	4.6%	15.4%	66.8%	13.2%
Shortage of management-level personnel	350	4.3%	19.4%	65.7%	10.6%
Absence or undecided successor	586	2.4%	13.8%	70.1%	13.7%

Source: Web survey “Corporate Attitudes towards Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

4.5.3 *Expectations for the Management Personnel Introduction Services from Financial Institutions*

In this survey, we asked, “From the perspective of solving your company’s management challenges, do you expect the management personnel introduction services from financial institutions?” The results are shown in the first column of Table 4.10. While the combined total of “not very hopeful” and “not hopeful at all” is 65.9%, the combined total of “very hopeful” and “somewhat hopeful” is only about 10%.

However, as explained in Sect. 4.5.2, nearly 70% of respondents answered “no explanation” about management personnel introduction service from their main bank. This means that respondents may be answering “not hopeful” without sufficient information about the management personnel introduction services of financial institutions. If so, it means that financial institutions are not effectively utilizing the new customer support tool of management personnel introduction.

Table 4.10 also shows the results of organizing expectations for management personnel introduction from companies that responded that they are struggling with personnel issues. Of the companies that see “shortage of management personnel” as a challenge, 23.5% show positive expectation about the management personnel introduction. That is, the respondents are highly expecting management personnel introductions from financial institutions. Furthermore, although not shown in the table, when looking at the scale of employees, among the 86 companies with “51 or more” employees who consider the shortage of management personnel as a management issue, 5.8% “expect very much” and 29.1% “expect to some extent,” totaling 34.9% who have expectations. This is a considerably higher ratio compared to the 19.5% of the 82 companies with “21–50 employees.” It would be adequate to propose to relatively large companies that cite a “shortage of management personnel” as an issue.

Table 4.10 Expectations for the management personnel introduction services (by management challenge)

	Overall	Securing employees (nonmanagement level) and human resource development	Shortage of management-level personnel	Absence or undecided successor
Expect very much	0.8%	1.2%	2.9%	1.7%
Expect to some extent	10.5%	15.5%	20.6%	11.6%
Not very much	32.3%	38.6%	37.7%	37.4%
Not at all	33.6%	26.7%	23.4%	29.9%
Concerned	7.6%	5.4%	6.0%	7.2%
Do not know	15.2%	12.7%	9.4%	12.3%
Number of responses	2500	970	350	586

Source: Web survey “Corporate Attitudes towards Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

However, as shown in Table 4.9, only 4.3% of the respondents struggling with “shortage of management personnel” have received proposals for personnel introduction services. In order to utilize management personnel introduction for customer support, it can be said that the field staff of financial institutions need the ability to perceive customers’ concerns accurately.

4.6 Bank’s Response to the COVID-19 Crisis and Support Beyond Finance

4.6.1 General Evaluation of the Main Bank’s Response to the COVID-19 Crisis and New Support Methods

This survey asked for a five-level general evaluation of the main bank’s response to the COVID-19 crisis. The results of calculating the ratio of the intention to use regional trading companies (the total of “have used it” and “have not used but want to use it”) and the expectation for management personnel introduction (the total of “expect very much” and “expect to some extent”) by evaluation are shown in Table 4.11.

According to Table 4.11, 36.1% of the 122 companies that responded that they “highly evaluate” the overall response of the main bank in the COVID-19 crisis have an intention to use regional trading companies. On the other hand, the intention to use regional trading companies is only 11.0% for the 181 companies that “do not evaluate at all.” The more positively the main bank’s response to the COVID-19 crisis is evaluated, the stronger the intention to utilize the regional trading company business through the main bank.

On the other hand, among the 122 companies that responded that they “highly evaluate” the main bank’s response to the COVID-19 crisis, the ratio of those who expect personnel introduction from financial institutions is 31.9%, but for companies that “do not evaluate at all,” it is 3.3%. As the evaluation of the main bank’s response

Table 4.11 General evaluation of the main bank’s response to the COVID-19 crisis and the intention to use regional trading companies and expectations for personnel introduction service

	Number of responses	Intention to use regional trading companies	Expectations of personnel introduction
Highly evaluate	122	36.1%	31.9%
Somewhat evaluate	597	26.5%	18.8%
A little evaluate	547	21.8%	13.7%
Do not evaluate	390	13.8%	8.8%
Do not evaluate at all	181	11.0%	3.3%

Source: Web survey “Corporate Awareness of Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

to the COVID-19 crisis decreases, the expectation ratio for personnel introduction services by financial institutions also decreases.

These results may be due to the fact that client firms understand the response of financial institutions in the COVID-19 disaster as a manifestation of the financial institutions' ability to evaluate the business potential and their attitude of being close to their clients. The attitude of financial institutions on a daily basis is vital for implementing new support methods beyond finance.

4.6.2 Financial and Nonfinancial Support from Main Banks During the COVID-19 Crisis

In this survey, we also asked about the specific responses of main banks during the COVID-19 crisis. The responses and firms' expectations for the use of regional trading company businesses and personnel introductions by main banks are summarized in Table 4.12.

Table 4.12 Specific responses of main banks during the COVID-19 crisis and firms' expectations for the use of regional trading companies and personnel introductions

	Number of responses	Intention to use regional trading companies	Expectations of personnel introduction
They introduced us to new business partners	34	52.9%	35.3%
They sincerely helped us with management consultations other than cash flow	96	47.9%	44.8%
They kept in close touch with us online and by phone	133	40.6%	32.3%
When we asked for advice on cash flow, they responded friendly	234	36.8%	22.2%
They lent us the necessary funds	277	32.5%	22.0%
They visited us frequently	209	31.6%	24.4%
They introduced us to subsidies and helped us apply for them	176	31.3%	23.9%
They allowed us to change our repayment terms	86	30.2%	27.9%
When we asked for advice on cash flow, the response was clerical with no warmth	72	29.2%	19.4%
They were concerned about our cash flow, even though we did not ask them to do so	311	28.6%	22.2%
No officer could be said to be in charge	459	7.6%	3.1%
They didn't do anything special for us	1037	12.4%	6.8%

Source: Web survey "Corporate Awareness of Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era."

Of the 1037 companies that said “they didn’t do anything special for us,” the intention to use regional trading companies is very low at 12.4%. In contrast, in the 34 companies that said “they introduced us to new business partners,” the intention to use is 52.9%. It is one of the functions expected of a regional trading company, so they may be highly evaluating the ability of the financial institution from their usage experience.

Also, of the 96 companies that said “they sincerely helped us with management consultations other than cash flow,” the intention to use is nearly 50%. On the other hand, of the 277 companies that said “they lent us the necessary funds,” the intention to use was only 32.5%. During the COVID-19 crisis, it is normal that they worked on cash flow support. Still, the intention to receive new services from financial institutions is strengthened by receiving a more comprehensive range of support, not just cash flow support.

To confirm this point, we divided the 277 companies that said “they lent us the necessary funds” into two groups based on the answer “they sincerely helped us with management consultations other than cash flow.” Although not shown in the table, only 38 out of 277 companies chose “they sincerely helped us with management consultations other than cash flow.” Still, in these 38 companies, the intention to use regional trading companies was 47.4%. On the other hand, in the 239 companies that did not choose “they sincerely helped us with management consultations other than cash flow,” the intention to use was only 30.1%. In other words, it can be confirmed that the intention to use the regional trading company business is exceptionally high for the main banks that responded to management consultations other than cash flow, in addition to lending the necessary funds.

Looking at the expectations for personnel introductions shown in Table 4.12, 44.8% of the 96 companies that answered “they sincerely helped us with management consultations other than cash flow” have expressed expectations for the personnel introduction services of financial institutions. In addition, “they introduced us to new business partners” is also one of the nonfinancial supports, and there is a high expectation for personnel introduction services for the main banks that implemented this during the COVID-19 disaster. Similarly, efforts to maintain close relationships, such as “they kept in close touch with us online and by phone,” are also increasing the expectation ratio.

On the other hand, the expectation ratio of respondents who said: “they lent us the necessary funds” (22.0%) is lower compared to “they sincerely helped us with management consultations other than cash flow” (44.8%) or “they introduced us to new business partners” (35.3%). The expectation ratio of respondents who received financial responses such as “they allowed us to change our repayment terms” is just over 20%. In other words, financial support alone was not enough to raise firms’ expectations for nonfinancial services.

As mentioned above, during the COVID-19 disaster, many companies expect regional trading company operations and personnel introduction services only from main banks that have been supportive not only in financial aspects but also in nonfinancial aspects.

4.6.3 Importance of Trust Relationship with Main Bank

Table 4.13 uses the response results about the relationship with the main bank to organize the responses to the intention to use regional trading companies and expectations for management personnel introduction.

In companies where “there is no meaningful relationship,” the intention to use regional trading companies is only 8.8%, and the expectation ratio for personnel introduction is only 3.0%. Compared to that, the expectation ratio is higher when there is a certain trust relationship.

What is particularly noteworthy is that the expectation for the use of regional trading companies and personnel introduction is stronger among respondents who say “the main bank’s staff and branch managers fully understand our strengths, which are not just shown in the figures” and “the bank is willing to provide consultation on matters other than borrowing (e.g., developing new customers)” than those who have a sense of trust in cash flow support, “there is a sense of trust that the main bank will always be able to meet our funding needs in a stable manner.” This suggests that financial support is the norm and that the extent to which nonfinancial support has been provided is the foundation for corporate acceptance of new support methods.

Finally, we examined the relationship between the experience of receiving management advice from the main bank, the experience of the advice leading to management improvement, the intention to use regional trading companies and expectations for personnel introduction. Table 4.14 is the result.

For example, 37.8% of 230 companies that have received information about “New sales partner” from the bank had an intention to use regional trading companies. Still, for 1801 companies that have not received any information, the intention to use regional trading companies is limited to 12.2%. Similarly, of the

Table 4.13 Relationship with main bank, intention to use regional trading companies, and expectations for management personnel introduction

	Number of responses	Intention to use regional trading companies	Expectations of personnel introduction
There is a sense of trust that the main bank will always be able to meet our funding needs in a stable manner	309	31.1%	23.3%
The main bank’s staff and branch managers fully understand our strengths, which are not just shown in the figures	248	33.9%	26.2%
The bank is willing to provide consultation on matters other than borrowing (e.g., developing new customers)	205	36.1%	28.8%
There is no meaningful relationship	623	8.8%	3.0%

Source: Web survey “Corporate Consciousness on Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era.”

Table 4.14 Expectations for personnel introduction (by the track record of advice from the main bank)

	The experience of receiving management advice from the main bank			The experience of the advice leading to management improvement		
	Number of responses	Intention to use regional trading companies	Expectations of personnel introduction	Number of responses	Intention to use regional trading companies	Expectations of personnel introduction
New sales partners	230	37.8%	27.4%	105	44.8%	33.3%
New suppliers	118	39.8%	29.7%	43	55.8%	34.9%
New technologies and how to obtain them	60	45.0%	28.3%	30	53.3%	33.3%
New products and new businesses	138	39.1%	25.4%	48	47.9%	31.3%
Introduction of human resources	108	38.9%	43.5%	37	51.4%	59.5%
Introduction of experts and professional organizations	203	27.1%	23.6%	98	32.7%	33.7%
None of the above items apply	1801	12.2%	6.3%	2110	13.9%	8.1%

Source: Web Survey on "Corporate Attitudes towards Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era."

108 companies that have received advice or information on “Introduction of human resources,” 43.5% responded that they expect personnel introduction services. Still, in the case of 1801 companies that have not received any information, the expectation ratio for personnel introduction services is limited to 6.3%. In this way, if firms have experience receiving relevant advice, their intention to use regional trading companies and expectations for personnel introduction services increase.

Furthermore, if these companies have experience that advice or information has led to business improvement, their intention to use and expectations become even stronger. For example, 59.5% of companies receiving advice on “introduction of human resources” that has led to business improvement expect the personnel introduction service from the bank.

Many financial institutions have entered the regional trading company business and personnel introduction business, but it is natural that financial institutions with a poor track record of support so far will struggle in the post-COVID-19 era.

4.7 Conclusion

Many small- and medium-sized enterprises have been seriously affected by the COVID-19 disaster, but they have been able to manage their finances due to unprecedented government support measures. As a result, the bankruptcy of small- and medium-sized enterprises has been suppressed, and the unemployment rate has stabilized at a low level. However, in the post-COVID-19 era, many small- and medium-sized enterprises must transform their business structures to cope with the new normal while repaying accumulated debts. Regional financial institutions are expected to support such transformations of small- and medium-sized enterprises. Although regional financial institutions position such support as their main business, it does not seem they are necessarily producing sufficient results.

In this chapter, based on the results of our survey on “Corporate Attitudes towards Corporate Support and Business Evaluation by Financial Institutions in the Post-COVID-19 Era” conducted on 2500 small- and medium-sized enterprises in October 2021, we particularly examined regional trading company business and personnel introduction services, which are expected to be powerful tools for supporting small- and medium-sized enterprises by regional financial institutions in the post-COVID-19 era.

As a result, corporate awareness was low for all support services, and intentions and expectations were not high. However, upon detailed analysis, expectations for such new operations were higher when a trust relationship with the main bank had been built on a daily basis or when the financial institution’s response during the COVID-19 crisis was sympathetic. Furthermore, the expectations were higher when the support received so far included more nonfinancial elements, and such support had been more successful. In other words, companies do not expect new support from financial institutions that lack such attitudes and achievement.

These results suggest that while many financial institutions are entering new support operations, it is not the novelty or fee income of new operations that matters, but the attitude of conducting a solid business evaluation, understanding the real management issues of the company, and providing the best solution to solve those issues. Implementing personnel introduction or regional trading company business is not an end in itself; instead, we want to emphasize that a business model that begins with enhancing the value of client companies is required.

4.8 Comment by Yoshiaki Ogura: Transition to Problem-Solving Finance in Regional Financial Institutions

The Banking Act strictly regulates the scope of business that banks and other deposit-taking institutions can engage in. This is a regulation known as “business scope regulation.” It is a regulation aimed at protecting deposits from risks of other businesses unrelated to financial business, preventing the conflicts of interest, and preventing the abuse of the privileged position of banks, which receive preferential treatment in various systems for depositors protection, such as deposit insurance system. In recent years, this regulation has been significantly relaxed, against the backdrop of the rapid development of new financial services known as fintech and calls for more effective support for local businesses. In 2017, it became possible to establish an “advanced banking service company” for the purpose of fintech and regional trading business as a subsidiary of a bank, and in 2018, it became possible for the bank itself to engage in human resources introduction business.³ Furthermore, with the legal revision in 2021, the bank itself can now carry out a variety of related businesses, such as registered human resources dispatch, sales of self-developed apps and IT systems, data analysis, marketing, advertising, consulting, and business matching.

This paper attempts to evaluate the deregulation, particularly in terms of regional trading business and human resources introduction business from the perspective of the user companies, based on a survey of 2500 small- and medium-sized enterprises conducted by the authors in October 2021.

The survey results reveal many interesting trends. The points that seem to be of high importance are as follows:

³Financial Services Agency “Explanation materials for bills submitted to the Diet (204th Diet)” March 2021. <https://www.fsa.go.jp/common/diet/204/01/setsumei.pdf>

- ① About 40% of the survey respondents recognize “securing employees (non-management level) and human resource development” as a management issue. This is followed by “securing and developing customers and sales channels” (35%) and “absence or undecided succession” (23.4%). Only 18% of companies cite “cash flow and fund raising” as an issue.
- ② About 70% of companies agree with the statement that “financial institutions should support firms in difficulty in ways other than providing funds.”
- ③ More than half of the survey respondents, regardless of company size, answered “I don’t know” about the regional trading business of financial institutions. For the human resources introduction business, more than half of the micro enterprises with less than 10 employees answered “I don’t know.”
- ④ Companies that highly rate their main bank’s responses during the COVID-19 crisis tend to have higher intentions to use banks’ regional trading businesses and higher expectations for human resources introduction.

Many small- and medium-sized enterprises (SMEs) are struggling to secure employees (non-management level) in the above mentioned point ①, and relatively few SMEs are struggling with cash flow. This suggests that “people” rather than “money” are becoming a constraint on business growth due to unprecedented public financial support in response to the COVID-19 crisis and a nationwide decline in the working-age population. This point can indeed be clearly seen in several other surveys. Figure 4.1 shows the trend of the Employment Personnel DI (all industries) of the “Short-term Economic Observation Survey (Tankan)” conducted quarterly by the Bank of Japan. The DI is a value obtained by subtracting the percentage of firms

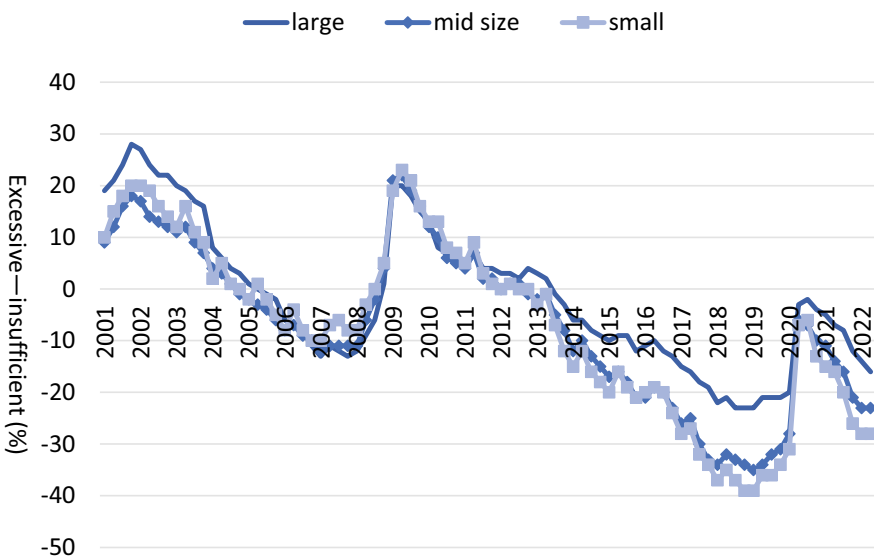


Fig. 4.1 Employment personnel DI (“excessive”—“insufficient”). (Source: Bank of Japan “Short-term Economic Observation Survey”)

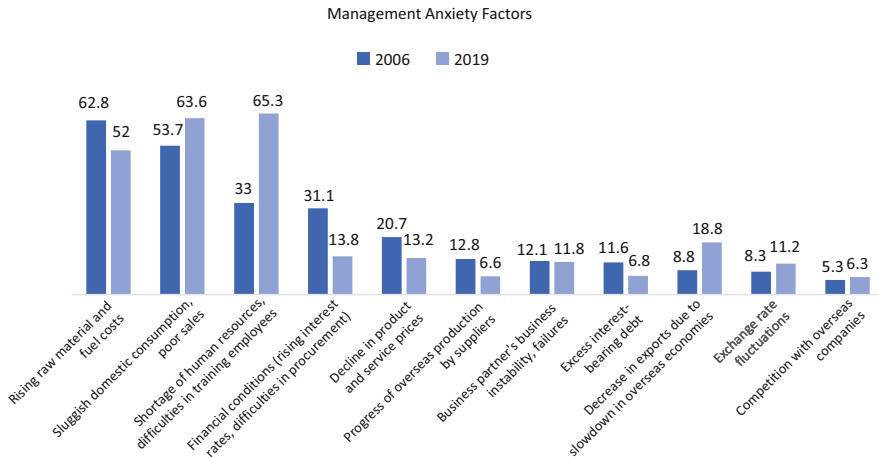


Fig. 4.2 SMEs’ “management anxiety factors.” (Source: “2006 SME Business Outlook” (SME Finance Corporation Comprehensive Research Institute, December 21, 2005) 600 SME Corporation clients. “2019 SME Business Outlook” (Japan Finance Corporation Comprehensive Research Institute, December 4, 2018) 572 Corporation clients)

that answered “insufficient” from the percentage of companies that answered “excessive” among the firms surveyed. Despite the negative shocks such as the Japanese banking crisis in the early 2000s, the global financial crisis around 2009, and the COVID-19 shock in 2020, the trend shows an increasing sense of labor shortage. The sense of shortage in small- and medium-sized enterprises since the mid-2010s is particularly noticeable.

Figure 4.2 shows the responses to the “management anxiety factors” in the annual questionnaire survey conducted by the Japan Finance Corporation for about 600 borrowing companies, comparing the 2006 survey and the 2019 survey just before the COVID-19 disaster. The most notable change from 2006 to 2019 is the significant increase in the proportion of companies citing “lack of human resources, difficulty in training” as a factor of anxiety (33→65%). These data indicate that the shortage of human resources has become a structural problem for small- and medium-sized enterprises (SMEs).

The relaxation of business scope regulations in recent years, particularly those related to personnel introduction and temporary staffing, was implemented in response to policy requests from finance-related industry associations, and was a prompt response to concerns about the shortage of human resources in small- and medium-sized enterprises, which were recognized on the front lines of business. However, as indicated in ③, awareness of these additional services has not spread. Especially in micro enterprises do not seem to receive proactive information from their main banks regarding this point. Also, as indicated in ④, those who are positive about using additional services tend to be companies that have a strong relationship

with their main bank and highly evaluate the bank's response during the COVID-19 crisis. Although not much time has passed since the start of the service, many readers may ask the following questions. Can financial institutions accumulate the personnel and know-how to effectively carry out recruitment and trading company operations? Are there merits and prospects for regional financial institutions to enter these businesses where specialized operators already exist?

If we broadly define financial institutions, there are in fact institutions that are thoroughly involved in recruiting and developing sales channels. These are venture capitals. Venture capitals provide funding to promote corporate growth through a method called staged financing (Gompers and Lerner 2004), where a venture capitalist gradually increases its investment by stepping through stages. Performance targets are set for each stage, and management personnel are dispatched and introduced to enable their achievement, as well as support for market development. Once the company has grown sufficiently, venture capital gets capital gains by going public or selling shares to other companies. Unlike banks, venture capital mainly provides equity finance, while banks mainly provide debt finance. In equity financing, the more the company grows and the higher the corporate value, the more capital gains the investor receives. Therefore, investors have a strong incentive to introduce personnel and sales channels that contribute to the growth of corporate value. On the other hand, in debt financing, no matter how much the corporate value grows, what the lender can get is only the predetermined principal and interest, so the support will tend to focus on securing the repayment rather than the growth of the company. If you only consider the revenue from a single loan contract, you can't expect a big capital gain, so such support is likely to be modest so that it doesn't cost too much. However, if the lending relationship is expected to continue repeatedly, beyond the current contract period, as the company grows, it is expected that the loans volume and the income from service fees will increase. Thus, the growth of the company will contribute to the bank's profit in the long run. This was the basic idea of relationship banking (Boot 2000).

So far, empirical studies on relationship banking have shown that the implicit liquidity insurance function, in the form of flexible funding and renegotiation when the bank considers that a borrower's difficulties to be temporary in light of its accumulated information, attracts lending customers and contributes to securing loan-deposit margins (Bolton et al. 2016, in Japan; Nemoto et al. 2016). On the other hand, to the best of our knowledge, there is no empirical evidence that differentiation through additional services such as personnel introductions, has contributed to the profits of firms and banks. Recent deregulation in Japan can be seen as the first test case in this context. The premise of relationship banking is that growing companies will continue to be customers of a particular bank for a long time in the future. If bankers anticipate that a growing firm is likely to switch to another financial institution, they will provide only a low level of support for a single contract, as described above. As indicated in ④ above, relationship banking is only possible for banks that have established a reputation for using the information they have effectively and responding accurately to customer needs.

Financial institutions need to develop expertise to provide additional services such as regional trading company functions and personnel introductions. The presence of existing specialized firms is expected to vary region to region. Especially in regions where there are enough specialized firms, it is realistic for regional financial institutions to cooperate with existing specialized firms to provide these services, rather than providing these services themselves. However, even in such cases, financial institutions need to acquire “absorptive capacity” (Cohen and Levinthal 1989) to fully digest information on these new operations in order to realize effective cooperation. In this regard, it seems meaningful to start these tasks on their own, with a view to future collaboration. Especially for personnel introductions, asymmetric information, in the sense that the hiring company does not know enough about the candidate, and the candidate does not know enough about the company, becomes a barrier in transactions. Compared to existing staffing agencies, financial institutions are believed to have strengths in information about the hidden needs and management conditions of hiring companies. There will be more moves in the future to explore collaborations that take advantage of these strengths.

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Part III
Innovations and Developments
in the Japanese Stock Market in the 21st
Century

Chapter 5

The Japanese Stock Market in the Twenty-First Century: New Market Environment Shaped by Digitization and Automated Transactions



Tokuo Iwaisako and Masahiro Yamada

Abstract This chapter examines the impact of common elements that have been the driving forces in the transformation of stock markets in developed countries since the 1980s, long before the term *FinTech* was coined. The authors examine factor investing and high-frequency trading (HFT) as examples of the impact of digitization and increasing trading speed. They discuss how they have transformed the current state of the stock markets in Japan and the rest of the world. First, factor investing, although developed in both research and practice from the 1990s to the 2000s, has lost its effectiveness since the Global Financial Crisis. The authors confirm that what has happened in the Japanese market in this regard is broadly consistent with what has happened abroad, particularly in the US. Second, regarding HFT, three characteristics of HFT in Japan are identified: a dramatic increase in trading value share, a stronger aspect as a liquidity consumer that trades using supplied liquidity rather than as a liquidity provider that offers limit orders in advance, and a high ability to earn trading profits. Regarding the second point, the comment in this chapter, “Changes in Liquidity in the Japanese Stock Market” (Wataru Ohta), points out that the liquidity of the Japanese stock market, measured by the effective spread, has been declining since the 2000s and that it has become difficult to make profits by providing liquidity.

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5.1 Introduction

A common image that comes to mind when looking back at the history of the Japanese stock market is the loud and frenetic trading floor of the Tokyo Stock Exchange (hereafter, TSE), filled with traders at the height of the bubble economy in the late 1980s. However, if you visit the TSE today, while there are gimmicks on the floor, such as an electronic bulletin board that speeds up in proportion to trading activity, you will only see the exchange staff sitting at their desks, going about their business in an unobtrusive manner.

This is the result of the digitization and ever-increasing acceleration of transaction speed that has occurred in stock markets in all advanced economies. Stock markets are generally considered to be the real markets that most closely resemble the theoretical model of perfect competition, and from an optimistic point of view, the efficiency gains from electronic and high-speed trading should have brought today's financial market closer to the ideal. What has happened in the real market, however, is far more complex. Electronic and high-speed trading has given rise to new trading strategies and business models. As these trends continue, concerns have been raised about whether new trading strategies are taking profits away from other market participants and/or creating instability in the market. In response to the evolution of the market, we have seen regulators implement various regulatory and institutional reforms to ensure fairness and systemic stability.

Algorithmic trading is a major business model that has emerged as a result of the computerization and acceleration of stock market trading. This chapter focuses on two particular types of algorithmic trading, namely factor investing, as represented by the Fama–French three-factor model, and high-frequency trading (HFT). The basic idea of factor investing is that the cross-sectional pattern in the stock market can be summarized as the sensitivity of individual stocks to the fluctuations of a relatively small number of factor variables. The concept predates the full development and expansion of algorithmic trading. However, the Fama–French model that appeared in the early 1990s, combined with the expansion of algorithmic trading, became very influential not only in academic research but also in financial practice over the next quarter century. On the other hand, HFT, which emerged in the mid-2000s, is a type of trading strategy that specializes in physical speed competition, in which relatively simple trading strategies are repeated at high speed.

This chapter presents the evolution and current status of factor investing and HFT in a way that is easily understood by economists and practitioners who are not familiar with the field. We summarize the important results of recent academic research in the field of asset pricing through a discussion based on empirical analyses of Japanese stock market data.

This chapter is organized as follows. Section 5.2 discusses the benefits and concerns of the digitization and acceleration of financial transactions based on actual data and events. Section 5.3 discusses value investment strategies using factor models, comparing Japanese and US data with a focus on the Fama–French model. Section 5.4 introduces major discussions on HFT, which has rapidly

increased its presence in the market since the late 2000s, and sheds light on the current situation in Japan using the latest data. Section 5.5 provides a summary and conclusions.

5.2 The Benefits Brought by the Digitization and the Acceleration of Trading Speed and Potential Instability of the Financial System

When the Tokyo Stock Exchange introduced an electronic trading for the 33 stocks on the Second Section of the TSE in January 1982, the daily order processing capacity was approximately 100,000 orders. The trading capacity increased to 12 million in January 2006, 14 million in November 2006, 137 million in January 2010, when the current electronic trading system, *Arrowhead*, was launched, and 270 million when the system was renewed in September 2015. The number of contracts has increased at an accelerated pace, from 137 million in January 2010 to 270 million in the September 2015 renewal. The most recent renewal in November 2019 also included various enhancements in order to compete with overseas markets, including measures to make it easier to execute trades at the close of trading, measures to control sudden stock price fluctuations, and transaction processing capacity during periods of high order volume.¹

In the United States, fully electronic trading platforms had already appeared in the mid-1990s, and trading was rapidly becoming more automated and faster. At the same time, advanced asset management and risk management techniques based on quantitative approaches, or *quant*, developed and took hold. Factor investing, which will be discussed in this chapter, has played a central role in the evolution of the asset management business in the past 30 years. The acceleration of transaction speed also dealt a severe blow to the vested interests of the stockbrokers who, against the backdrop of the deregulation trend of the time, generated revenue through market making (Patterson 2013). As a result, competition for order execution in the US market became even more intense in the 2000s, with overall market trading volume doubling between 2001 and 2010, while trading costs fell to less than 50% of the previous levels. This is due to the growth of computer-based algorithmic trading strategies. The decline in trading costs is interpreted as a positive aspect of the spread of this trading environment (Menkveld 2016).

On the other hand, there have been a number of events that suggest that algorithmic trading has become a source of market instability. For example, during a one-week period in early August 2007, many funds employing a type of investment strategy called Long-Short Equity, which had been very successful in the early

¹See Japan Exchange Group webpage. <https://www.jpx.co.jp/english/systems/equities-trading/01.html> (last accessed July 2023).

2000s, suffered unprecedented losses. This event, known as the *Quant Meltdown*, is believed to have been initiated by turmoil in the market for mortgage-backed securities and their derivatives. Losses in these asset classes were incurred by financial institutions that were forced to rapidly liquidate their asset holdings. As a result, the correlations between various factors used in factor investing models and between factors and asset returns changed and became unstable (Khandani and Lo 2011).

High-frequency trading (HFT) gained wide attention after the Flash Crash of May 6, 2010, when the US stock market and its futures experienced a significant intraday price decline and volatility increase. On that day, the Dow 30 Industrial Average temporarily fell by about 9%, but this drop was not accompanied by any specific news, exposing previously unrecognized vulnerabilities in the stock market. Although the Flash Crash was in fact caused by a combination of various factors (Vaughan 2020), one of the main factors postulated was the hot potato phenomenon caused by HFT. This refers to a phenomenon in which large amounts of assets are continuously traded among HFTs during price declines, just like hot potatoes being passed around one after another. In response to such an event, Nobel Prize winner in economics Joseph E. Stiglitz has expressed concern that HFT is a negative-sum game, harmful to both price discovery and liquidity provision, and increases social costs (Stiglitz 2014).

5.3 The Fama–French Model and the Evolution of the Value Investing in the Japanese and US Stock Markets

5.3.1 Value Investing Strategy and the Fama–French Three-Factor Model

The stock market as a whole has often been overvalued, which has sometimes leading to the huge asset price bubbles and subsequent crashes. In retrospect, such overvaluations such as Japan’s bubble economy in the late 1980s and the dot-com bubble in the United States in the early 2000s seem self-evident. However, it is not easy for even the smartest professional investor to identify when the market as a whole is undervalued in real time, buy at a discount, and sell out when the market is overvalued.

Therefore, the investment technique most widely used in the asset management industry is called *value investing*, which aims to make a profit by buying stocks that are relatively undervalued at the same point in time and selling (or shorting) stocks that are overvalued, rather than focusing on the level of the market as a whole.

The prototype of value stock investors commonly cited are Benjamin Graham, who is called the “Father of Value Investing,” and his disciple Warren Buffett, who is still active at over 90 years of age. Graham and Buffett basically only take long positions, buying undervalued stocks after carefully identifying good stocks to

hold for the long-term. In contrast, since the 1990s, brokerage firms and investment funds have adopted more systematic and quantified trading methods—known as *quants*—to identify value stocks. This new generation of value investors trades more frequently, actively taking short positions in overvalued stocks take as well as long positions in undervalued stocks. At the core of their investment strategy is the factor investing, represented by the three-factor model proposed by Eugene Fama and Kenneth French.²

In a series of papers in the early 1990s, they proposed an asset pricing model that came to be called the “Fama–French three-factor model” (hereafter, the FF model), and the FF model has since become the most important benchmark for asset pricing in both academic research and financial practice. More specifically, Fama and French (1992, 1993) suggest the existence of a firm size effect, whereby the performance of small-cap stocks outperforms that of large-cap stocks, using 30 years of US market data from the 1960s to the early 1990s. At the same time, they provide strong evidence of the so-called value effect, by grouping individual stocks based on the book-to-market ratio (hereafter, BM ratio), which is the ratio of the firm’s value as measured by accounting data to its value as measured by market valuation. Value stocks (i.e., undervalued) with high BM ratios have higher average returns than growth stocks (i.e., overvalued) with a low BM ratios. Based on these results, they proposed an asset pricing model in which the returns of individual stocks or portfolios depend not only on the market portfolio, but also on the two factors mentioned above.

$$R_{i,t} = \alpha_i + \beta_{M,i} \text{MKT}_t + \beta_{\text{SMB},i} \text{SMB}_t + \beta_{\text{HML},i} \text{HML}_t \quad (5.1)$$

The first factor, $\text{MKT}_t \equiv R_{M,t} - R_{Mf,t}$, is the excess return of the market portfolio over safe assets at the same point in time as in the CAPM. The second factor, SMB, is the difference in returns between small-cap and large-cap portfolios, based on firm sizes measured by market capitalization. The third factor, HML, is the difference in return between the portfolios of stocks with high and low BM ratios. It is customary to refer to the former as the SMB factor, which stands for “small-minus-big,” and the latter as the HML factor, which stands for “high-minus-low.”³

Fama and French (1992, 1993) report in Eq. (5.1) that both $\beta_{\text{SMB},i}$ and $\beta_{\text{HML},i}$ are positive and statistically significant. The means of SMB_t and HML_t are also positive and statistically significant. These results suggest that one can construct a trading strategy that, on average, outperforms the market portfolio by buying small stocks and selling large stocks, buying stocks with high BM ratio (value stocks) and selling

²See Campbell, Lo, and MacKinlay (1997, Chap. 6) and Ang (2014) for more general explanations of factor models in finance.

³More precisely, the SMB factor is defined as the difference in the rate of return between the small-cap and large-cap portfolios, where all stocks are sorted by company size (= share price × number of shares issued) and separated at the 50% point. On the other hand, the HML factor is defined as the difference between the rates of return of the high BM ratio portfolio and the low BM ratio portfolio, where the top 30% of all stocks are sorted by BM ratio and the bottom 30% of all stocks are sorted by BM ratio. See Kenneth French’s webpage: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/ff-factors.html (last accessed February 2024).

(i.e., going short) stocks with low BM ratio (growth stocks). In addition, when the degree to which the BM ratio of value stocks exceeds the BM ratio of the market as a whole is higher than normal, investors should seek higher performance by increasing their allocation to value stocks more aggressively.

Fama and French (2017) also present the international evidence—for the period 1990–2015, there exists a so-called “value premium” in the stock markets of the European and Asia-Pacific regions, including Japan, where the average returns of value stocks significantly exceed those of growth stocks or market portfolios, as in the US market. In an important early study of the Japanese market, Chan, Hamao, and Lakonishok (1991) reported that the value premium in the Japanese market was larger and statistically more significant than in the United States, while the firm-size effect was barely observed.

The FF model was an academic triumph in that it explained the cross-sectional pattern of differences in expected returns better than the earlier benchmark, the CAPM. At the same time, the FF model paved the way for automated higher-frequency investment strategies by replacing the method of identifying value stocks, which had previously been considered a skill of professional portfolio managers, with numerical criteria such as the BM ratio. These “successes” ultimately led to Eugene Fama being awarded the Nobel Prize in Economics for his contributions to financial economics in 2013.

However, the above discussion oversimplifies the evolution of actual investment strategies in practice. For example, prior to the Lehman shock, the positive expected excess returns of trading strategies based on the BM ratio were relatively stable as will be described later, but the absolute values were not very large. Therefore, the actual value investment strategy using the BM ratio used significant leverage. The FF three-factor model is only a benchmark, and financial institutions and investment funds use more complex trading strategies that use more factors based on their own analysis. For a more detailed discussion and analysis of investing strategies based on quantitative approaches based on the Fama–French model and beyond from an academic perspective, see Lo (2010), Ang (2014), and Pedersen (2015).

In the mid-2010s, however, both researchers and practitioners began to recognize a significant decline in the performance of value investment strategies based on the Fama–French three-factor model in the US stock market (Fama and French 2021). Looking back, the decline of the value premium in Japan began around the time of the global financial crisis in the late 2000s, triggered by the Lehman shock in September 2008.

5.3.2 Actual Performance of Value Investing Strategies in the Japanese and US Stock Markets

Let us confirm our discussion so far with actual data.⁴

⁴See Cadamuro and Iwaisako (2023) for the original full discussion in this section.

5.3.2.1 Performance of the Fama–French Portfolio

Table 5.1 reports the average annualized values for each of the three factors, MKT, SMB, and HML. The full sample period is from September 1977, the first date of the available Japanese data, to March 2022. It is divided into two subsamples: the period up to August 2008, just before the Lehman shock/Global Financial Crisis (pre-Global Financial Crisis), and the period from September 2008 to December 2019, just before the market turmoil caused by the pandemic of the new coronavirus (post-Global Financial Crisis). In addition, the pre-Global Financial Crisis period is divided by late 1998/early 1999 (Pre-Global Financial Crisis I and II), as this is necessary for the analysis using the predictive regression described below.

First, the excess return of the market portfolio, MKT, is 3.72% in Japan and 8.51% in the United States, a difference of nearly 5 percentage points for the full sample, reflecting the difference in the performance of the two stock markets after the burst of the bubble in the early 1990s. The difference is even larger, more than 7.5 percentage points, in the subsample from pre-GFC I to the end of the 1990s. In the pre-GFC II sample, which includes the bursting of the US dot-com bubble and the period of stagnation immediately before the Lehman shock, the two countries' performance is reversed. However, in the post-GFC sample, the US market recovery was much stronger, and the US performance again outperforms Japan's by less than 5 percentage points.

Next, in the full sample, the average HML return for Japan was 9.48%, while that for the United States was 2.42%, with Japan being more than 7 percentage points

Table 5.1 Performance of Fama–French portfolios in the Japanese and US markets

Panel A: Annualized average return			
Japan	MKT	SMB	HML
(1) Full sample	3.72	0.48	9.48
(2) Pre-GFC I	1.92	−0.49	11.16
(3) Pre-GFC II	2.88	−1.56	13.68
(4) Post-GFC	6.42	4.44	4.92
The United States	MKT	SMB	HML
(1) Full sample	8.51	1.87	2.42
(2) Pre-GFC I	9.64	0.71	3.82
(3) Pre-GFC II	0.68	6.30	5.63
(4) Post-GFC	11.10	0.32	−2.57

MKT: Excess return of market portfolio over risk-free rate

SMB: Small minus big (the average return on the three small portfolios minus the average return on the three big portfolios)

HML: High BM ratio minus low BM ratio (the average return on the two value portfolios minus the average return on the two growth portfolios)

Sample periods

(1) Full sample: September 1977 to March 2022

(2) Pre-GFC I: September 1977 to December 1998

(3) Pre-GFC II: January 1999 to August 2008

(4) Post-GFC: August 2008 to December 2019

higher. In the subsample, the annual HML returns in the pre-GFC I and II periods were all above 10%, and in the pre-GFC II period, they were about 8 percentage points higher than those in the US market. On the other hand, in the post-GFC subsample, the HML returns in Japan and the United States are 4.92% and -2.57% , respectively, which are much lower than the pre-crisis returns in both countries. In the United States, stocks with low BM ratios outperform stocks with high BM ratios, so that we observe a “value discount” for this particular subsample. Finally, average of SMB returns becomes lower than the HML returns, although it remained stable and positive in the US market before the Global Financial Crisis. In Japan, on the other hand, the average SMB return was zero or slightly negative in Japan. These results are consistent with Chan, Hamao, and Lakonishok (1991) and other early analyses of Japanese data. Finally, since the Global Financial Crisis, the average SMB return in the United States has fallen to 0.32 percent, while the average SMB return in Japan is 4.44 percent, much higher than in the United States.

5.3.2.2 Recent Decline of the Value Premium in Japan

For a more in-depth discussion of the Japanese data, we will analyze the returns of individual portfolios sorted by firm size and BM ratio, which are used to create the SMB and HML factors. Specifically, we will analyze the excess return over the market portfolio for four sorted portfolios: small-value (SV), large-value (BV), small-growth (SG), and large-growth (BG). The universe of individual stocks used in the analysis in Table 5.1 consists of all stocks in the First and Second Sections of the Tokyo Stock Exchange, excluding the bottom 20% of companies that are considered unlikely to be subject to quantitative trading strategies employed by large financial institutions. The full sample runs from 1999 to the end of 2019, just before the global pandemic caused by COVID-19, and is divided into two subsamples at the end of August 2008. The first half of the sample period corresponds to (3) “Pre-GFC II” in Table 5.1, while the second half corresponds to (4) “Post-GFC.”

Panel A of Table 5.2 shows the average excess return of each portfolio for sample (3) in Pre-GFC II period and sample (4) in Post-GFC period, and the last column shows the difference between the two periods (sample (4)–(3)). Panel B shows the estimation results of the following predictive regression, which regresses the excess return of portfolio i on the difference between the current BM ratio of portfolio i and the BM ratio of the market portfolio (excess BM ratio) in the previous month.

$$R_{i,t+1} - R_{M,t+1} = \gamma_i + \delta_i(BM_{i,t} - BM_{M,t}) + \epsilon_{it} \quad (5.2)$$

If, as hypothesized in the series of papers by Fama and French, profits from value investing strategies arise from the process of prices of stocks whose BM ratios deviate from their long-run average, then if the BM ratio is higher (lower) than the

Table 5.2 Performance of size/BM sorted portfolios and predictive ability by BM ratio: pre-GFC vs post-GFC comparison

Panel A: Excess return over market portfolio (%)			
	Sample (3)	Sample (4)	(4)–(3)
SV – Rm	0.70	0.60	–0.10
BV – Rm	0.88	0.36	–0.52
SG – Rm	–0.23	0.22	0.45
BG – Rm	–0.37	–0.11	0.48
Panel B: Monthly predictive regression			
Sample (3): 1999:1–2008:8			
	γ	δ	adj. R2
SV – Rm	–2.286***	3.199***	0.057
	[0.720]	[0.766]	
BV – Rm	–0.429	1.658	0.004
	[0.836]	[1.271]	
SG – Rm	0.263	2.323	–0.007
	[0.777]	[3.808]	
BG – Rm	0.601	4.507	0.015
	[0.835]	[3.501]	
Sample (4): 2008:8–2019:12			
	γ	δ	adj. R2
SV – Rm	–2.985**	3.485***	0.052
	[1.068]	[1.133]	
BV – Rm	–3.125	4.368	0.043
	[1.976]	[2.758]	
SG – Rm	2.150**	5.227**	0.012
	[0.850]	[2.295]	
BG – Rm	0.081	0.528	–0.007
	[0.452]	[1.452]	

Note: (***) and (**) indicate that the coefficient is statistically significant at the 1% and 5% level, respectively. In parentheses are the Newey-West standard errors.

market average, stock prices should tend to rise (fall) in the next period. Therefore, if this month's $BM_{it} - BM_{Mt}$ is high, next month's return should be high, so δ_i is expected to be positive.

First, in panel A, for the sample (3) prior to the global financial crisis, the average returns for the two portfolios with high BM ratios (SV and BV) are both positive, while the average returns for the two portfolios with low BM ratios (SG and BG) are both negative. In both cases, there is no clear difference by firm size. Thus, the analysis of the average returns of the factors in the FF model in the previous subsection is confirmed by the portfolio excess return data. On the other hand, in sample B after the Global Financial Crisis, the excess returns of value stocks with high BM ratios declined while those of growth stocks with low BM ratios increased. In particular, the decline in the performance of large value stocks and the increase in the performance of small growth stocks are evident.

Next, looking at the estimation results of the predictive regression in panel B, the estimated values of δ , the coefficient of the BM ratio, are all positive, especially for small value stocks (SV), where the estimated values are above 3 regardless of the period before or after the global financial crisis, and all are significant at the 1% level. Therefore, as hypothesized in equation (5.2), the positive return of HML, that is, the difference between the returns of stocks with high BM ratios and those with low BM ratios, can be predicted to some extent by the deviation from the long-run average BM ratio. The source of the predictable HML returns is found to be small value stocks in particular.

For the large-value stock (BV) portfolio, none of the coefficients in the estimating equations are statistically significant for both subsamples, but the value of the constant term γ drops significantly from -0.429 before the global financial crisis to -3.125 after the crisis. For small growth (SG) stocks, the value of γ increases from 0.263 to 2.151 and δ increases from 2.323 to 5.227 before and after the Global Financial Crisis, and both estimates are statistically significant. Conversely, for the large growth stocks (BG), γ decreased from 0.601 to 0.081 and δ decreased from 4.507 to 0.528 . Although the changes in the constant terms of the predictive regression before and after the global financial crisis are not statistically significant, they are consistent with the average return of the HML in Table 5.1 and the average excess return of the portfolios in panel A of Table 5.2.

The results of the analysis so far suggest that the decline in HML's returns and value premiums in the decade following the Global Financial Crisis was driven by a pattern in which large stocks with high BM ratios continued to fall in price and small stocks with low BM ratios continued to rise. However, it is not clear whether this was a phenomenon that could be characterized as a structural change in the returns of the size-BM sorted portfolios. On the other hand, the predictability of the BM ratio has persisted even after the global financial crisis, and the estimation results of the predictive regression equation suggest that a mechanism that generates positive HML returns, as suggested by Fama and French, still exists, especially for small stocks.

5.3.3 Why Has the Value Premium Declined?

The underperformance of value investing strategy in the 2010s was initially seen as a consequence of the market turmoil caused by the Lehman shock and the subsequent prolonged global recession. But, by the mid-2010s, it was recognized as an undeniable statistical fact. Many funds that had adopted investment strategies based on the Fama–French framework had performed poorly. In the late 2010s, a number of studies have attempted to identify the causes of the downturn in value investing strategy appear. In this section, we review such recent contributions.

First, it is argued that investors' adaptive learning about the profit opportunities behind value stock strategies may have led to their own depletion. If the predictability of returns based on BM ratios reflects mispricing, then investors who have

become sophisticated through the publication of academic papers should learn about it quickly. If trading strategies incorporating such academic findings become widespread, the excess returns predictable by the predictor variables under analysis should disappear, or at least attenuate, after the publication of the paper. McLean and Pontiff (2016) examine 97 variables (factors) reported in academic papers to predict the cross-sectional pattern of stock returns, such as the BM ratio, and report that the predictive power has significantly declined for about 60 percent of them after the papers' were published. They attribute this to evidence that institutional investors adaptively learn about mispricing/profit opportunities (from academic papers).

Second, the growing importance of intangible assets in corporate valuation might have weakened the effectiveness of the BM ratio as a measure and predictor for value investment. The source of firm value of giant ICT firms such as GAF A, which have been a driver of strong economic growth in advanced economies in the 2010s, especially in the United States, includes many features that are difficult to value using traditional accounting standards, such as competitiveness in cutting-edge technologies and huge amounts of customer information accumulated through e-commerce. The claim that the effectiveness of accounting value based on traditional standards as an indicator of corporate fundamentals/intrinsic value has declined significantly in recent years. For example, Arnott et al. (2021) suggest that a significant part of the recent decline in the value premium can be explained by the successful quantification of technological capabilities (using patent data) and brand value, as well as the inclusion of intangible assets held by companies in accounting values.

It should be noted, however, while these arguments seek the cause of the recent downturn in value investing in the diminished effectiveness of the BM ratio as a measure of value stocks, they do not deny the basic principle of value investing, "buy low, sell high." The reason that the Fama–French three-factor model has become widely used in the investment management industry is that it has made it possible to construct investment strategies that are easy to understand and replicate based on quantifiable criteria such as the BM ratio. The fact that they are easily quantifiable and replicable means that this type of investment strategy can be easily digitized and high-speed trading can be achieved. On the other hand, the effectiveness of the BM ratio as a measure of value stocks was not invariant posteriori, possibly for the reasons pointed out by McLean and Pontiff (2016).

The rapid increase in the use of similar investment methods due to digitization may have rendered the trading strategy based on the Fama–French three-factor model obsolete, causing the BM ratio to lose its effectiveness. Therefore, it is quite possible that a new measure of value stocks will emerge in the future to replace the BM ratio and restore the effectiveness of value investing. However, it is also quite possible that the generalization of trading strategies based on the new criterion will lead to a repetition of the weasel-like cycle in which the effectiveness of the new criterion will disappear again (Iwaisako 2022).

5.4 High-Frequency Trading (HFT) in the Japanese Stock Market

5.4.1 Institutional Background and Current Status of HFT

As mentioned at the beginning of this chapter, HFT has been criticized from the perspective that it increases social costs associated with increased competition and can cause market instability. On the other hand, its defenders argue that HFTs' trading strategy is market-making, and that HFT firms provide liquidity that is essential for market transactions. In other words, HFT firms read market information quickly to estimate the intrinsic value of traded assets and trade in a direction that corrects for price deviations from that value, while also reducing the volatility of price fluctuations through the liquidity-providing behavior of limit orders (Menkveld 2013). However, the behavior of HFT firms during the 2010 flash crash did not fall into this category (Kirilenko et al. 2017), and debates over whether HFT contributes to market stability continue to this day.

In the United States, there is also a concern about the strong ties between exchanges and HFT, as exchanges rely on HFT as a liquidity provider. In contrast to Japan, transactions in the United States are distributed across multiple exchanges, and electronic trading at exchanges, centered on the Nasdaq market, has been developing since the 1990s. However, the fragmentation of the exchanges was problematic as it led to price discrepancies across different venues. Regulation NMS, which was enacted in 2005 to address this problem, strengthened the obligation to execute at the National Best Bid and Offer (NBBO), but the emergence of new smaller exchanges created further fragmentation in terms of liquidity dispersion (U.S. Securities and Exchange Commission 2013). Exchanges began to give preferential treatment to HFT firms in order to ensure liquidity. Examples of such measures include providing incentives such as rebates for liquidity provision using limit orders, rather than imposing fees; increasing the speed of market information dissemination; diversifying order options useful for HFTs; and reducing order latency. However, these measures have complicated the trade execution system, and the large volume of orders placed by HFTs has inflated the market information, making monitoring and analysis difficult.

In Japan, the market share of HFT firms has been gradually increasing due to the improvements in order execution speed with the introduction of Arrowhead by the TSE in 2010, and their presence has been growing, with HFTs actively participating in market making in the ETF market. In response to this situation, HFTs connected to the Tokyo Stock Exchange (TSE) have been required to pre-register since 2018, and as of May 2022, 51 firms had registered. This mechanism allows the Financial Services Agency (FSA) to understand the trading strategies of HFTs in advance. It also allows for analysis using data that identifies the ordering party for each order, and a summary of this research is published quarterly. On the other hand, only one out of the 51 pre-registered HFTs is a domestic firm, and HFTs' presence is not as large as in the United States when compared to the share of orders and value traded.

The reasons for this include (i) arbitrage trading, which exploits the differences in trading conditions among multiple exchanges, is one of the sources of HFT revenue in the United States. In Japan, however, trading is concentrated on the TSE (90–95% of trading value of exchange-traded issues in Japan),⁵ and there are few arbitrage opportunities for HFTs; (ii) the TSE charges a small volume-based fee for each order, so it is costly to place a large number of limit orders; and (iii) except for ETFs with a market-making system, there are no incentives from the exchanges to provide liquidity.⁶

5.4.2 Issues and Current Status of HFT Research

With the above background, themes based on the “economics/finance” perspective have been studied theoretically and empirically, including (1) lower transaction costs due to liquidity provision by HFTs, (2) imbalance in trading profits (or social welfare) between HFTs and non-HFTs, and (3) improvement in price efficiency by HFTs. The U.S. Securities and Exchange Commission (2014) and Menkveld (2016) provide surveys of academic research on such issues. The general consensus of the existing empirical studies is that the existence of HFTs increases liquidity and price efficiency, and that HFTs gain a certain amount of profit from trading against non-HFTs.⁷ On the other hand, Budish, Cramton, and Shim (2015) theoretically argue that the speed competition conducted by HFTs not only increases social costs but also negatively affects liquidity, and Aquilina, Budish, and O’Neill (2022) empirically demonstrate this with data.

Studies using data on HFT in the Japanese stock market include Fukuda (2016), Hosaka (2014), Saito et al. (2018), Goshima, Tobe, and Uno (2019), Bellia et al. (2017), Oyama and Tsuda (2020), among others. In addition, the presence of HFT has been considered an important factor in the general analysis of stock market microstructure in recent years.

⁵Based on TSE’s share of total trading value of TSE, Japannext, and Chi-X from 2012 to 2022, from CBOE Monthly Report (Chi-X) and Japannext statistical data table.

⁶JPX “Transaction Participation Fees” (<https://www.jpx.co.jp/rules-participants/participants/fees/index.html>). The Tokyo Stock Exchange has introduced a market-making system that places designated market makers who have an obligation to quote to increase the liquidity of ETFs with small trading volumes. Designated market makers can earn incentives by supplying liquidity, and many HFTs have entered. JPX “Market Making System” (<https://www.jpx.co.jp/equities/products/etfs/market-making/index.html>) (both URLs last accessed in July 2023).

⁷Carrion (2013), Menkveld (2013), Brogaard, Hendershott, and Riordan (2014), Baron et al. (2019), etc.

5.4.3 Analysis Using Tick Data with Order Identification

In the following, we attempt to analyze liquidity provision and profits of HFTs using the transaction data in the TSE. The sample period of the data spans from 2010 to 2021; and in order to clarify the relative trends in HFT activity, we also identify and compare proprietary trading by securities companies (hereafter, proprietary trading) and individual investors. In the following analysis, we focus on the stocks listed on the First Section of the Tokyo Stock Exchange as samples.

From publicly available data provided by exchanges, such as Nasdaq-ITCH and TSE FLEX-Full, it is difficult to identify an order coming from an HFT. In order to make this identification, it is desirable for exchanges and regulators to provide information on the entity distinction for each order. However, this type of information is extremely confidential, making it difficult to use in academic research. We address this issue by using data provided by the Japan Exchange Group (JPX) for researchers. The data contain the ID of the virtual server used to place each order, and by analyzing the trading trends of each virtual server, we can identify HFT trades. These virtual server IDs do not change throughout the period as long as the version of the Arrow-head matching system remains the same, allowing for analysis of long-term trends.⁸

5.4.3.1 Identification of the Investment Entity

For the identification of HFT firms using the data, there are the criteria established by Hosaka (2014) and their improved version by Oyama and Tsuda (2020). These criteria classify virtual servers and identify HFT based on several indicators such as low execution rate, high cancellation rate, low proportion of market orders, and low proportion of manual orders. We follow Oyama and Tsuda's (2020) criteria, and readers interested in the details are referred to Yamada (2023) for a more detailed explanation, as the specifics are rather technical.

In addition to HFT firms, there are two other investment entities that can be identified in the TSE market data. One is orders placed by securities firms themselves as TSE market participants for their own accounts (i.e., proprietary trading), which can be identified by the proprietary / brokerage flags recorded in the data. Orders from retail brokerage firms can be identified by the utilization rate of margin trading. This identification is based on the observation that margin trading is predominantly used by individual investors; the virtual servers with margin trading activity are likely to be those of retail brokerage firms.⁹

⁸Virtual server IDs were reassigned when the matching system was updated on September 24, 2015, and November 5, 2019. Therefore, it is not possible to track the same entity across these periods, but it is possible to track the entire HFT. For details of the data, please refer to the aforementioned Japanese HFT studies (e.g., Hosaka 2014).

⁹There are several other indicators that are useful for identification, but we omit them here. For more detailed information, including comparisons with published statistics, see Yamada (2021).

In this section, we first identify virtual servers operated by HFT firms, then virtual servers operated by retail brokerage firms, and then orders/executions that are flagged as proprietary trading. All other orders are considered “other entities.” It should be noted that even if a trade identified as HFT has a proprietary flag, it is counted as HFT, not proprietary trading by the brokerage firm. “Other entities” may include foreign investors and domestic institutional investors who are not registered as market participants.

5.4.3.2 Share of Trading Value and Number of Orders Placed by Entity

First, we observe the share of each entity in terms of trading value and number of orders placed (Fig. 5.1). In terms of trading value, the share of HFTs has remained

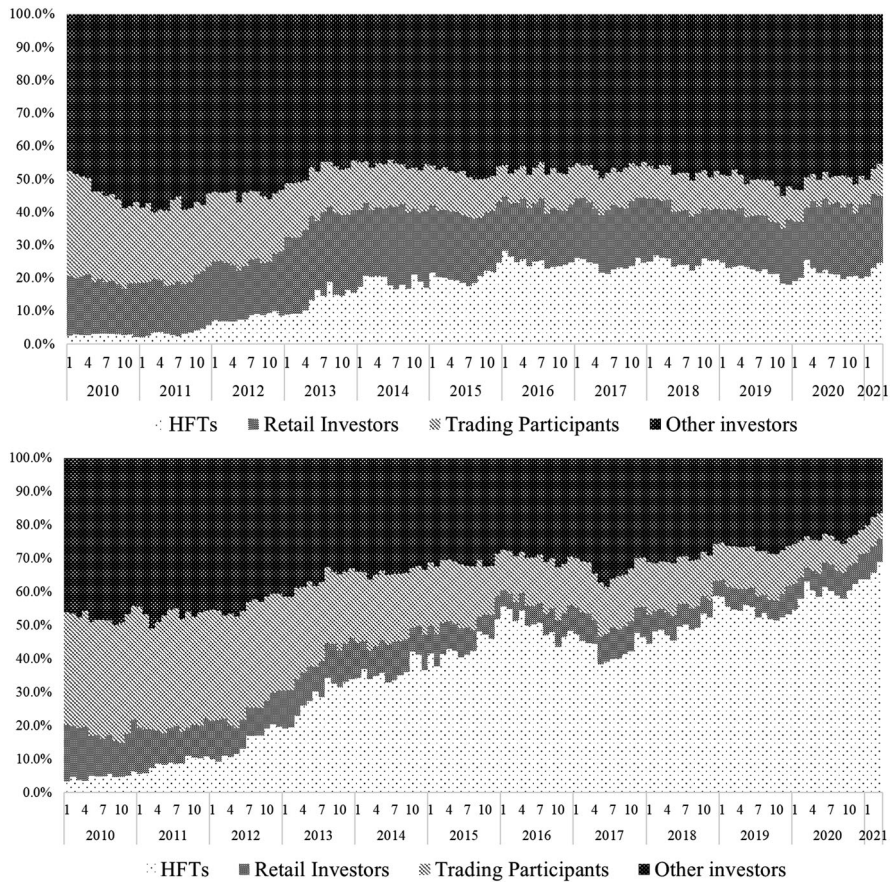


Fig. 5.1 Share of Trading Value (top panel) and Order Count (bottom panel) by Entity: Monthly Averages of Daily Trading Activity. (Source: Created by the author)

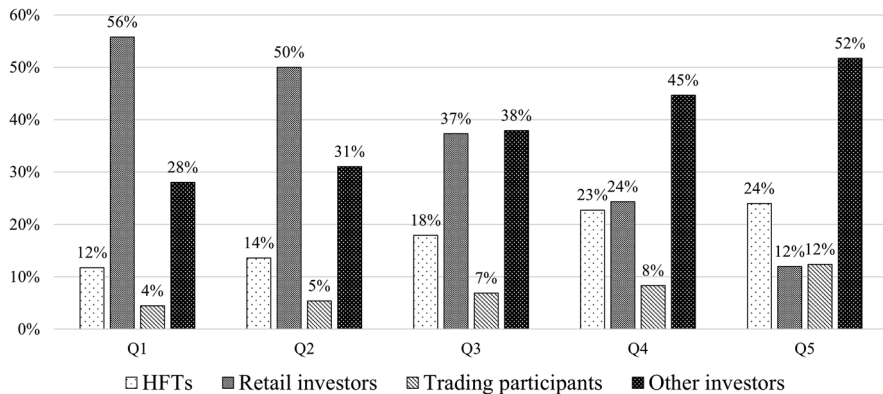


Fig. 5.2 Share of trading value by entity type across the market capitalization quintiles. [Note] Stocks are divided into five groups (Q1–Q5) based on market capitalization, where Q1 represents the largest market capitalization group. (Source: Created by the author)

almost constant since mid-2016. As of January 2010, HFTs accounted for 2.6%, individual investors for 18.0%, proprietary trading by securities firms for 32.0%, and other categories for 47.5%, and as of March 2021, they were 24.6%, 20.4%, 9.6%, and 45.4%, respectively.¹⁰ The decrease in the ratio of proprietary trading appears to have been directly replaced by the increase in the ratio of HFTs. Even so, HFTs' share of Japan's trading value is not very high compared to the United States, where it was over 50% in 2015. In contrast, HFTs' share of the number of orders placed has continued to increase throughout the period, reaching 68.8% in March 2021. These analyses indicate that HFTs have become the dominant source of non-executed orders.

Does HFT prefer certain stocks? Does HFT contribute to providing liquidity to illiquid small-cap stocks? These questions are important because the share of trading value by entity strongly depends on the size of the stocks. Figure 5.2 compares the share of trading value across each group of stocks by dividing them into five groups according to market capitalization, restricting the sample to 2018. The results show that HFTs' trades are concentrated in stocks with large market capitalization. This tendency is similar to that of securities firms' proprietary trading, but this may be due to the fact that HFTs often conduct trading on behalf of securities firms and foreign investment entities. In contrast, individual investors have a large share in small-cap stocks.

¹⁰The share of trading value was 37% in March 2021 according to FSA data, which is about 10 percentage points higher than the value calculated here (FSA 2021). This difference arises because the FSA's analysis is based on calculations using the HFT registered operator flag directly, not according to the above criteria.

5.4.4 *Liquidity Provision*

The TSE trading system employs an order-driven mechanism based on price and time priority, in which a trader either places a limit order specifying price and quantity, or a market order specifying only quantity. Execution occurs when an existing limit order is matched with a new order, with the liquidity provider (“maker”) being the entity that placed the limit order in advance and the liquidity consumer (“taker”) being the entity that immediately executes the order.¹¹ Generally, liquidity consumers establish trades immediately at the cost of the bid–ask spread, leading to price formation, while liquidity providers establish trades at a more favorable price within the spread, suppressing sudden price changes.

Table 5.3 shows whether HFTs are providing or consuming liquidity, as measured by traded value, for the sample after 2018, when HFTs’ share of trading value became sufficiently stable. The table shows that HFTs do not necessarily trade to provide liquidity when compared to other entities, with 312.8 billion yen/day (27% of the total trading value by HFTs) in 2018 acting as a liquidity provider, while 765.9 billion yen/day (66%) acting as a liquidity consumer. This trend of excess liquidity consumption has continued since 2019, with HFT having the highest consumption ratio among all entities in terms of percentage. The “Other” entities category provides the most liquidity in terms of trading value, and individual investors have the highest ratio of liquidity provision. This result differs from previous studies suggesting that HFTs are liquidity providers.

Next, we show the results of the measurement of order aggressiveness (Table 5.4).¹² Here, we calculate the aggressiveness of new or modified orders based on how much their price deviates from the best quote, and whether they involve changes in the mid-price (average of the bid and ask prices). Similarly, when an order is canceled, it is classified and aggregated based on the deviation between the best quote at the time of cancellation and the order price.¹³ The characteristics of HFTs’ order placement are highlighted as a low proportion of immediate execution and a high proportion of limit orders that are more than 1% away from the best quote. There is not much difference in order behavior near the best quote among HFTs, securities firms’ proprietary trading, and “other” entities. Regarding the cancellation of limit orders, the cancellation rate of limit orders away from the best quote is high (this reflects the high volume of distant limit orders), but there are no other particularly noticeable characteristics.

¹¹For the trading system at the Tokyo Stock Exchange, refer to the following explanation by JPX: “Domestic Stock Trading System” (<https://www.jpx.co.jp/equities/trading/domestic/index.html>) (last accessed: July 2023).

¹²This measure of aggressiveness is based on references such as Biais, Hillion, and Spatt (1995), Ahn, Bae, and Chan (2001), Rinaldo (2004), Cao, Hansch, and Wang (2008).

¹³Order expirations at the time of order changes and IOC orders are not included in the cancellation totals.

Table 5.3 Trading value shares for liquidity provision (“Make”), liquidity consumption (“Take”), and trading at the opening (“Open”) and closing (“Close”) of each entity category from January 2018 to March 2021

	Other						HFT						Retail						TP					
	Make	Take	Open	Close	Make	Take	Open	Close	Make	Take	Open	Close	Make	Take	Open	Close	Make	Take	Open	Close	Make	Take	Open	Close
Average	1199.4	953.9	117.0	358.9	312.8	765.9	19.2	63.4	337.2	236.4	68.1	24.6	264.9	160.3	53.7	228.2								
2018	968.7	846.4	103.4	337.9	290.4	487.7	17.9	67.2	284.3	181.4	57.6	24.4	199.9	109.3	40.1	198.3								
2019	1047.4	1058.7	121.8	382.5	318.1	466.1	22.2	93.5	400.8	210.9	73.0	27.9	159.4	96.3	34.1	200.2								
2020	1019.9	1232.7	145.8	477.0	444.4	590.5	25.2	91.7	567.0	280.8	97.0	34.8	164.3	95.3	42.9	248.0								
Ratio																								
2018	46%	36%	4%	14%	27%	66%	2%	5%	51%	35%	10%	4%	37%	23%	8%	32%								
2019	43%	38%	5%	15%	34%	56%	2%	8%	52%	33%	11%	4%	37%	20%	7%	36%								
2020	40%	41%	5%	15%	35%	52%	2%	10%	56%	30%	10%	4%	33%	20%	7%	41%								
2021	35%	43%	5%	17%	39%	51%	2%	8%	58%	29%	10%	4%	30%	17%	8%	45%								

Note: The “Average” panel shows the daily trading value (billion yen). The “Ratio” panel shows each entity type’s trading value as a proportion of total daily trading value. Other: “other” entities; HFT: high-frequency trading entities; Retail: individual investors; TP: trading participants’ (i.e., registered securities company) proprietary trading. (Source: Created by the author)

Table 5.4 Measurement of the aggressiveness of limit orders

		HFT	Retail	Trading participants	Others
	New/Modified Orders				
(1)	Limit >1% from BBO	6.1%	17.8%	1.3%	1.7%
(2)	Limit <1% from BBO	53.3%	42.9%	57.3%	28.9%
(3)	Limit at BBO	27.6%	16.0%	25.5%	35.5%
(4)	Limit updating BBO	9.7%	5.9%	7.4%	19.9%
(5)	Limit with execution	2.6%	8.2%	6.7%	10.8%
(6)	Market order	0.0%	7.9%	1.1%	1.1%
(7)	(5) or (6): Midpoint change	0.8%	1.2%	0.7%	2.1%
	Order Cancellation				
(8)	Cancel limit >1% from BBO	8.2%	42.5%	4.3%	2.8%
(9)	Cancel limit < 1% from BBO	60.8%	49.8%	68.4%	56.3%
(10)	Cancel limit at BBO	29.6%	7.2%	25.1%	35.6%
(11)	(10): Midpoint change	1.4%	0.5%	2.2%	5.3%

Note: For each entity category, limit order are counted by their prices from the best quote, and whether they involve mid-price changes. The sample spans from January 1, 2018, to March 31, 2021, excluding REITs and ETFs. Values are represented as frequencies, summing to 100% within each category. (Source: Created by the author)

In contrast, the tendency of individual investors to place orders is distinctive, with a higher percentage than any other entity for placing limit orders that are 1% or more away from the best quote (17.8%) or for immediate execution (8.2% + 7.9% + 1.2% = 17.3%). Their cancellation of orders was also less responsive, with only 7.2% of orders being canceled even when the order was at the best quote. It is not always possible for individual investors to constantly watch the market and change their limit prices in response to price changes. Therefore, in order to capture large price movements, individual investors tend to place limit orders far from the best quote in advance. This characteristic in order placement is consequently linked to the finding that individual investors tend to trade as liquidity providers.

5.4.5 Estimation of Profits

Table 5.5 shows the estimation of the profit earned by each entity. The detailed definition and calculation method of profit are left to Yamada (2023), and we will describe only the summary. For each entity and individual stock i , setting $t = 0$ as the reference point, we track transactions from $t = 1$ onward, calculate signed traded value and positions held, and define total profit as the difference between the market value of positions held and the cumulative sum of signed traded value at $t = T$. Assuming that $t = 0$ is set as the starting point of the data, the question is how to

Table 5.5 Estimation of profits acquired by entity

Short-term profit (billion yen/day)				
	Others	HFT	Retail	Trading participants
Daily average	0.091	0.254	-0.355	0.01
Standard deviation	0.774	0.543	0.607	0.926
Standard errors	0.024	0.017	0.019	0.029

Long-term profit (billion yen)	
	HFT
2015	-28.1
2016	-75.5
2017	328.7
2018	179.9
2019	250.5

Notes: Long-term profit is sum of market value of positions and cash position changes at year-end (relative to Sep 24, 2015)

define the ending point T . Based on the definition of the ending point, two types of profit are calculated: “long-term profit” and “short-term profit.”

“Long-term profit” is calculated when $t = T$ is set longer than one day. “Short-term profit” is calculated when $t = T$ is set to the close of the day, where profits are calculated for each day assuming that positions are always liquidated at the closing price. Because transactions occurring outside the TSE cannot be taken into account in the data, the calculation of long-term profits assumes that the positions obtained through market transactions are held for the entire period.¹⁴

Table 5.5 shows short-term profits by each entity and long-term profits for HFTs. Existing studies such as Carrion (2013) employ a similar way to estimate HFTs’ profit and show that HFTs have an ability to earn short-term profits. The same results are confirmed in our analysis; HFTs earn an averaging 250 million yen/day in profits, and these profits are statistically significantly positive. Even in the definition of long-term profits, returns have been positive since 2017, and as of November 1, 2019, the position value had increased by about 250.5 billion yen compared to September 2015.¹⁵ This value is close to the average daily short-term profit times the number of days, but since it has been increasing and decreasing since 2017, as observed worldwide, the excessive competition of HFT business may be suppressing profits. However, the profits of these investors may well be affected by the trends during our sample period. Therefore, the results here do not necessarily imply that HFTs are making profits and individual investors are losing money in general.

¹⁴Due to the need to track positions for each virtual server, the sample targeted a total of 1004 days from September 24, 2015, to November 1, 2019, when the ID remained the same over time.

¹⁵Note that the HFT position balance fluctuates on a monthly basis, but was almost zero and stationary during the period.

5.5 Conclusion

In this chapter, we attempted to clarify the impact of the electrification and acceleration of financial transactions on the stock market through discussions based on asset pricing theory and analysis using Japanese data. As specific examples, we analyzed the transition and current status of factor investing and high-frequency trading (HFT), which have emerged more recently.

In Sect. 5.3, we first analyzed the Fama–French model from the 1990s to the 2000s. The “success” of factor investing in both research and practice, as represented by the Fama–French model, seems to have disappeared since the late 2000s. The focus of the discussion is the effectiveness of the HML factor based on the ratio of book value to stock price (BM ratio), which was the biggest factor in the success of factor investing and was particularly significant in Japan, has declined dramatically after the Lehman Shock/Global Financial Crisis. However, there is no clear consensus in the academic community as to why such a phenomenon occurred. This chapter suggests that the explanation by investors’ adaptive learning behavior discussed in McLean and Pontiff (2016) might be important, but such a discussion has potentially important implications for the application of machine learning, which has achieved great results in various fields outside of economics since the late 2010s. Unlike machine learning with audio or images, machine learning with financial data must keep in mind that the observers’ own actions affect the data. Therefore, if investors adjust or change their trading strategies based on the results of learning, those changes will affect the nature of the data being analyzed. This is the same logic as the argument called “Lucas Critique” in macroeconomics. In the case of financial transactions, the feedback from changes in the behavior of economic agents due to learning can occur in an extremely short period of time. Thus, the more machine learning is used, the more limited its effectiveness becomes (Nagel 2021; Iwaisako 2022), and there is even a potential possibility that it could bring instability to the financial system itself (Lo 2017).

In Sect. 5.4, we examined the rise of HFT, which has dominated market transactions in the 2010s. We analyzed the trends of their activity in the Japanese stock market in comparison with individual investors and securities companies. The results can be summarized as follows: (1) the share of trading value by HFTs has increased as a substitute for the decrease in securities companies, and the preference for stock size, which favors large stocks, is similar to that of securities companies; (2) HFTs consume more liquidity than they provide; and (3) HFTs consistently demonstrate daily trading profits. Among these, point (2) contradicts the prevailing view of HFT behavior. This pattern may be a phenomenon unique to the microstructure of the Japanese market, and we look forward to future research progress.

Our analysis shows that the behavioral characteristics of HFTs are particularly different from those of individual investors. This is likely due to differences in the availability of trading systems, investment horizons, and preferences for liquidity, and it does not mean that HFTs are making profits from individual investors. However, such behavioral disparities may cause a sense of unfairness and distrust.

As Kiuchi (2022) points out, while the new technology of HFT has great potential to contribute to the development of the securities industry if used properly, but there is still much uncertainty about its impact on the market. We hope this section has helped to clarify the current situation.

On the other hand, there are many issues related to the relationship between the stock market and technology that could not be addressed in this chapter. For example, from the perspective of the efficiency and sophistication of financial transactions through technology, the issue of so-called *alternative data* has gained importance in recent years. Machine learning is often used in the use of alternative data, but the essence of its innovative nature as a technology lies in the use of new types of large-scale data that have not been used before, such as tweets on SNS, text mining of newspaper articles, POS data, and economic forecasts using night lights from satellite photos. How the use of alternative data will affect the stock market in the future and how it will change the function of the market in the overall economy is a very important ongoing research topic, and we look forward to the development of future research for specific analysis and verification.

5.6 Comments by Wataru Ohta: Liquidity in the Japanese Stock Market

5.6.1 Introduction

This chapter is about the Japanese stock market; the first is about factor investing, focusing on the value premium, and the second is about high-frequency trading (HFT). There are different views on the value premium, and more research is expected. On the other hand, although HFT is supposed to provide liquidity to the market, the chapter makes a novel finding that HFT does not necessarily provide liquidity to the Japanese market in a typical way by analyzing original data. Due to space limitations, this comment will focus on this new finding.

In the following section, we first summarize the results of the second half of this chapter from the perspective of liquidity provision. Next, we explain liquidity measures and review their changes in the Japanese market. The final section, Sect. 5.6.5, is a summary.

5.6.2 Liquidity Provision

When it is difficult to buy or sell, a stock is said to be illiquid. Suppose that the market price of stock X is 100 yen, that person A wants to sell one share, and that person B wants to buy one share. If both parties know that the other wants to trade,

then person A and person B can trade at 100 yen per share. However, if it is difficult to find a counterparty, that is, if liquidity is low, the transaction will not occur.

The activity of profiting from low liquidity is called liquidity provision or market making, and the entity that performs this activity is called a liquidity provider or a market maker. For example, person C provides liquidity by placing a limit order to sell at 102 yen and a limit order to buy at 98 yen. Person A can sell at 98 yen by placing a sell market order, and person B can buy at 102 yen by placing a buy market order. Trading with a market order is called liquidity consumption. In addition, if person B places a limit order to buy at 102 yen, the limit order is executed immediately, which is also liquidity consumption. In this example, person C, who provides liquidity through a limit order, earns 4 yen by selling at 102 yen and buying at 98 yen.

In a typical liquidity provision, liquidity providers submit only limit orders, and other participants who consume liquidity submit only market orders. In this case, the share of trading by liquidity providers is 50%, 100% of the liquidity provider's orders are executed as limit orders, and 0% as market orders. In the example above, one share is traded by person A, one by person B, and two by person C. Out of these four shares, person C's trading share is 50% and uses 100% by limit orders and 0% by market orders.

The results of the analysis in this chapter show that HFTs do not provide liquidity in a typical manner in the Japanese market: for the HFTs identified in this analysis on stocks listed on the First Section of the Tokyo Stock Exchange (TSE) from 2010 to 2021, (1) the trading share of HFTs in yen volume has remained roughly constant at around 25% since mid-2016; (2) although HFTs heavily use limit orders, the share of HFT executions from liquidity-consuming orders such as market orders has been 66% since 2018; and (3) HFTs have made a positive profit. If HFTs provide liquidity in a typical way, (1) is 50% and (2) is 0%. In contrast, HFTs in the Japanese market significantly differ from this prediction, consuming liquidity. Liquidity consumption by market orders is price-disadvantageous compared to liquidity provision by limit orders. Nevertheless, it is surprising that HFTs earn positive profits.

5.6.3 *Liquidity Measures*

This section explains the effective spread, the adverse selection cost, and the realized spread as liquidity measures. These measures are used in several studies, including Hendershott, Jones, and Menkveld (2011) and Shkilko and Sokolov (2020).

The effective spread measures the revenue from liquidity provision or the cost of liquidity consumption. In the previous example, based on the quote mid-point of 100 yen, which is the average of the price of person C's sell limit order at 102 yen and the price of his buy limit order at 98 yen, person A and person B each pays a transaction cost of 2 yen. This transaction cost is called the effective spread. When we calculate it as a percentage of the quote mid-point, 100 yen, it is 2%. The effective spread is a transaction cost for persons A and B, who consume liquidity.

At the same time, it is revenue for person C, who provides liquidity. Person C's revenue is two yen per transaction or 2% of the quote mid-point.

The adverse selection cost is a part of the cost of providing liquidity. Suppose that the market price declines after person A sells one share at 98 yen and that person C modifies the price of the limit sell order from 10 yen to 101 yen and the price of the limit buy order from 98 yen to 97 yen. If person B buys at 101 yen, person C's profit is the difference of 3 yen between the price to sell at 101 yen and the price to buy at 98 yen. The quote mid-point has fallen by 1% from 100 yen to 99 yen, corresponding to the fall in revenue for liquidity provision. If market participants who can predict future prices more accurately than liquidity providers place a market order to sell (buy), the price will subsequently fall (rise), and the liquidity providers who traded with them will suffer a loss. The size of this loss is measured as the rate of change in the quote mid-point after the market order, multiplied by minus one if the market order is the sell order, and is called the adverse selection cost.

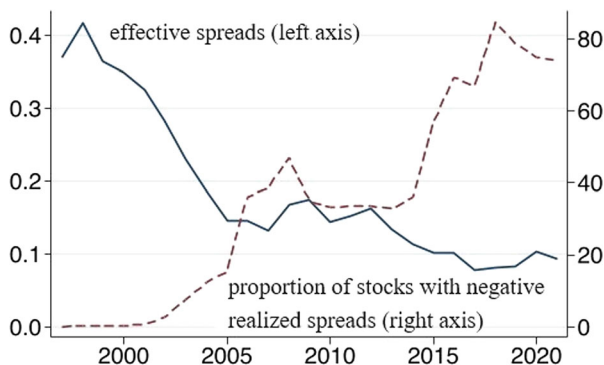
Reducing the adverse selection cost is important in providing liquidity. Liquidity providers incur adverse selection costs when they trade with market participants with superior information. To avoid this cost, a typical HFT collects market information, uses a co-location service to place servers in the exchange, and submits and cancels limit orders quickly as market conditions change.

The realized spread is the effective spread, which is the revenue to the liquidity provider, less the adverse selection costs that are part of the cost. The actual profit for a liquidity provider is the profit after deducting trading commissions, the cost of operating the order placement system, and so forth. In the example, the effective spread of person A's market order is 2%, the adverse selection cost is 1%, and the realized spread is the difference of 1%. If the price doesn't change after the transaction of person B, the effective spread of person B's market order is 2%, the adverse selection cost is 0%, and the realized spread is 2%. The sum of the realized spread of persons A's and B's market orders is 3%, which corresponds to a profit of 3% for person C.

5.6.4 *Changes of Liquidity*

Figure 5.3 shows the changes in effective spreads in the Japanese market. It also shows the proportion of stocks with negative realized spreads. The sample consists of common stocks listed continuously for each year on the First Section of the Tokyo Stock Exchange from 1997 to 2021. The data used are Nikkei Media Marketing NEEDS tick data based on publicly available data disseminated by the TSE FLEX Standard. The solid line indicates the effective spread, computed as a volume-weighted average for each trading day for each stock, the median for each year for each stock, and the median for each year. The dotted line indicates the proportion of common stocks with negative realized spreads. First, the volume-weighted average realized spread is computed for each stock for each trading day using the changes in the quote mid-point one minute after execution as the adverse selection cost. Then,

Fig. 5.3 Changes in liquidity in the Japanese market. Solid line: effective spread (lhs). Dotted line: proportion of common stocks with negative realized spreads (rhs). (Source: Compiled by the author from Nikkei Media Marketing NEEDS tick data)



the figure shows the proportion of stocks whose realized spreads are significantly different from zero by the Newey-West standard error (lag 5).

As can be seen from the figure, the effective spread, that is, the transaction cost of a market order, has declined over the years. This chapter explained that trading costs in the US market decreased by more than 50% between 2001 and 2011. In the Japanese market, the effective spread decreased from 0.33% in 2001 to 0.15% in 2011, less than half, and to 0.09% in 2021. The effective spread fell from 0.17% to 0.14% before and after the TSE upgraded its trading system to a faster one in 2010. Though liquidity is affected by trading system upgrades and so on, the figure suggests that the decline in effective spreads is a long-term trend and that the behavior of market participants is an important factor in determining liquidity and transaction costs.

A decrease in the effective spread leads to decreased profits from liquidity provision. As shown in Fig. 5.3, the percentage of stocks with negative realized spreads has increased from 0% in 2001 to 34% in 2011 and 74% in 2021, suggesting that it is becoming difficult to earn profits from typical liquidity provision in the Japanese market. This chapter shows that HFTs earn positive profits but not through typical liquidity provision, consistent with the recent decline in realized spreads displayed in Fig. 5.3.

5.6.5 Conclusion

It is not well understood what HFTs are doing in the Japanese market. Regarding this question, this chapter shows that HFTs profit by consuming liquidity rather than providing it. However, it is not clear what exactly they do. Possible candidates are executing when other market participants are slow to modify their limit orders, executing when a very low (high) sell (buy) limit order is placed due to severe price competition among limit orders submitted by other market participants, or anticipating large orders.

Future work is needed to clarify HFTs' specific order submission strategies. It is also necessary to clarify how HFTs' behavior affects the trading profits of market participants and price formation, whether HFTs can be a source of market vulnerability, and how the best execution policies affect market outcomes.

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Chapter 6

Ambiguity Aversion in Stock Investment: Analysis Using Stock Market Data from the United States and Japan



Toshiki Honda

Abstract This chapter analyzes the consistency between the standard asset pricing model and actual return data from an asset allocation perspective. Modern portfolio theory such as Capital Asset Pricing Model (CAPM) implies that it is optimal for all investors to hold a portfolio of risky assets with the same composition as the market portfolio. Therefore, most general investment advice recommends buying mutual funds or exchange-traded funds (ETFs) that tracks market indices as a first step. However, there is always noise and parameter uncertainty in the information about expected returns and covariance investors use when making investment decisions. Honda models the optimizing behavior of investors in the presence of such uncertainty by introducing the concept of ‘ambiguity aversion’ and examines its validity using Japanese and US stock market data. His approach has been relatively successful with US data; however, analyses using Japanese data have been somewhat disappointing. Honda’s chapter also serves as an excellent introduction to the vast amount of academic research on two important topics, “model uncertainty” in finance and “ambiguity aversion” in microeconomic theory. In his comments to Honda, “Challenges and Solutions for the Estimation of the Ambiguity Aversion,” Hideyuki Takamizawa offers suggestions for improving the fit to Japanese data, as well as other potential applications of the concept of ambiguity aversion.

6.1 Introduction

The mean–variance approach by Markowitz (1952) is considered the fundamental model for asset selection and is covered in many finance textbooks. However, it is also well known that the model cannot fully explain investor’s behavior in asset markets. How to explain the discrepancy between the mean–variance theory and actual investor’s behavior is an important issue both in theoretical studies and

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empirical analyses. In this chapter, we consider this problem from the perspective of ambiguity aversion. Figure 6.1 shows the efficient frontier on the mean–standard deviation plane using the sample mean and sample covariance of US stock return data from July 1926 to June 2022. The details of the data used will be described in Sect. 6.3, but the efficient frontier is illustrated assuming that investment universe is the value-weighted (VW) portfolio of all stocks and the FF25 portfolio, which is often used in academic research.

The tangency portfolio, which is an efficient portfolio in the mean–variance approach, coincides with the VW portfolio according to the Capital Asset Pricing Model (CAPM), but in Fig. 6.1, the VW portfolio seems to be located away from the efficient frontier. In other words, it gives the impression that a more efficient investment portfolio than the VW portfolio exists in terms of risk and return combinations.

However, it should be noted that the efficient frontier in Fig. 6.1 is drawn using the estimated expected return and variance–covariance. In other words, this figure is drawn assuming that the estimated values are as if they were true values. Neither investors nor researchers can know the true values of expected returns and covariances, and they cannot accurately grasp the probabilistic fluctuation of the invested

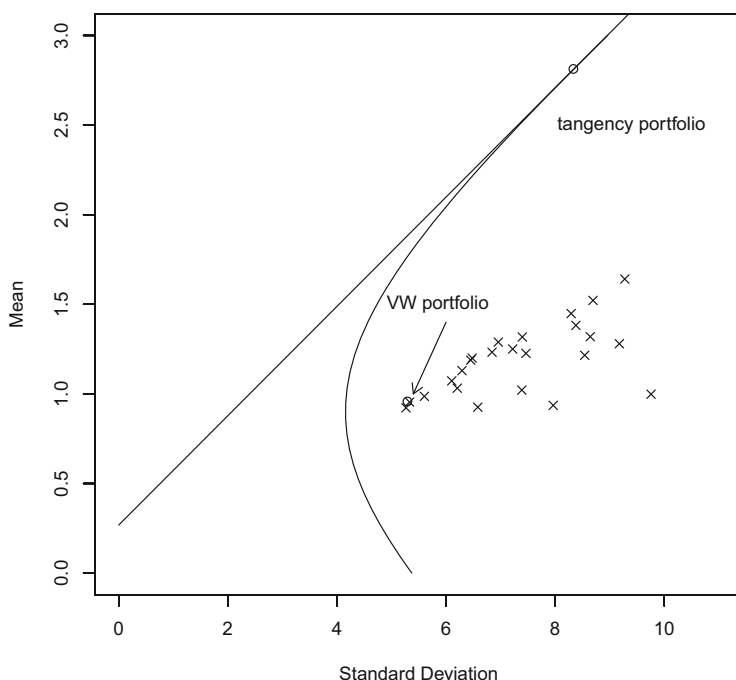


Fig. 6.1 Efficient frontier using US stock market data. (Note: The efficient frontier and tangency portfolio were drawn by calculating the sample mean and sample covariance from the return data of the value-weighted (VW) portfolio and FF25 portfolio. The tangency portfolio and VW portfolio are marked with “○,” and the FF25 portfolio is marked with “x”)

funds. In the sense that the true parameter values are unknown, actual stock investment is like a lottery whose winning probability is unknown.

How would people behave if lottery's odds of winning were unknown? In this regard, Ellsberg's paradox is famous. Ellsberg's paradox is about the choice between a lottery where the odds of winning are known and a lottery where the odds are unknown. Generally, it points out that people tend to avoid lotteries where the odds of winning are unknown. It is known that standard models such as the expected utility theory cannot adequately describe this behavior.

Various extensions of the expected utility theory already proposed, and serious readers are invited to refer textbooks in decision theory such as Hayashi (2020). One possible interpretation of the situation where the odds of winning are unknown is the model uncertainty, where the uncertainty is not clearly defined as a model. The decision maker behaves in the presence of such "model uncertainty." In other words, it is considered that there is model uncertainty about the odds of winning a lottery, and that there is also uncertainty about the lottery's outcome given the odds of winning. The behavior to avoid uncertainty like the former is called "ambiguity aversion," and it is distinguished from the "risk aversion" behavior of avoiding the latter uncertainty. Klibanoff, Marinacci, and Mukerji (2005) and Maccheroni, Marinacci, and Ruffino (2013) propose to introduce a parameter called the degree of ambiguity aversion to represent how decision-makers avoid ambiguity. In their approach, the degree of risk aversion and the degree of ambiguity aversion are represented as the two separate parameters.

Hara and Honda (2022) study the ambiguity aversion in the context of the mean–variance approach. Specifically, they introduce model uncertainty about expected returns, which are more difficult to estimate than variance and covariance, as Merton (1980) pointed out, and derive the optimal portfolio when investors take ambiguity into account. The optimal portfolio of ambiguity-averse investor would be judged to be an inefficient portfolio by the usual mean–variance criterion. Hara and Honda (2022) also propose a method to calculate the degree of ambiguity aversion of the representative economic agent, assuming that the representative economic agent is ambiguity-averse, using the VW portfolio as an example.

Section 6.2 introduces the model of Hara and Honda (2022), Sect. 6.3 examines the ambiguity-averse behavior of the representative economic agent using US stock market data, and Sect. 6.4 uses Japanese stock market data. Finally, in Sect. 6.5, we examine the impact of short-selling constraints on portfolio selection and examine their relationship with ambiguity-averse behavior.

6.2 Model of Ambiguity Aversion

This section reviews Hara and Honda (2022). Let the return of N risky assets be an N -dimensional random variable vector R , and the deterministic return of a safe asset be R_f . The vector R of random variable is assumed to follow a multivariate normal distribution, and its variance–covariance matrix Σ_R is assumed to be known, but

there is uncertainty about the expected return, which is represented by the N -dimensional random variable vector M . Here, M follows a normal distribution with mean μ and covariance matrix Σ_M , that is, it is assumed to be $\mathcal{N}(\mu, \Sigma_M)$. The conditional distribution of the return R given the realized value m of M is also assumed to follow a normal distribution, $\mathcal{N}(m, \Sigma_R - \Sigma_M)$. Here, $m \in R^N$, Σ_R is an $N \times N$ symmetric positive definite matrix, and Σ_M is an $N \times N$ symmetric semi-positive definite matrix.

If the expected return is known, one can choose portfolio according to the standard mean–variance portfolio theory. However, in the actual investment decision-making process, it is impossible to know the true values of parameters. Especially, the expected return is known to have a large estimation error, and investors need to choose portfolio understanding that they do not know the correct model parameters.

Therefore, the following function is assumed as the investor's utility function. First, using the constants $\gamma > 0$ and $\theta > 0$, define the functions $u_\gamma : R \rightarrow R$ and $u_\theta : R \rightarrow R$ by $u_\gamma(z) = -\exp(-\gamma z)$, $u_\theta(z) = -\exp(-\theta z)$, $z \in R$. Then, the utility level obtained from the random variable Z is determined by the function $u_{\gamma, \theta}$, which is defined by

$$u_{\gamma, \theta}(z) = E[u_\gamma(u_\theta^{-1}(E[u_\theta(z)] | M))]. \quad (6.1)$$

This utility function, first, evaluates the expected utility when the realized value m of the uncertain expected return M is known. Next, from the value of this conditional expected utility, the certainty equivalent (given m) is calculated using the inverse function of u_θ . Finally, the expected utility regarding the uncertainty of the expected return M is calculated using the function u_γ . By evaluating the expected utility in two stages by using different parameters γ and θ , it is possible to distinguish the uncertainty regarding the expected return and the remaining uncertainty of the return after the level of the expected return is determined, and to describe the behavior of investors who take different attitude toward each type of uncertainty.

Now, if we define $\eta = \gamma/\theta - 1$, we find that when $\eta = 0$, $u_\gamma \circ u_\theta^{-1}$ is linear, making it ambiguity-neutral. When $\eta > 0$, $u_\gamma \circ u_\theta^{-1}$ is a concave function, indicating ambiguity aversion. When $\eta < 0$, $u_\gamma \circ u_\theta^{-1}$ is a convex function, indicating ambiguity-seeking.

Let $(x, y) \in R^N \times R$ represent the investment amounts in N risky assets and a safe asset, a total of $N + 1$ assets. The return of this portfolio (x, y) is $x^\top R + yR_f$. Therefore, if we denote the total asset value as $W \in R$, and $\mathbf{1}$ as a vector where all elements are 1, the investor's utility maximization problem can be defined as follows:

$$\begin{aligned} \max_{(x, y) \in R^N \times R} \quad & u_{\gamma, \theta}(x^\top R + yR_f) \\ \text{Subject to} \quad & \mathbf{1}^\top x + y \leq W. \end{aligned} \quad (6.2)$$

Here, if we define the function $V_{\gamma, \theta} : R^N \times R \rightarrow R$ as

$$V_{\gamma,\theta}(x,y) = \mu^\top x + R_f y - \frac{1}{2} x^\top (\gamma \Sigma_M + \theta (\Sigma_R - \Sigma_M)) x, \quad (6.3)$$

(x,y) is the solution to the optimization problem (6.2) when x is the solution to the following optimization problem:

$$\max_{x \in R^N} V_{\gamma,\theta}(x, W - \mathbf{1}^\top x). \quad (6.4)$$

Therefore, from the first-order condition, we can derive the optimal portfolio of problem (6.2)

$$x = \frac{1}{\theta} (\Sigma_R + \eta \Sigma_M)^{-1} (\mu - R_f \mathbf{1}). \quad (6.5)$$

The optimal portfolio for an ambiguity-neutral investor ($\eta = 0$) is $(1/\theta) \Sigma_R^{-1} (\mu - R_f \mathbf{1})$, which is a portfolio with the same investment ratio as the tangency portfolio. In contrast, an investor who is ambiguity-averse chooses a portfolio different from the tangency portfolio due to η and Σ_M . Also, similar to the negative exponential utility function, the choice of portfolio among risky assets is independent of the total asset value W . Furthermore, the investment ratio in risky assets $(\mathbf{1}^\top x)^{-1} x$ depends on the relative ambiguity aversion coefficient η , but does not depend on the risk aversion coefficient θ .

Hara and Honda (2022) also propose a way to calculate backward the ambiguity aversion coefficient η and the covariance matrix Σ_M of the expected return M from a given portfolio $x \in R^N$, if it is chosen by an ambiguity-averse investor.

We invite readers to the original paper, but here we briefly touch on the difficulties associated with this backward calculation. In order to model ambiguity aversion, it is necessary to determine not only the degree of ambiguity aversion but also the model of uncertainty. Whether these two elements can be discussed separately or not is a matter of debate among experts.

As an example, let's consider investors who do not own Tesla stock. These investors may not hold Tesla stock because they believe there is a great deal of uncertainty in the expected return on Tesla stock. On the other hand, these investors may believe that Tesla stock is very promising and that model uncertainty is relatively small, but they do not own Tesla stock because their degree of ambiguity aversion is very high. Both model uncertainty and ambiguity aversion are not observed because they exist, so to speak, in the mind of the investor. It is difficult to identify these two from the fact that they do not own Tesla stock.

In order to avoid this problem, Hara and Honda (2022) propose a method of selecting the smallest ambiguity aversion that is consistent with a given portfolio. They call the smallest degree of ambiguity aversion as the implied ambiguity of the given portfolio.

The implied ambiguity can be linked to the GRS statistic (Gibbons, Ross, and Shanken (1989)), which is often used in empirical asset pricing literature. When the

excess return of an asset is regressed on the excess return of a given portfolio x , define $\alpha(x)$ and $\beta(x)$ by

$$\alpha(x) \equiv (\mu - R_f \mathbf{1}) - ((\mu - R_f \mathbf{1})^\top x) \beta(x) \quad (6.6)$$

$$\beta(x) \equiv \frac{1}{x^\top \Sigma_R x} \Sigma_R x \quad (6.7)$$

and the size of the pricing error by $\sqrt{\alpha(x)^\top \Sigma_R^{-1} \alpha(x)}$. The Sharpe ratio $Sr(x)$ of portfolio x is defined as

$$Sr(x) = \frac{(\mu - R_f \mathbf{1})^\top x}{(x^\top \Sigma_R x)^{1/2}}. \quad (6.8)$$

If we choose a portfolio $\bar{x} \equiv \Sigma_R^{-1}(\mu - R_f \mathbf{1})$, the tangency portfolio, then the Sharpe ratio is maximized. Since $Sr(\bar{x}) = ((\mu - R_f \mathbf{1})^\top \Sigma_R^{-1}(\mu - R_f \mathbf{1}))^{1/2}$, Gibbons, Ross, and Shanken (1989, Section 3) shows the following relation.

Lemma 1 (Gibbons et al. 1989) For each $x \in R^N \setminus \{0\}$,

$$\alpha(x)^\top \Sigma_R^{-1} \alpha(x) = (\mu - R_f \mathbf{1})^\top \Sigma_R^{-1} (\mu - R_f \mathbf{1}) - (Sr(x))^2 = (Sr(\bar{x}))^2 - (Sr(x))^2.$$

Here, the implied ambiguity aversion of portfolio x defined by Hara and Honda (2022) is given by

$$\frac{2 \left(1 - (Sr(x)/Sr(\bar{x}))^2 \right)^{1/2}}{1 - \left(1 - (Sr(x)/Sr(\bar{x}))^2 \right)^{1/2}}. \quad (6.9)$$

That is, the implied ambiguity corresponds one-to-one with the ratio $Sr(x)/Sr(\bar{x})$ of the Sharpe ratio to its maximum value. By Lemma 1, the implied ambiguity can be expressed using the pricing error as

$$\frac{2 \left(\frac{\alpha(x)^\top \Sigma_R^{-1} \alpha(x)}{(\mu - R_f \mathbf{1})^\top \Sigma_R^{-1} (\mu - R_f \mathbf{1})} \right)^{1/2}}{1 - \left(\frac{\alpha(x)^\top \Sigma_R^{-1} \alpha(x)}{(\mu - R_f \mathbf{1})^\top \Sigma_R^{-1} (\mu - R_f \mathbf{1})} \right)^{1/2}}. \quad (6.10)$$

From Eq. (6.9), we see the relationship between the implied ambiguity and the GRS statistic.

6.3 Analysis Using the FF25 Portfolio of the US Stock Market

In this section, we calculate the implied ambiguity using the FF25 portfolio in the US stock market. We use monthly return data for T-Bills, all listed stocks (AMEX, NYSE, NASDAQ) market value-weighted (VW) portfolios, and FF25 portfolios from July 1926 to June 2022 obtained from Kenneth French's website.¹ The FF25 portfolio is constructed by dividing all stocks into quintiles by market capitalization and by the ratio of book value to market value (B/M). Then, the return of value-weighted portfolio for a total of $5 \times 5 = 25$ portfolios. We take the return of T-Bills as the return of risk-free asset and the return of the VW portfolio as the return of the market portfolio.

Table 6.1 shows the sample mean, sample standard deviation, and CAPM alpha and beta that are estimated from the excess returns (over riskless rate) of the VW portfolio and each FF25 portfolio. As revealed in a series of empirical studies on the CAPM, beta values cannot fully explain the cross-sectional differences in average returns, and there is a tendency for stocks with small market capitalization and stocks with high book-to-market ratios (B/M) to have positive alphas.

Table 6.2 calculates the Sharpe ratio of the tangency portfolio drawn using the sample mean and sample covariance calculated from the return data of the VW portfolio and FF25 portfolio. The Sharpe ratio of the tangency portfolio is 0.31, but the Sharpe ratio of VW is only 41% of that level, which means that investing in the tangency portfolio improves the Sharpe ratio of the held portfolio.

Gibbons, Ross, and Shanken (1989) proposed a statistic (hereafter, GRS statistic) to test the null hypothesis that all intercept terms are zero when regressing the return of each asset on the return of the VW portfolio. The value of the GRS statistic corresponds one-to-one with the ratio of the Sharpe ratios of the tangency portfolio and the VW portfolio, and from the value of the GRS statistic (WSTAT) in Table 6.2, the null hypothesis that the VW portfolio is located on the efficient frontier is rejected. In other words, the VW portfolio actually held by the representative agent is inefficient from the viewpoint of mean–variance analysis.

However, as shown in Sect. 6.2, if an investor is ambiguity-averse in stock investment, the investor does not necessarily hold the mean–variance efficient portfolio. It suggests that the representative agent of the US stock market is ambiguity-averse. Using the Hara and Honda (2022) model introduced in Sect. 6.2, we calculated the implied ambiguity from the VW portfolio, and as shown in Table 6.2, it was 20.82. We have to wait for the progress of future research to judge this level of ambiguity aversion is plausible as representative agent's ambiguity aversion. However, the deviation from zero, which is the ambiguity-neutral case, seems not negligible. The result supports the hypothesis that representative economic agent is ambiguity-averse.

¹Kenneth R. French website, Data Library, Current Research Returns. https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Table 6.1 Analysis using US stock market data

	Mean	SD	Alpha	Beta	Tangency Portfolio	Constrained Portfolio	Lagrange Multiplier
VW	0.67	5.34	0	1	-3.02	0	0.06
SZ1BM1	0.56	12.03	-0.52	1.61	-0.49	0	0.89
SZ1BM2	0.7	9.75	-0.24	1.4	-0.74	0	0.59
SZ1BM3	0.99	9.16	0.05	1.4	-0.42	0	0.29
SZ1BM4	1.16	8.28	0.32	1.26	0.87	0	0.03
SZ1BM5	1.36	9.26	0.45	1.37	1.04	0.46	0
SZ2BM1	0.63	7.98	-0.22	1.27	-0.95	0	0.44
SZ2BM2	0.93	7.47	0.11	1.22	0.16	0	0.13
SZ2BM3	0.96	7.22	0.16	1.2	0.28	0	0.08
SZ2BM4	1.04	7.39	0.23	1.21	0.5	0	0.03
SZ2BM5	1.24	8.68	0.32	1.38	0.41	0	0.01
SZ3BM1	0.72	7.39	-0.12	1.25	-0.58	0	0.28
SZ3BM2	0.9	6.45	0.15	1.12	0.99	0.06	0
SZ3BM3	0.92	6.47	0.17	1.12	0.42	0	0
SZ3BM4	1	6.95	0.22	1.17	0.25	0.23	0
SZ3BM5	1.11	8.37	0.2	1.36	0.02	0	0.08
SZ4BM1	0.73	6.21	0	1.09	1.35	0	0.06
SZ4BM2	0.79	6.1	0.06	1.09	-0.98	0	0.06
SZ4BM3	0.85	6.29	0.12	1.1	-0.14	0	0.03
SZ4BM4	0.95	6.83	0.18	1.16	0.38	0	0
SZ4BM5	1.05	8.64	0.11	1.41	-0.52	0	0.15
SZ5BM1	0.66	5.34	0.02	0.96	2.02	0.24	0
SZ5BM2	0.64	5.27	0	0.95	0.21	0	0.03
SZ5BM3	0.71	5.6	0.06	0.97	1.17	0	0.01
SZ5BM4	0.65	6.58	-0.08	1.1	-1.35	0	0.21
SZ5BM5	0.94	8.53	0.06	1.3	0.12	0	0.12

Note: Table 6.1 shows the mean, the standard deviation of the excess return against the riskless rate (monthly%), alpha, and beta for the portfolios: the tangency portfolio, the portfolio chosen by an ambiguity-neutral investor with short-sell constraints, and the value of the Lagrange multiplier associated with the optimization problem with short-selling constraints. The portfolio vector is normalized so that the sum of the components is 1. “SZ” represents the quantile of market capitalization, and “BM” represents the quantile by B/M. (“SZ1” represents small-cap stocks, “SZ5” represents large-cap stocks, “BM1” represents low B/M, and “BM5” represents high B/M quantiles)

6.4 Japanese Stock Market Data

In Sect. 6.3, we calculated the implied ambiguity using long-term data from the US stock market and obtained results that support the hypothesis that representative economic agent is ambiguity-averse. In this section, we do the same using the Japanese stock market data. The return data of VW portfolio and FF25 portfolio

Table 6.2 Implied ambiguity of the VW portfolio and short-selling constrained portfolio in the US stock market

	Maximum SR	Relative SR	WSTAT	JSTAT	p value	Implied ambiguity
VW portfolio	0.31	0.41	0.08	3.32	0	20.82
Constrained portfolio	0.31	0.49	0.03	1.47	0.06	13.27

Note: “Max SR” represents maximum Sharpe ratio, “Relative SR” represents ratio of VW portfolio’s Sharpe ratio to Max SR, and “WSTAT” and “JSTAT” represent GRS statistics, associated with “p-value” and “implied ambiguity”

Table 6.3 Implied ambiguity of the VW portfolio in the Japanese stock market

	Maximum SR	Relative SR	WSTAT	JSTAT	p value	Implied ambiguity
VW portfolio	0.3	0.2	0.09	1.67	0.02	94.35

Note: Max SR: maximized Sharpe ratio using all FF25 portfolios; Relative SR: ratio of the Sharpe ratio of the VW portfolio to the maximized SR; WSTAT and JSTAT: GRS statistics; p-value: p-value of the GRS test, implied ambiguity

are from Financial Data Solutions, Inc. The sample period is monthly data from September 1977 to December 2021.²

As shown in Table 6.3, the maximum Sharpe ratio of VW portfolio in the Japanese stock market is 0.30, which is about the same as the US data shown in Table 6.2. However, the Sharpe ratio of VW portfolio is at the level of 20% of the maximized Sharpe ratio using all FF25 portfolio, which is considerably smaller than the VW portfolio in the US market. The null hypothesis that the VW portfolio is on the efficient frontier is also rejected by the GRS statistic. Moreover, the calculated implied ambiguity for the VW portfolio is 94.35, which seems very large.

The reason why the calculated implied ambiguity is large would be due to the characteristics of the Japanese stock market data. First, available Japanese stock market data period is not as long as the US data, and there have been several medium-term trend reversals, from the formation and collapse of the bubble, the subsequent long-term slump, and the rise in stock prices under the monetary easing policy after the global financial crisis. When we analyze the data with a static model like Hara and Honda (2022), the calculated implied ambiguity varies depending on the sample period.

To consider the impact of market trend, we estimate, at the end of each month, the Sharpe ratio of the tangency portfolio and the VW portfolio using the monthly return data of the previous 10 years. The Sharpe ratio of the tangency portfolio started at a high level of 0.8, gradually decreased to about 0.5, then kept similar level in the first half of the 2000s. After that, it rose in the late 2000s, but it returned to about 0.5 again in the 2010s.

²“What is NPMServices.” <https://www.fdsol.co.jp/npmservices/npmservices-top/>

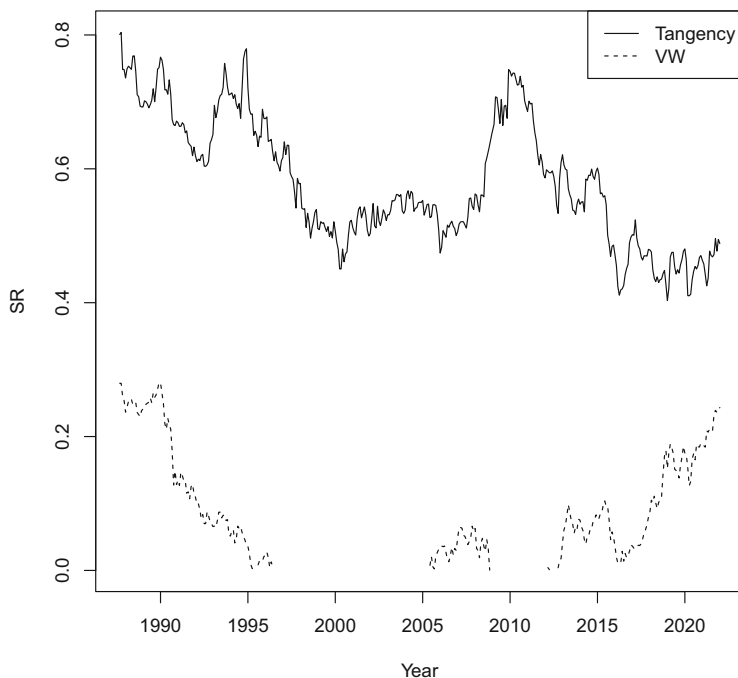


Fig. 6.2 Sharpe ratio of the tangency portfolio and market capitalization weighted (VW) portfolio in the Japanese stock market. Note: The Sharpe ratio of the tangency portfolio and VW portfolio are calculated using the monthly return data for the previous 10 years at the end of each month. The periods when the Sharpe ratio of the VW portfolio became negative are excluded as missing data

On the other hand, the Sharpe ratio of the VW portfolio started at around 0.2, but it dropped sharply in the 1990s, and it became negative in the late 1990s, the first half of the 2000s, and around 2010. This means that it continued to be almost 0 or negative for about 20 years. From the mid-2010s, it has risen sharply, and the difference from the Sharpe ratio of the tangency portfolio is narrowing. According to Hara and Honda (2022), in order to take a given portfolio as the optimal portfolio of an ambiguity-averse investor, the excess expected return of that portfolio needs to be positive. Therefore, for the periods when the expected return is negative, it is not possible to calculate the implied ambiguity of the VW portfolio, so it is treated as missing data in Fig. 6.2.

Figure 6.3 shows the p-value of the GRS statistic associated to Fig. 6.2. According to the GRS statistic, there are many periods when the null hypothesis that the VW portfolio is efficient is accepted, and it can be said that there is some rationality in holding the VW portfolio during these periods. However, the periods that are treated as missing data in the graph are when the Sharpe ratio of the VW portfolio is negative, so overall, there were long and many periods when holding the VW portfolio cannot be justified.

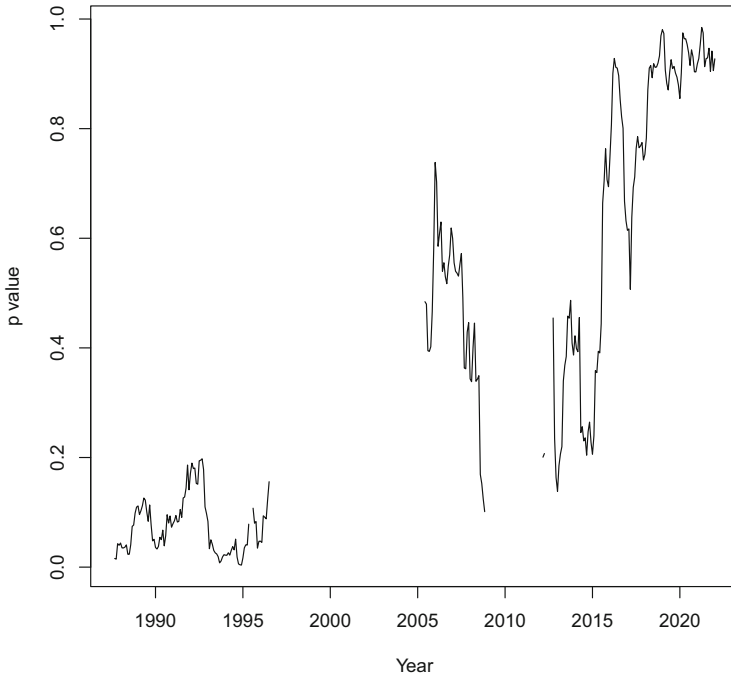


Fig. 6.3 P-value of the GRS statistic in the Japanese stock market. Note: The transition of the p-value of the GRS statistic calculated using the monthly return data for the last 10 years at the end of each month. The periods when the Sharpe ratio of the VW portfolio became negative were excluded as missing data

Although the efficiency of the VW portfolio is not rejected in many months as shown by the p-value of the GRS statistic in Fig. 6.3, the implied ambiguity often takes a very large value. Furthermore, the Sharpe ratio of the VW portfolio is negative for some months, where the implied ambiguity is not even obtained. Overall, in order to justify holding the VW portfolio in the Japanese stock market, it was necessary to assume investors is strongly ambiguity-averse (Fig. 6.4).

6.5 Short-Selling Constraint and Investor's Forecasts

In Sect. 6.4, using Japanese stock market data, we calculated the implied ambiguity of investors who hold the VW portfolio and found that their implied ambiguity often takes very large values. In the case of Japanese stock market data, it is not possible to justify holding the VW portfolio without assuming very ambiguity-averse investors.

However, even in periods when the estimated Sharpe ratio is negative, the VW portfolio was not sold short by the representative economic agent. In reality, market

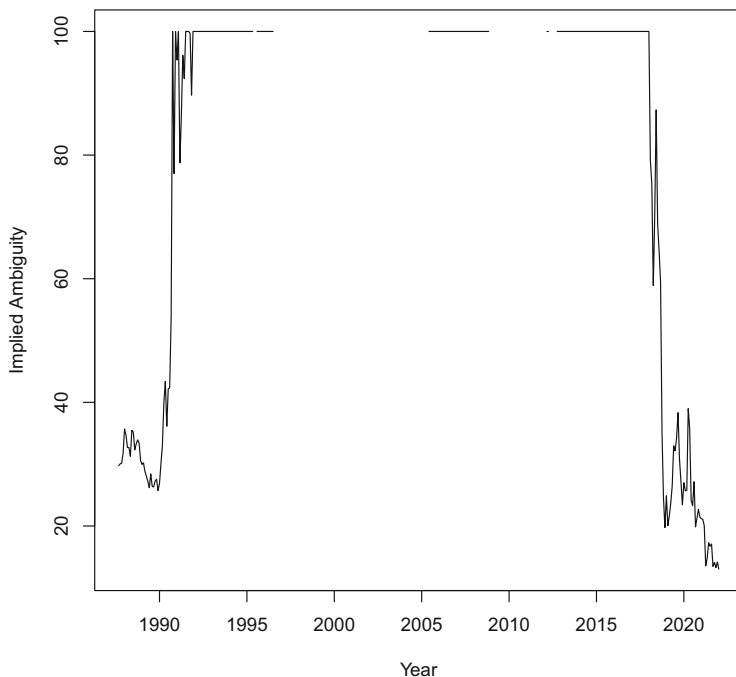


Fig. 6.4 Implied ambiguity in the Japanese stock market. Note: At the end of each month, the implied ambiguity of the VW portfolio is calculated using previous 10 years' monthly return data. Periods when the Sharpe ratio of the VW portfolio was negative were excluded as missing values. Also, for periods when the calculated value exceeded 100, it is shown in the figure as 100

participants choose their portfolio not only by looking at the estimated value from past data but also by updating those estimated values based on their own thoughts and future forecasts. From this perspective, the implied ambiguity calculated using the sample mean of past return data may have overestimated the ambiguity aversion of the representative economic agent. In this section, we consider how the estimated value from past data would be updated by investors.

Researchers already proposed many methods to adjust the estimated parameters to obtain reasonable value as input parameters of the mean–variance portfolio model. For example, Levy and Roll (2010) suggest calculating the combination of the expected returns and covariance that make the VW portfolio optimal under the mean–variance model. They argue that those values can be obtained without making large deviation from the historically estimated values.

Here, we consider the relation between short-selling constraints on the portfolio and ambiguity aversion to propose another method to adjust the estimated parameters. Suppose that investors estimate the expected return using past return data and calculate the mean–variance optimal portfolio. It is well known that the tangency portfolio in mean–variance analysis tends to take extremely large values (in absolute terms) in both positive and negative directions. If investors are not confident in the

accuracy of the estimated expected returns, they may hesitate to construct a portfolio that includes short-selling positions. One possible method resolving this issue is to impose short-sale constraint to the mean–variance model.

In the following, we use the US stock market data dealt with in Sect. 6.3 and show the mean–variance portfolio with short-selling constraints. Then, we consider the implied ambiguity associated with those constrained portfolios.

First, we impose the upper limit $\bar{x} = (\bar{x}_1, \bar{x}_2, \dots, \bar{x}_n)$ and a lower limit of 0 to the optimization problem of Eq. (6.4):

$$\max_{x \in \mathbb{R}^N} V_{\gamma, \theta}(x, W - 1^\top x) \quad (6.11)$$

$$\text{Subject to} \quad 0 \leq x_i \leq \bar{x}_i, \quad i = 1, 2, \dots, N \quad (6.12)$$

The Lagrangian of this problem, using Lagrange multipliers $\lambda = (\lambda_1, \lambda_2, \dots, \lambda_N) \geq 0$ and $\delta = (\delta_1, \delta_2, \dots, \delta_N) \geq 0$, are given by

$$\mathcal{L} = \mu^\top x + R_f(W - 1^\top x) - \frac{\theta}{2} x^\top \Sigma_R x - \frac{\gamma - \theta}{2} x^\top \Sigma_M x + \lambda^\top x - \delta^\top (x - \bar{x}). \quad (6.13)$$

The first-order condition is given by

$$(\mu - R_f \mathbf{1} + \lambda - \delta) = \theta(\Sigma_M + \eta \Sigma_M)x,$$

and the CSC condition is given by $\lambda_i x_i = 0$, $\delta_i(\bar{x}_i - x_i) = 0$, $i = 1, 2, \dots, n$.

Similar to the maximizing problem using negative exponential utility function, the solution to (6.11) and (6.12) should be interpreted as the amount of money invested in each asset. It is difficult to set a meaningful numerical value as the upper limit of the investment amount, so no constraint on the upper limit of the holding amount is set in the numerical example here. Table 6.1, an analysis using US data, shows the optimal solutions and the corresponding Lagrange multiplier when the short-selling constraint $x_i \geq 0$, $i = 1, 2, \dots, N$ is imposed, assuming that the investor is ambiguity-neutral ($\eta = 0$).

Table 6.1 shows that only four of the FF25 portfolios are held in the constrained portfolio. Forty-six percent of the wealth is allocated to SZ1BM5, which is a group of stocks with the smallest market capitalization and the highest B/M. It can be thought that the higher return due to the size effect and the value stock effect is pursued here. On the other hand, 24% is allocated to SZ5BM1, which is a group of stocks with the largest market capitalization and the smallest B/M. Although the average return of large-cap growth stocks is not necessarily high, the standard deviation of the return is low because it contains large-cap stocks. In addition, 6% is allocated to SZ3BM2 from the third quartile of market capitalization, and 23% to SZ3BM4. Both have moderate levels of standard deviation but have relatively large alpha values.

Table 6.2 shows the implied ambiguity of the short-sale constrained portfolio, assuming that the portfolio is chosen by ambiguity-averse investors. The Sharpe

ratio of the short-sale constrained portfolio is 49% of the Sharpe ratio of the tangency portfolio without constraints, which is 0.31. The Sharpe ratio is improved from the VW portfolio, which is 41% of. Correspondingly, the calculated implied ambiguity decreased from 20.82 to 13.27. Furthermore, we calculated the ratio of the Sharpe ratios of the portfolio chosen under short-selling constraints and the tangency portfolio, and their corresponding GRS statistic. The null hypothesis that the portfolio chosen under short-selling constraints is located on the efficient frontier is rejected at the 6% level of statistical significance. The implied ambiguity of a short-sale constrained portfolio is lower than that of the VW portfolio, but it still takes a large value of 13.27. This value and the corresponding GRS statistic suggest that the assumption of ambiguity-neutral is hardly justified.

Next, let us suppose that an ambiguity-neutral investor makes some subjective adjustment to the estimated expected return and hold the short-sale-constrained portfolio.

As Jagannathan and Ma (2003) point out, the mean–variance portfolio under the short-sale constraint can be taken as an optimal portfolio of ambiguity-neutral investor but the expected return vector is adjusted to $(\mu + \lambda - \delta)$. Jagannathan and Ma (2003) call it as “a shrinkage interpretation of the effects of portfolio weight constraints,” assuming that the expected return of assets subject to short-selling is adjusted by adding λ_i to the estimated expected return.³

In Table 6.1, assuming that the investor is ambiguity-neutral ($\eta = 0$), we show the optimal solution and the associated Lagrange multiplier values when short-selling constraints (6.12) are imposed in optimization problem (6.11). If we consider the value of this Lagrange multiplier as a correction to the sample mean, it can be seen that the expected return is adjusted upward for assets other than the four portfolios actually held. In particular, the correction tends to be larger for portfolios that were sold short. For example, the SZ2BM1 portfolio is estimated to have a monthly excess return of 0.63%, which is adjusted upward by 0.44%.

In conclusion, we numerically calculated the mean–variance portfolio with short-sell constraints using US stock data and compute the implied ambiguity of the constrained portfolio. If we interpret that the investor chooses the short-sale constrained portfolio because of investor’s ambiguity aversion, the implied ambiguity takes a large value of 13.72. Or, if we suppose that the investor chooses the short-sale constrained portfolio because they adjust the estimated expected return, the adjustment in expected return is relatively large.

³In Bayesian portfolio selection literature such as Jorion (1986), the correction for estimated values is also called shrinkage.

6.6 Conclusion

In this chapter, using US and Japanese stock market data, we calculate the implied ambiguity of the VW portfolio. In both cases, the implied ambiguities are large, confirming the importance of ambiguity aversion behavior in the stock market. On the other hand, the calculated implied ambiguity can be too large because we assume that the deviation of the VW portfolio from the tangency portfolio is caused solely by the ambiguity-averse behavior.

Thus, we examined a short-sale constrained portfolio. The implied ambiguity of the short-sale constrained portfolio is also large. Even if a short-sale constrained portfolio is chosen because investors adjust the estimated expected return by some reasons, the expected return adjustment is also large.

Thus, the deviation of the VW portfolio from the mean–variance theory, that is, the tangency portfolio, can be caused by ambiguity aversion as well as institutional reasons such as short-selling constraints, and adjustment of estimated values due to the difficulty of estimation. Our results encourage future research to identify the causes of the deviation of the VW portfolio from the mean–variance theory, that is, the tangency portfolio.

6.7 Comment by Hideyuki Takamizawa: Issues and Solutions Regarding the Estimation of Ambiguity Aversion Coefficients

In Honda's paper, an implied ambiguity (IA) aversion coefficient, which is derived from the model proposed by Hara and Honda (2022), is estimated using Japanese and US data. In this discussion, we review how to derive IA in Sect. 6.7.1, point out the issues with estimating IA in Sect. 6.7.2, and suggest directions for improvement and applications in empirical research in Sect. 6.7.3.

6.7.1 Review of IA Derivation

The portfolio that investors actually hold is probably not the optimal portfolio (tangency portfolio) in the sense of mean–variance as taught in finance textbooks. So why does this gap occur? Honda's paper seeks the answer in the ambiguity of the distribution of asset returns and the preference of investors to avoid this ambiguity.

Simply put, the ambiguity here means that the distribution is not uniquely determined. In Honda's paper, the return vector R is assumed to follow a normal distribution with its covariance matrix known a priori. However, the distribution is not unique because the mean vector M is not uniquely determined. The fact that M

can take various values is modeled as M following a normal distribution. Then, the conditional distribution of R given M also follows a normal distribution.

Next, the preference for ambiguity is given by a special form of the Smooth Ambiguity model. This model is characterized by its ability to distinguish between the degree of ambiguity (given by the covariance matrix of M , denoted as Σ_M) and the preference for ambiguity (given by the preference parameter η). However, it is not straightforward to obtain them separately from observed data, which is well explained in Honda's paper using the example of investment in Tesla shares.

The optimal portfolio in this model is derived from the following three steps: (i) obtain the expected utility of future wealth under the conditional distribution of R given M , and then its certainty equivalent, in which the degree of risk aversion is reflected. (ii) Obtain the expected utility of the certainty equivalent obtained in (i) under the distribution of M , which takes into account the degree of ambiguity aversion. (iii) Maximize the expected utility obtained in (ii) for portfolio weights. The optimal portfolio for this model is analytically obtained as in Eq. (6.5) of Honda's paper. This is the portfolio that an ambiguity-averse investor actually chooses. In this discussion, we call this the *actual* portfolio.

If we set $\eta = 0$ or $\Sigma_M = 0$ in Eq. (6.5), the actual portfolio matches the tangency portfolio that "textbook" investors would choose. Here, $\eta = 0$ means an ambiguity-neutral preference. Therefore, investors who are aware of the ambiguity of average returns ($\Sigma_M \neq 0$) but do not care about it ($\eta = 0$) and investors who are not aware of the ambiguity in the first place will choose the same portfolio.

By construction, the Sharpe ratio (SR) of the actual portfolio is smaller than that of the tangency portfolio. That is, the actual portfolio is inefficient in the mean–variance sense. Nevertheless, investors choose the actual portfolio because they do not prefer ambiguity ($\eta > 0$). Thus, η is key to the departure of the actual portfolio from the tangency portfolio, and by observing this departure, Hara and Honda (2022) made it possible to obtain an implied value of η , IA. This IA has two important features. One is that IA is expressed simply as a function of the (squared) ratio of the SR of the actual portfolio to that of the tangency portfolio. The value of IA increases as the SR of the actual portfolio becomes smaller compared to that of the tangency portfolio. Therefore, IA is not only calculated easily, but also consistent with economic intuition. The other is that IA can be linked to the GRS statistic. If the actual portfolio is found to be inefficient in the GRS test, the value of IA can be considered to be significantly different from zero. The ability to make a statistical evaluation of the implied value, albeit indirectly, is a breakthrough.

6.7.2 Challenges in Estimating IA

Although the IA derived by Hara and Honda (2022) has desirable properties from an economic and statistical perspective, there are mainly two challenges when applying it empirically.

The first challenge is that IA cannot be calculated when the SR of the actual portfolio is negative. In fact, when estimating IA sequentially by a 10-year rolling window method using Japanese data, there were periods with missing values. Meanwhile, the SR of the tangency portfolio consistently takes positive values, because assets with negative average returns are likely held short in the tangency portfolio. Therefore, to avoid the missing-value problem, it is necessary to devise a way to estimate the average return of the actual portfolio. The estimation of average returns, which was well avoided in the theoretical derivation of IA, is in fact an unavoidable problem in practical use.

The second challenge is the possibility that IA is overestimated. This is because, as stated in Honda's paper, the reason for investors to hold inefficient portfolios is attributed solely to ambiguity-averse preferences. In fact, in Japanese data, there were periods when IA was over 100. Since the IA obtained from the US data is at most 20, it is not unreasonable to think that the Japanese value is excessive. However, since the power of the GRS test is not strong in small samples, it can also be interpreted that the value of 100 or above is not statistically different from zero. The problem of overestimation becomes prominent when the performance of the tangency portfolio is too good relative to the actual portfolio, which indicates that it may be necessary to review the tangency portfolio to mitigate this problem.

6.7.3 Directions for Improvement and Practical Applications

(1) Change the Estimation of Average Returns

We failed to calculate IA when the average return of the actual portfolio is lower than the return of the safe asset. This phenomenon is not uncommon in Japan, where the stock market has been sluggish for a long time. However, at the time of decision-making, investors should be expecting the average excess return to be positive (otherwise, they would not hold the actual portfolio). It might be worth considering an average that reflects this investor's prior outlook. Investors have an average value that they perceive as most plausible a priori, and then adjust it according to recent conditions. In fact, Jorion (1986) provides an estimate of the mean as a weighted average of the prior and sample values, and determines its weight by a Bayesian statistical method. Such a weighted average is less variable than the simple average of the sample, and thus has a smaller chance of being negative.

The estimation method of MacKinlay and Pastor (2000) may also be useful. One of their proposed settings is that the average return depends on latent stochastic factors, so it is similar to the setting in Honda's paper that assumes that the mean vector is stochastic due to ambiguity. In the estimation, the average return with the factor structure was positive even during periods when the simple average of the sample was negative.

The problem here is that the assumptions about ambiguity and uncertainty in the average return differ between portfolio selection and average return estimation. At

the time of portfolio selection, a strong assumption was made that the average return follows a normal distribution in order to obtain the portfolio weight analytically, but such an assumption is not necessary when estimating the average return. Then, if we assumed a more general form of ambiguity for estimating the average return, we should also apply this assumption to the portfolio problem. In this case, however, the optimal portfolio weight is no longer available in closed form. Therefore, in order to improve the estimation accuracy while retaining the advantage of the closed-form solution, we have to accept the theoretical inconsistency. However, this is not a major problem in the implementation of theoretical models. For example, in the Black–Scholes model, the volatility of returns is assumed to be constant to derive the analytical solution for option prices, but the implied volatility calculated from option data varies depending on both the exercise price and time to maturity.

(2) Change the Tangency Portfolio

The tangency portfolio always performs well because it likely shorts assets with negative average returns, which results in the overestimation of IA. Remember that the tangency portfolio is a portfolio chosen by textbook investors who do not recognize ambiguity of return distribution nor have preferences for ambiguity. In Honda's paper, this portfolio was also chosen by investors who recognize ambiguity but are ambiguity-neutral. But in reality, would these two types of investors make the same choice? It may be more natural to think that the latter investors make more conservative choices. Then, an appropriate benchmark portfolio to which the actual portfolio chosen by ambiguity-averse investors is not the tangency portfolio chosen by textbook investors, but some realistic optimal portfolios chosen by ambiguity-neutral investors.

From this perspective, one way to obtain such a more realistic benchmark portfolio is to substitute into the formula of the tangency portfolio the mean return vector that is estimated with ambiguity and uncertainty taken into consideration. By construction, the elements of the estimated mean return vector are more smoothed than those of the mean return vector estimated simply as the sample average. Then, the assets that are extremely long or short will decrease, resulting in a more conservative tangency portfolio. The SR of this tangency portfolio will be closer to that of the actual portfolio, thus mitigating the problem of overestimating IA.

However, it should be noted that the theoretical consistency is also secondary in this discussion. As discussed in (1), the optimal portfolio of ambiguity-neutral investors may not be solved analytically under a more realistic ambiguity of return distribution. Here too, we are separating the theory and its implementation.

By the way, in Honda's paper, the optimal portfolio of ambiguity-neutral investors with short-selling constraints was used as the actual portfolio. Instead, it would be interesting to consider this as a tangency (benchmark) portfolio and the VW portfolio as the actual portfolio. This is because, as shown in Honda's paper, the constrained portfolio can be considered a tangency portfolio with the mean return vector adjusted by the Lagrange multiplier related to the constraint. This adjustment, like the ambiguity-reflecting estimate, levels the elements of the vector. Therefore, we may be able to interpret this adjustment derived from the short-selling constraint

as due to ambiguity. Alternatively, we may think that the short-selling constraint was imposed because of the ambiguity of return distribution. Either way, since the actual portfolio (here the VW portfolio) is compared with a conservative tangency portfolio, the overestimation problem is alleviated.

(3) Applicability

In Honda's paper, the VW portfolio and the short-selling constrained optimal portfolio are used as candidates for the actual portfolio. It would be interesting to add an equally weighted (EW) portfolio to the actual portfolio. For example, the GPIF, the Japanese public pension fund management organization, uses a benchmark portfolio with equal allocations to four asset classes. By comparing this EW portfolio with the tangency portfolio composed of the same four asset classes, it is possible to obtain the IA of a real institutional investor. If we could collect a number of IAs of real investors, it would be a significant contribution. This is because there is currently no consensus value for IA, and it is possible to form one.

It would also be interesting to evaluate the value of IA in relation to economic episodes. For example, when it comes to the phase of elevated ambiguity and preferences for its aversion, the global financial crisis after the Lehman shock and the Corona pandemic come to mind. If the value of IA actually increased at these times, the credibility of IA would increase.

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Part IV
Challenges in Corporate Finance
and Corporate Governance

Chapter 7

Nonhomogeneous Characteristics of Institutional Investors and ESG: From Long-Term Investment in Japanese Firms and CO₂



Yoko Shirasu and Baosheng Yang

Abstract This chapter conducts an empirical analysis focusing on the heterogeneity of institutional investors after reviewing the literature on ESG and institutional investors. The analysis considers ESG activities as a form of extended governance that is responsible for all stakeholders. Empirical evidence shows that foreign and long-term institutional investors promote long-term tangible and intangible investments in companies that engage in ESG activities, leading to increased innovation in the long run. These findings contradict the popular view that foreign investors tend to pursue short-term outcomes. It also reveals that differences in CO₂ emission standards, which are of high interest to institutional investors, have an impact on the ownership of companies. It is important to consider the characteristics and country of origin of institutional investors when analyzing companies' ESG. The comment by Kazuhiko Ohashi, "On the Relationship Between Investor and Corporate Behaviors Regarding ESG," discusses various aspects and channels for ESG investment, including different forms of companies such as public and private companies. He also examines the so-called impact investing, which pursues not only financial returns but also environmental and social impact.

This chapter is an excerpt from the working paper. For details, see Shirasu and Baos-heng (2022), "Institutional Investor Heterogeneity and ESG: A Survey of Papers and Empirical Analysis of Corporate Investment and Carbon Emissions in Japan," TCER Working Paper Series, No. J—21. We would also like to thank Kazuhiko Ohashi and Kenji Suzuki for their helpful comments in preparing this chapter. We also thank Mr. Hitoshi Takehara for the database on the number of patents granted and Mr. Yukihiro Yasuda for the YK value. We thank them for their comments. Shirasu received research grants from JSPS Grants-in-Aid for Scientific Research 20K01750 and 21H04394.

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7.1 Introduction

The Nonhomogeneous Characteristics of ESG and Institutional Investors

The topic of environmental, social, and governance (ESG) investing is of great significance to institutional investors worldwide. Academic research primarily focuses on two key areas: (1) the outcomes of ESG corporate valuations and (2) the determinants of ESG activities. Recent studies suggest that ESG can enhance corporate value, although the empirical evidence on the relationship between corporate value and ESG is mixed (e.g., El Ghouli et al. 2011, 2018; Friede et al. 2015; Flammer 2015; Griffin et al. 2021). The later academic issues discussed this relationship in terms of ESG determinants, including firm-level factors such as shareholder structure (institutional investors), CEO, and board characteristics, as well as industry-/country-level factors. This chapter focuses specifically on corporate shareholders (institutional investors) and emphasizes the nonhomogeneous characteristics of these investors.

Institutional investors are not a homogeneous group. For instance, there is a positive relationship between ESG activities and long-term investment (Boubaker et al. 2017; Shirasu and Kawakita 2021) and a positive relationship between ESG activities and the percentage of foreign investor ownership (Ferreira and Matos 2008; Boubakri et al. 2016). This is because foreign investors generally do not have close relationships with domestic portfolio companies, such as corporate groups or crossholdings, etc. However, it is important to note that foreign investors are not a monolithic group, and the nonhomogeneous investment styles, objectives, and characteristics of each home country can have different effects on ESG investment decisions (Marshall et al. 2022). Given the high percentage of foreign investment in the Japanese securities market in recent years, it is essential to understand which types of investors are leading ESG investments, not only in terms of their owner share ratio but also their influence and voice.

In this chapter, we survey recent papers on ESG investment and institutional investors and conduct an empirical analysis after organizing and presenting three arguments regarding shareholder structure, tangible and intangible corporate investment through ESG, and the environmental field, which has received much attention among ESG factors. The analysis reveals that stock ownership differs depending on institutional investors' characteristics: foreign investors who are actively engaged in environmental (E) factors within ESG and long-term foreign investors play an important role in long-term corporate investment. Foreign institutional investors were not short-term investors but rather played a role in promoting long-term investment in firms. Additionally, we find that institutional investors make investment decisions based on original data on environmental (E) factors, such as CO₂ emissions, and that their decisions differ depending on the characteristics of the institutional investor and the norms of the country of origin.

Expanded Governance (ESG) Is a Method of Corporate Governance that Encompasses Non-Shareholder Stakeholders

Theoretically, corporate social activities are rooted in contract theory, which posits an expanded model of corporate governance in which corporate managers have substantial responsibilities to widely stakeholders, in addition to their fiduciary duties to shareholders (Grossman and Hart 1986, Sacconi 2006). This model contends that companies can enhance their reputation and financial performance by engaging in ESG activities that foster positive relationships with stakeholders (Antoni and Portale 2011) and align the interests of management and non-shareholder stakeholders (Marshall et al. 2022). In this chapter, ESG activities will be explored as a means of expanded corporate governance.

Corporate and Institutional Investors

The relationship between corporate investment and institutional investors is worth examining. Investment in tangible and intangible assets, including innovation, is essential for the long-term success of a business enterprise. While short-term-focused managers may hesitate to invest in the future, shareholders expect managers to pursue innovation to maximize long-term value (Flammer and Bansal 2017). Corporate investment can help bridge the gap between shareholders and managers, encouraging investment in future preferences (Tsang et al. 2021). Some argue that innovation has a more significant influence on firm value than ESG performance (Awaysheh et al. 2019).

Surroca, Tribo, and Waddock (2010) suggest that the connection between ESG activities and their “direct” financial performance might be spurious. The authors contend that corporate investment in intangible assets, such as innovation, human resources, and reputation, serves as a “mediator” between ESG and financial performance. The study’s findings indicate that investment in intangible assets plays a crucial role in linking ESG to financial performance. In the case of Japanese firms, growth in corporate investment is a significant factor in enhancing ESG-mediated corporate value.

In general, firm value is the present value of expected future cash flows. According to Görgen et al. (2019), in the discounted cash flow method, the discount rate (cost of capital) has only a temporary impact on wealth due to investment “sentiment”, while changes in cash flows reflect a revaluation of fundamentals and have a permanent effect. Berk and van Binsbergen (2022) argue that the influence of the cost of capital as a discount rate on investment decisions is minimal. A firm’s long-term investment in tangible and intangible assets, which are included in future cash flows, is a crucial factor. Innovations, in particular, provide firms with new revenue streams (Han et al. 2017) and result in high stock returns for firms with technological capabilities (Ahmed and Alhadab 2020). However, securities markets tend to undervalue innovative firms (Da Silva et al. 2018; Yamada et al. 2017), and firms with a high proportion of institutional ownership and thriving innovation are less risky (Duppatti et al. 2022). On the other hand, regarding ESG, firms that excel in governance (Giroud and Mueller 2011), eco-efficiency (Derwall et al. 2005), and customer and employee satisfaction (Fornell et al. 2006; Edmans et al. 2014) tend to

increase intangible assets and enhance corporate reputation. Firms that prioritize customer and employee satisfaction (Fornell et al. 2006; Edmans et al. 2014) are known to boost corporate reputation by increasing intangible assets. Yamada, Usui, and Goto (2017) found that Japanese firms that are easy to work for experience higher profitability and stock returns over several years, suggesting that the intangible asset of a good work environment, which is costly, may be undervalued.

How does ESG affect corporate investments (investments in tangible and intangible assets, capital expenditures, and innovation and patents)? According to Tsang et al. (2021), a positive association exists between ESG and corporate investment. This is because companies that engage in ESG practices exhibit higher levels of innovation productivity, encourage managerial risk-taking, and decrease agency costs. Nevertheless, the specific types and characteristics of institutional investors that contribute to the growth of corporate investments in both tangible and intangible assets, as well as human resources, remain unclear.

Foreign, Long-Term Investors and Corporate Investment in Tangible and Intangible Assets

Certainly, higher foreign institutional ownership has been demonstrated to enhance long-term investment in both tangible and intangible assets of firms through the implementation of effective governance mechanisms (Bena et al. 2017). However, the extent to which this applies to the Japanese context remains uncertain. Research by Elyasiani and Jia (2008) and Elyasiani, Jia, and Mao (2010) indicates that long-term institutional investors are driven by a strong motivation, possess exceptional resources for efficient monitoring, and fulfill a crucial function in alleviating agency problems.

The authors' empirical analysis of Japanese firms reveals that corporate investment increases with the percentage of shares held by foreign investors, and the trend is stronger for firms with high environmental (E) scores. We find that the effect is larger under the conditions of higher E scores and more established governance systems, and that the effect is stronger for long-term institutional investors.

Non-Homogeneity of Environmental Activities and Institutional Investors

Institutional investors often have the socially responsible investing in line with their social preferences (Riedl and Smeets 2017). Let us consider what kind of social preferences investors have. In a survey conducted by the Pension Fund Investment Fund (GPIF), mandated managers were questioned to identify the most important ESG issues for both domestic and foreign institutional investors. Notably, climate change was as the top concern (Stewardship Code 2019).

Krueger, Sautner, and Starks (2020) argue that CO₂ emissions are a significant risk for institutional investors and require engagement. And Dimson, Karakas, and Li (2015) state that institutional investors engage in environmental and social (E/S) engagement with companies with poor ESG performance, resulting in improved governance and lead to hold stock ownership.

ESG is promoted by influential foreign investors such as BlackRock. The data from the fiscal year 2018 reveals that foreign investors hold a considerable percentage of Japanese stocks in industries such as mining and oil and coal-related

industries. It is noteworthy that these industries have high percentages of holdings, with the mining industry ranking first. It is important to consider that this trend does not simply suggest a straightforward approach of divesting from companies that generate substantial amounts of CO₂ emissions.

Recent studies begin to highlight the non-homogeneity of investors. As per Flammer (2021), it has been observed that long-term institutional investors, investors from countries with stewardship codes, investors from countries with strong environmental norms, and universal owners display increased activity in disclosing climate change risks (Ilhan et al. 2021). Additionally, it is noted that the culture and social norms of a country play a crucial role in shaping the ESG preferences of foreign investors, which can vary depending on the investor's country of origin (Dyck et al. 2019).

Therefore, this chapter analyzes the relationship between the characteristics of institutional investors and CO₂ emission reductions. The results of the authors' empirical analysis of Japanese companies show that institutional investors judge CO₂ emissions only by total CO₂ intensity and that Nordic and European investors invest in companies with low total CO₂ emission levels, while other investors tend to hold more shares of Japanese companies that have high total CO₂ emission levels but are making efforts to significantly reduce them, rather than of companies with low total CO₂ emission levels.

In the remainder of this chapter, we introduce as much relevant literature as possible. Section 7.2 summarizes the comprehensive discussion of ESG. Section 7.3 organizes the discussion by reviewing existing studies, and Sects. 7.4 and 7.5 present the results of the empirical analysis. Section 7.6 discusses the results of the analysis, and concludes the paper.

7.2 Organizing the General Discussion on ESG and Institutional Investors

This section summarizes existing discussions on the relationship between ESG, valuation, and institutional investors.

7.2.1 ESG and Valuation

There are two traditional arguments about the relationship between corporate ESG activities and corporate value. Stakeholder theory holds that ESG performance enhances a company's reputation and social capital, thereby increasing corporate value. On the other hand, agency theory posits that managers intentionally engage in excessive ESG activities for their own gain, ultimately detrimental to shareholders' wealth and diminishing corporate value. While there are many empirical studies

about these two views, El Ghoul et al. (2011) show that activities such as employee and environmental can lead the lower cost of capital),¹ Cho, Lee, and Pfeiffer (2013) and Harjoto and Laksmana (2018) show that ESG performance can mitigate information asymmetry; Albuquerque, Koskinen, and Zhang (2019) show that product differentiation by ESG leads high profits; Servaes and Tamayo (2013) show that consumers who have ESG loyalty positively evaluate ESG products and purchase them. Many papers support the stakeholder theory by showing that the positive evaluation of ESG performance is due to consumers' product purchase intentions. Ferrell, Liang, and Renneboog (2016) show that it is not an agency problem, but rather that firms with good governance perform socially. In other words, active ESG engagement is related to the strength of governance, depending on shareholders' views on social activities (Krüger 2015).

With respect to empirical studies on ESG and financial performance, Hong and Kacperczyk (2009) report findings of low expected returns. Additionally, meta-analyses conducted by Friede, Busch, and Bassen (2015) and Huang, Sim, and Zhao (2020) find a positive correlation between ESG and financial performance. However, a review paper by Gillan, Koch, and Starks (2021) revealed that the relationship between ESG and firm value is mixed, with some studies finding positive, negative, and neutral relationships. In contrast, Khan, Serafeim, and Yoon (2016) find that firms with higher ratings on key sustainability issues outperform their peers. Huang, Sim, and Zhao (2020) also note that factors such as economic conditions and endogenous statistical issues need to be properly addressed in order to obtain accurate results. Furthermore, Buchanan, Cao, and Chen (2018) find the effects of the hypotheses vary depending on the economic situation, both before and after the global financial crisis, and that the relationship between ESG and agency problems is reversed. Therefore, it is important to consider the analysis method and economic conditions at the time of the analysis in order to understand the results of empirical studies on ESG and financial performance.

Recent empirical studies re-examine the relationship, using the 2008–2009 global financial crisis and the COVID-19 pandemic as exogenous shocks to ESG demand (Lins et al. 2017; Buchanan et al. 2018; Bae et al. 2021; Garel and Petit-Romec 2021). Particularly during the global financial crisis, studies for stakeholder theory suggest that ESGs can help build social capital that provides an insurance payoff (Lins et al. 2017). In contrast, studies relying on agency theory find that ESGs have a particularly negative impact on firm value during the global financial crisis (Buchanan et al. 2018). However, many analyses find that ESGs play a moderating role in stock price declines (Ding et al. 2021), that stock returns are better in the United States (Garel and Petit-Romec 2021), and that there is a significant positive impact on ESG stock returns (Bae et al. 2021) or no impact (Takahashi and Yamada 2021).

¹It should be noted that El Ghoul et al. (2011) only include U.S. firms and their sample institutions are from 1992 to 2007, before the global financial crisis.

Next, we present some theoretical studies. Pedersen, Fitzgibbons, and Pomorski (2021) identify three types of investors (“ESG-unaware”, “ESG-aware”, and “ESG-oriented”). The “ESG unaware” investor unconditionally maximizes the Sharpe ratio, the “ESG-aware” investor chooses a higher Sharpe ratio while taking ESG scores into account, and the “ESG-oriented” investor chooses the Sharpe ratio while optimally selecting a higher level of ESG and is willing to accept lower returns. In other words, the higher the ESG score, the higher the demand from “ESG-oriented” investors, the higher the price and the lower the return. Pedersen, Fitzgibbons, and Pomorski (2021) note that governance (G) factors can predict future positive returns, and that environmental and social (E/S) factors are likewise positive predictors of future corporate profitability and excess returns. Higher expected returns can be viewed as a positive signal of rising ESG fundamentals, but if ignored by “ESG-unaware” investors, this signal will not be fully reflected in prices. Therefore, the model assumes that ESGs earn positive returns when securities markets underreact to future forecasts of fundamentals or when ESG values are not fully incorporated into securities markets. This interpretation is consistent with Yamada, Usui, and Goto’s (2017) analysis that the stock prices of firms that are easy to work for do not fully reflect the intangible asset of being easy to work for. In addition, Edmans (2011) states that corporate value is not immediately reflected in stock prices, and even in the U.S. market it takes at least four to five years, making it an important issue whether ESG information is sufficiently incorporated into the securities market.

Focusing on the topic of climate change (E), Pastor, Stambaugh, and Taylor (2021) posited that unforeseen alterations in circumstances can significantly impact the relationship between ESGs and returns. They proposed that under normal conditions, green assets yield lower expected returns (negative alpha), which reduces the firm’s cost of capital. This lower alpha is attributed not only to investors’ preference for green funds, but also to their capacity to successfully hedge climate risk. Investors are content with the lower returns because they derive utility from holding green assets (investor surplus). However, they speculate (but do not provide empirical evidence) that when unexpected changes in ESG occur and ESG concerns increase, at those times, investors will make the opposite investment, resulting in increased returns on green assets (positive alpha). This hypothesis aligns with prior research that has demonstrated that the empirical analysis of ESG (positive or negative alpha) is influenced by the time of year.

7.2.2 Institutional Investors and ESG

Institutional investors typically exert their influence over corporate value through two primary methods: (1) voice and (2) exit threat. In terms of voice (1), these investors do the “engagements” in E/S activities in order to improve their ESG profile (Krueger et al. 2020; Azar et al. 2021). When their engagement is successful, it can lead to enhanced investment performance (Dimson et al. 2015). As for exit

threat (2), institutional investors allocate funds to the best-ESG portfolio and remove funds from the worst-ESG portfolio (Hartzmark and Sussman 2019).

Research into the influence of institutional investors on environmental, social, and governance (ESG) factors has increased in recent years. According to Chen, Dong, and Lin (2020), institutional equity ownership improves ESG performance through ESG-related proposals. Furthermore, Velte (2022) identifies three reasons why institutional investors take ESG-related actions. Firstly, institutional investors have complex portfolios from an international perspective, which enables them to understand stakeholder concerns as sustainability issues are global. Secondly, they are signatories to the PRI (United Nations Principles for Responsible Investment) and various networks, which provides them with access to more sustainability information and management tools. Lastly, compliance with the Stewardship Code is strongly required.

Institutional investors come in various types and characteristics, which, in turn, can lead to different agency issues among stakeholders. For instance, the differences between long-term and short-term investors, foreign and domestic investors (Dyck et al. 2019), the presence or absence of PRI signatures (Dyck et al. 2019), and whether they are asset owners, all contribute to unique agency issues. Additionally, ESG monitoring is highly variable and may not be uniformly implemented by all institutional investors. In fact, Velte's (2022) research on the heterogeneity of institutional investor characteristics revealed that only about 70% of investors demonstrated true progress in this area after 2019, highlighting the emerging nature of this research topic.

Institutional investors exhibit distinct varieties of types and characteristics, which consequently result in diverse agency issues among stakeholders (Dyck et al. 2019). For example, discrepancies may arise between long-term and short-term investors, foreign and domestic investors, or whether they possess PRI signatures and whether they are asset owners, among other factors (Dyck et al. 2019). Furthermore, ESG monitoring among institutional investors is highly uneven and not all investors are capable of uniformly implementing homogeneous monitoring (Velte 2022). As stated in Velte's (2022) paper, reviewing on the heterogeneity of institutional investor characteristics, after 2019 papers are approximately 70% and this area of study is relatively new and unexplored.

Since ESG investments and strategies take a long-term view, it would be natural for long-term institutional investors to take the lead in ESG. Bushee (1998) is regarded as a pioneering study for classifying long-term institutional investors, but in recent years many have followed their classification and divided investors by their portfolio turnover. With respect to environmental performance in particular, a causal relationship has been identified, with the presence of long-term investors as the cause (Oikonomou et al. 2019). In addition, they find a moderating role for long-term investors (Velte 2022). Shirasu and Kawakita (2021) and Erhemjamts and Huang (2019) on the relationship between ESG and positive BAHR (long-term excess-return on equity), Nguyen, Kecskés, and Mansi (2020) on ESG and Tobin q Nguyen, and Kim, Li, and Li (2014) conduct an empirical analysis of the relationship between ESG and stock price crash risk reduction with long-term institutional investors, and

treat them as moderators. Next, for investors with sustainable preferences, we position institutional investors that have signed the PRI as such and find a positive impact on ESG, especially environmental performance (Dyck et al. 2019). However, Gibson et al. (2022) warns of the potential for greenwashing in PRI signatures.

Institutional investors are obligated to fulfill their fiduciary responsibilities. In the United Kingdom, it became mandatory in 2018 for investors to consider ESG factors that are financially material, and in 2019, they were required to explicitly state how these factors are incorporated into their investment policy statements. In France, ESG information disclosure was required for listed companies and institutional investors as of July 2015, and a new form of “Entreprise a Mission” was recognized in a 2019 amendment to the law. Legislation is also currently being developed. Meanwhile, in the United States, the interpretation of the law varies depending on the administration in power, and the issue has become more political in nature. The contrast between the circumstances in the United States and Europe is evident.

7.3 Existing Studies and Hypotheses for the Analysis

7.3.1 *Does a Higher Shareholding of Foreign Investors Facilitate Corporate Investment Through ESG Expanded Governance Mechanisms?*

Foreign Investors and Corporate Value/ESG

First, we summarize existing research on tangible and intangible corporate investment through shareholder composition and ESG and explain the authors’ hypothesis. In general, the view is that foreign investors encourage managers to obtain short-term profits, tend to be short-term (Ferreira et al. 2014), and reduce long-term R&D (research and development) to reduce expenses (Bushee 1998). On the other hand, there is a view that foreign investors play an important role as monitors. For example, many large foreign investors are independent institutions with no business relationship with the firms, which can be expected to have a monitoring effect on firms and corporate governance (Bena et al. 2017). Bena et al. (2017) found that when the share of foreign investors’ holdings is high, firm investment increases. Furthermore, they find that foreign investors play a role in raising firms’ long-term investment by supporting low governance as effective monitors.

It is clear that an increase in foreign investor ownership strengthens corporate governance around the world and increases corporate social investment (Bae et al. 2004; Ferreira and Matos 2008; Bena et al. 2017; Deng et al. 2018; Tsang et al. 2021; Wang et al. 2022); Suzuki, Tanimoto, and Kokko (2010) find that Japanese firms are more effective in establishing ESG departments and hiring people responsible for ESG activities.

Corporate Investment, Innovation, and ESG

Surroca, Tribo, and Waddock (2010) empirically demonstrate that investment in intangible assets, such as innovation, human resources, and reputation, serves as a mediator between ESG and financial performance. Furthermore, when firms position ESG activities as an implicit private contract against externalities and strengthen their relationships with stakeholders, this leads to a reduction in firm risk and ultimately to higher levels of innovation (Karpoff 2021). In essence, examining corporate investment through ESG activities is crucial to understanding the outcomes associated with ESG.

Although it is a concern that increased corporate investment may expose firms to additional risk, Duppati et al. (2022) indicate that the risk is lower for firms with high institutional ownership and high levels of innovation, suggesting that institutional investors do not have a negative impact on firm value, that suggest not likely to be negatively impacted by institutional investors.

Based on the above, the following hypothesis is formulated.

Discussion 1: Higher foreign investor shareholdings promote long-term investment in the firm, which is facilitated through the mechanism of ESG, which is expanded governance.

7.3.2 Does a Higher Shareholding of Long-Term Institutional Investors Facilitate Corporate Investment Through ESG Extended Governance Mechanisms?

Characteristics of Long-Term Investors

According to Bushee (1998, 2001), short-term institutional investors tend to hold smaller positions and shorter investment horizons in the firms they invest in, which may encourage managers to pursue short-term gains. On the other hand, long-term institutional investors typically have more concentrated positions in specific firms and gather special information about long-term investments. These investors often target firms with high growth potential for trading. Furthermore, long-term institutional investors can mitigate the cost-benefit of monitoring over time through a buy-and-hold strategy, as suggested by Gaspar, Massa, and Matos (2005) and Harford, Kecskés, and Mansi (2018). In other words, long-term institutional investors can optimize firm value by establishing ongoing relationships with the management of their portfolio companies and intervening in management with a comprehensive and insightful view of the firm, as noted by Derrien, Kecskés, and Thesmar (2013) and Harford, Kecskés, and Mansi (2018). From a cost perspective, long-term institutional investors have a strong incentive to allocate resources to monitoring because the benefits of monitoring outweigh the costs in the long run, as demonstrated by Gaspar, Massa, and Matos (2005), Harford, Kecskés, and Mansi (2018), and Nguyen, Kecskés, and Mansi (2020).

Long-Term Institutional Investors and Corporate Investment/Innovation, ESG

In the realm of corporate investment, Borochin and Yang (2017) demonstrate that long-term institutional investors encourage increased long-term corporate investment. Additionally, Bushee (1998) asserts that a higher proportion of long-term institutional investors leads to greater corporate R&D investment, the long-term institutional investors may also serve to deter excessive investment (Harford et al. 2018).

Regarding the relationship between long-term institutional investors and ESG, Boubaker et al. (2017), Starks, Venkat, and Zhu (2017), and Kim et al. (2019) find a positive relationship between investment horizon and social activities, Shirasu and Kawakita (2021) and Erhemjamts and Huang (2019) find that long-term institutional investors play as a moderator between ESG and financial performance, and Meng and Wang (2020) confirm the causal link from investor horizon to social action promotion. Besides, Gloßner (2019) analyzes that long-term institutional investors, who are blockholders, push managers to reduce costly ESG deals through long-term monitoring.

Based on the above, the following hypothesis is formulated.

Discussion 2: Higher long-term institutional investor shareholdings promote long-term investment in a company, which is facilitated through extended governance, ESG, and governance mechanisms.

7.3.3 Is There a Relationship Between CO₂ Emissions and Institutional Shareholding?

Characteristics of Environmental Elements

Shive and Forster (2020) argue that, despite the potential for climate change to cause widespread harm to society, the burden on polluters may be low. Therefore, it is sufficient to evaluate a company's commitment to addressing climate change to determine the seriousness of their ESG activities. According to Bénabou and Tirole (2010) points, it is sure that if the cost of neutralizing harmful pollutants exceeds the cost of continuing to emit them or if the company has a comparative advantage in social action, Friedman's (1970) argument, which focuses solely on maximizing shareholder returns, does not hold. Surely, Fowlie (2010) also points that this perspective does not hold. Fowlie (2010) finds that reducing greenhouse gas emissions is highly costly for electric utilities, and McCartney (2019) finds the same to be true for airlines.

Investors are known to assess the risk characteristics of their investments by taking into account environmental (E), social (S), and governance (G) factors. For instance, they evaluate the risks associated with climate change, and the next to immigration issues was followed by climate change in terms of the level of concern which was identified as the big concern in the 2019 EU poll. The same survey

revealed that the percentage of investors citing climate change as a significant risk factor increased from less than 10% in 2017 to 24% in 2019. The heightened interest in environmental factors demonstrates the growing awareness and importance of sustainable investing.

Climate Change and Finance

Bolton and Kacperczyk (2021) posit that higher levels of carbon dioxide emissions are linked to increased equity returns and are factored into the equity premium. They characterize the carbon premium as compensation for the carbon risk that investors are exposed to since the implementation of the Paris Agreement. In their analysis, they examine the three scopes separately and demonstrate that institutional investors, particularly insurance companies, pension funds, and mutual funds, do not hold shares of companies with high CO₂ intensity in Scope 1, which is negatively correlated with their shareholder composition. However, their findings have been challenged by other studies that present differing views, such as green funds having low returns (El Ghouli et al. 2018; Martí-Ballester 2019), high returns (Cuculiza et al. 2022), no carbon premium (Görge et al. 2019), that returns take long time to reflect (Xu et al. 2022), and that they vary depending on the type of green risk (Naqvi et al. 2021; Martí-Ballester 2019). In essence, numerous studies with discussing perspectives have been published in quick succession.

Institutional Investors and Climate Change

Some papers discuss the impact of institutional investors' shareholdings on various issues. Azar et al. (2021) demonstrate that an increase in the shareholding of the big three leads to a reduction in CO₂ emissions. Furthermore, environmental issues are considered a regulatory risk (Krueger et al. 2020), and some argue that firms that appeals to care about environmental issues are more likely to attract funds (Gibson et al., 2022). Regarding climate change, some experts believe that engagement methods are more effective than divestment (Shive and Forster 2020), and Ben-David et al. (2021) suggest that firms headquartered in countries with strict environmental policies have incentives to "export" their polluting activities to countries with less stringent policies.

On the one hand, there is the issue that investors are faced with substantial expenses due to the multitude of environmental indicators (Griffin et al. 2021). Moreover, Azar et al. (2021) advise caution, as the environmental (E) score does not indicate actual environmental improvement, but rather reflects a phenomenon known as greenwashing. Yang (2022) contends that the greenwashing of E/S ratings is not a problem of the rating agencies, but rather the result of information manipulation on the part of the companies providing the information. There is still significant discussion surrounding environmental performance indicators.

Foreign investors are subject to legal obligations that mandate a specific portion of their assets be allocated to ESG investments. European institutional investors, in particular, are bound by fiduciary responsibility to not only pursue investment returns, but also to take ESG factors into consideration.

Based on the above, the following hypothesis is formulated regarding CO₂ emissions and institutional investors' stock holdings.

Discussion 3: Since the implementation of the COP21 Paris Agreement (Paris Agreement) in 2015, European and long-term institutional investors' equity holdings have been influenced by performance indicators, including CO₂.

7.4 Data and Variables

Corporate Long-Term Investment Variables

The MSCI (Morgan Stanley Capital International)—ESG Rating² was utilized in the analysis of Japanese firms from 2014 to 2018. As per the methodology described by Bena et al. (2017), the long-term investments of the firms were categorized into two types: (1) investments in tangible and intangible assets and (2) innovation, which includes investments in intangible assets. Respectively, each proxy variables used for this analysis were RD_Capex, which represents the total R&D expenditures and capital expenditures relative to total assets, and patents, which includes the number of patent registrations. The financial data was obtained from the NEEDS-Financial QUEST (FQ) database, while the patent data was obtained from the IIP patent database provided by the Institute of Intellectual Property (IIP), as well as a company name dictionary supplied by the National Institute of Science and Technology Policy (NISTEP) of the Ministry of Education, Culture, Sports, Science, and Technology (MEXT).

In the context of innovation, various studies have typically utilized the number of patents as the most significant indicator (Griliches 1990). Additionally, we utilized the YK value, which embodies the quality of patents. The YK value serves as an index of patent technology competitiveness and represents an original evaluation method for patent rights (YKS method) created by Ichiro Kudo International Patent Office. This method measures the strength of patent exclusivity.

Investor Ownership Ratio

The foreign investor shareholding ratios (IO_FOR) and domestic institutional investor shareholding ratios (IO_DOM) are obtained from FQ. Refinitive Eikon is the source of data on the stock ownership and turnover rates of long-term and short-term institutional investors. Following the methodology of Nguyen et al. (2020) and Harford et al. (2018), turnover rates are used to classify institutional investors as either long-term or short-term. Long-term institutional investors are defined as those

²The raw scores from the MSCI dataset were preserved in their original form. According to Hartzmark and Sussman (2019), there is a strong correlation between these scores and the centile rank scores, specifically in the context of Morningstar ratings, with no statistically significant differences detected. It should be noted that the MSCI Japan index does not exactly correspond to the constituents of the MSCI Japan index. This is because the index covers the majority of stocks included in the MSCI IMI index and also includes the Berclay Global aggregate, which represents a bond universe.

in the bottom tertile (1/3) of the turnover distribution, while short-term institutional investors are defined as those in the top 1/3 of the turnover distribution.

ESG Score

The ESG index is the MSCI score, a widely employed metric in prior research and boasting a considerable history. The ESG score has certain limitations. A study by Avramov et al. (2022) reveals that ESG uncertainty contributes to a rise in beta, indicating increased risk. Griffin and Mahon (1997) find that the predecessor to the MSCI score, KLD, is inconsistent and biased. Furthermore, Chatterji, Levine, and Toffel (2009) highlighted the lack of transparency in KLD regarding a company's environmental performance. However, Shirasu and Yuyama (2021) posit that among the major ESG scores for the Japanese market in recent years, the MSCI score offers the most accurate reflection of ESG performance.

Environmental Indicators

The classification of CO₂ emissions is generally divided into three categories: direct emissions from production activities (Scope 1), indirect emissions from the consumption of purchased electricity, heat, and steam (Scope 2), and other indirect emissions from the production of purchased materials, use of products, waste disposal, outsourcing activities, and so on (Scope 3). While Scope 1 and Scope 2 emissions are systematically reported and accurately estimated, Scope 3 emissions are typically self-reported data, which is not reliable, and some argue that the estimates provided by data providers are not accurate (Kalesnik et al. 2021). The indicators for Scopes 1 through 3 are divided by the sales and are designated as CO₂scp1re, CO₂scp2re, and CO₂scp3re, respectively.

Since the number of companies disclosing other environmental performance indicators is remarkably low, we chose approximately 10 indicators for which around 150 companies disclosed information in one year. These indicators include NOxre (nitrogen oxide emissions per net sales), SOxre (sulfur oxide emissions per net sales), Wastere (total waste per net sales), WaterPllre (water pollutant emissions per net sales), Enere (energy use per net sales), and WaterUsere (total water use per net sales). These data are collected from the Thomson Reuter database for the period of 2013–2020.

Other Variables

In our analysis, we utilize various control variables as outlined by Bena et al. (2017) including Tobin's *q* (tobin_q), log of sales (ln_sales), debt ratio (leverage), cash holding ratio (cash), free cash flow/total assets (FCF), and total assets per employee (ln_capital_labor). Additionally, we employ ratios such as debt ratio (average), cash holding ratio (cash), free cash flow/total assets (FCF), and total assets per employee (ln_capital_labor). The list of investors who have signed the PRI can be obtained from the PRI website, and all variables are winsorized at the 1% or 99% level.

7.5 Empirical Analysis Method

First, we conduct a panel analysis. Subsequently, the instrumental variable method is employed to address the endogeneity problem, where foreign investors are inclined to invest in firms possessing long-term growth potential and innovation. As same as Bena et al. (2017), we employ the MSCI All Country World Index (MSCI ACWI index) as the instrumental variable and analyze it using the two-stage least squares method (2SLS). Velte (2022) states that Bena et al. (2017) chose the MSCI Index as an instrumental variable since “the MSCI Index is a benchmark commonly utilized by foreign investors.” MSCI (2018) reveals that the MSCI ACWI index includes the MSCI Japan index (*msci_JP*). The selection process for the MSCI Japan components (*msci_JP*) is guided by the 85% float-adjusted market capitalization coverage rule, which is applicable in Japan and is deemed to be randomly assigned and exogenously. This criterion aligns with the standards observed in the United States and other developed countries. Consequently, the sole criterion for inclusion in the MSCI Japan Index is the float-adjusted market capitalization,³ and no other endogenous causes are taken into account. This mechanical rule makes the determination of foreign ownership exogenous. There is a substantial discontinuous discontinuity (=jump) in relation to the foreign investor ratio before and after an 85% share of the float-adjusted market capitalization (see Bena et al. 2017).

In order to delve deeper into the impact of stock ownership on corporate investment, we make dummy variables for each of the E/S scores, where a value of 1 signified a median or higher score, and 0 represented all other scores. In addition, we include a cross term with the investor’s ownership ratio in our analysis.

7.6 Empirical Results

7.6.1 *Foreign Investors and Corporate Long-Term Investments*

The analysis of the relationship between the percentage of foreign ownership (*IO_FOR*) and the percentage of domestic ownership (*IO_DOM*) and corporate long-term investment among institutional investors is presented in Table 7.1. The panel analysis in Table 7.1 (1) and (2) reveals that *IO_FOR* is positive but not statistically significant. In contrast, *IO_DOM* displays a negative result, although it is also not statistically significant. Essentially, the results are contrasting between foreign and domestic investors, but neither relationship is statistically significant.

³The definition of this floating stock is a proprietary definition developed by MSCI, which has not yet been publicly disclosed. It appears to vary from the interpretations provided by other information vendors.

Table 7.1 Foreign and domestic investors and corporate investment

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Dependent variable					
	RD_Capex	Patent	RD_Capex	Patent	RD_Capex	Patent
	panel	panel	2SLS	2SLS	2SLS	2SLS
IO_FOR	-0.0165 (-1.554)	0.312 (0.880)	0.0155 (0.470)	2.738* (1.812)	0.0143 (0.430)	2.641* (1.752)
IO_DOM	-0.00692 (-0.698)	0.265 (0.789)				
PRI_dum					0.0025 (-1.31)	0.168** (-2.324)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Industry&YearFE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1731	1754	1731	1754	1731	1754
R-squared	0.41	0.694	0.403	0.675	0.404	0.677

Panel analysis results for foreign investors (IO_FOR) and domestic institutional investors (IO_DOM) and msci_JP dummy variables as control variables. The dependent variables are RD_Capex and patent, and the independent variables are IO_FOR, IO_DOM and control variables including PRI_dum. The instrumental variable is msci_JP. *** indicates significant at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level. In parentheses below the coefficients are t-values

The results of the 2SLS analysis (second stage) using the instrumental variable method are shown in Table 7.1 (3)–(6). The instrumental variable msci_JP was significantly positive in the first stage (report omitted). As shown in Table 7.1 (4) and (6), the results of the second stage show that IO_FOR is significantly positive for patent. We also find that major shareholders who have signed the PRI are significantly positive and that major shareholders who have signed the PRI have an impact on the long-term investment in the intangible asset of patents. These findings imply that a higher ratio of foreign investors is advantageous for patent.

To evaluate our hypothesis, we conduct an analysis of the relationship between domestic and foreign investor ratios and ESG activities. The results are presented in Table 7.2. Table 7.2 shows the cross-term results for the environment (E) score, with RD_Capex and patent both displaying significantly positive effects for the cross term with $\text{Escore}_m \times \text{IO_FOR}$. However, the cross terms for $\text{Escore}_m \times \text{IO_DOM}$ are not significant for all long investments. Regarding RD_Capex, it is less impact, as it is considering with the IO_FOR dummy and the score_m coefficient totally, offset effects. On the other hand, for patent, there is no offsetting effect, and IO_FOR has a strong impact on firms with high E-scores.

Table 7.2 (3) and (4) reveal the outcomes for the social (S) score cross term with IO_FOR. It is observed that only $\text{Score}_m \times \text{RD_Capex}$ is positively and significantly associated with the cross term, and the cross term with patent is not significant. In Table 7.2 (3), IO_FOR is positively significant for the cross term with RD_Capex, but the single dummy for IO_FOR is negatively significant with an almost equal magnitude of coefficient, resulting in a nearly null total effect. On the

Table 7.2 Foreign and domestic investors and long-term investments (ESG score intersection term)

	(1)	(2)	(3)	(4)
	Escore		Sscore	
	Dependent variable		Dependent variable	
Variables	RD_Capex	Patent	RD_Capex	Patent
Escore_m*IO_FOR	0.0560*** (3.328)	2.127*** (3.765)		
Escore_m*IO_DOM	-0.00165 (-0.0851)	0.657 (1.098)		
Sscore_m*IO_FOR			0.0352** (1.977)	0.454 (0.817)
Sscore_m*IO_DOM			0.0212 (1.209)	1.796*** (3.129)
IO_FOR	-0.0370*** (-2.818)	-0.503 (-1.295)	-0.0312** (-2.430)	0.107 (0.257)
IO_DOM	-0.00362 (-0.284)	-0.0211 (-0.0540)	-0.0160 (-1.150)	-0.628 (-1.560)
Score_m	-0.0123 (-0.911)	-0.670 (-1.469)	-0.0200 (-1.583)	-0.803* (-1.876)
Control	Yes	Yes	Yes	Yes
Industry&YearFE	Yes	Yes	Yes	Yes
Observations	1731	1754	1731	1754
R-squared	0.420	0.700	0.413	0.700

The results of the interaction analysis between foreign investors (IO_FOR), domestic institutional investors (IO_DOM), and ESG scores are shown for E, S, and score, respectively. The dependent variables are RD_Capex and patent, and the control variables include IO_FOR, intersection term between IO_DOM and ESG score, and PRI_dum. *** indicates significant at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level. In parentheses below the coefficients are t-values

other hand, Sscore_m* IO_DOM in (4) is significantly positive for patent, with the cross term with IO_FOR being insignificant. This result differs significantly from the E-score, prompting an investigation of the cause. The reason for this difference may be that foreign investors can evaluate financially reported investments such as RD_Capex, but they struggle to assess intangibles like patents explicitly. For environmental (E) factors, information regarding internationally accepted evaluation indicators, such as CO₂/GHG emissions, can be obtained from integrated reports. However, for social (S) factors, there are no clear indicators or indicators specific to Japanese companies, which may be because domestic investors can assess social (S) factors more accurately. To address this, it is necessary to establish a common scale, as is done for the environmental factor, and disclose information on the scale uniformly. If common measures and information disclosure for social factors are developed to the same extent as for environmental factors, foreign investors are able

Table 7.3 Long-term and short-term foreign institutional investors

Variables	(1)	(2)	(3)	(4)
	RD_Capex	Patent	RD_Capex	Patent
F_Long	-0.0114 (-0.674)	1.226* (1.942)	-0.0121 (-0.727)	1.178* (1.861)
F_Short	-0.0098 (-0.252)	0.0200 -0.015	-0.0134 (-0.348)	-0.245 (-0.184)
PRI_dum			0.0024 (1.265)	0.166** (2.362)
Control	Yes	Yes	Yes	Yes
Industry&YearFE	Yes	Yes	Yes	Yes
Observations	1713	1736	1713	1736
R-squared	0.405	0.698	0.406	0.699

The results of analysis for long-term foreign institutional investors (F_Long) and short-term foreign institutional investors (F_Short) are presented. The dependent variables are RD_Capex and patent, while the control variables include F_Long, F_Short and PRI_dum. *** indicates significant at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level. In parentheses below the coefficients are t-values

to use social activities as a means of extended governance and support long-term investment in companies through such activities.

The following provides analyses of the impact of the ratio of long-term foreign investors and the ratio of short-term foreign investors on long-term investment. The results are presented in Table 7.3, which shows the findings of the analysis of the long-term foreign investor ratio (F_Long) and the short-term foreign investor ratio (F_Short) among long-term institutional investors. The findings indicate that the long-term foreign investor ratio (F_Long) has a significant and positive effect on patent (Table 7.3 (2) and (4)), which supports long-term investment. Conversely, the short-term foreign investor ratio (F_Short) has either a negative or nonsignificant impact.

Similar to Ide and Takehara (2021), this study investigates the long-term investments of firms utilizing the YK value, which serves as an indicator of patent quality (excluding empirical outcomes). Notably, only foreign investors exhibit a discernible distinction between short-term and long-term investment strategies.

Short summarized, the findings indicate that the relationship between institutional investors' activities and companies' long-term investments is not homogeneous. The higher ratio of foreign investors and the higher ratio of foreign investors who are actively engaged in environmental activities among ESG are associated with a greater amount of intangible innovation. This effect is not evident for domestic investors. In addition, a higher ratio of long-term foreign investors is associated with not only a greater quantity but also a higher "quality" of investment in intangible assets. Long-term foreign investors are more likely to encourage long-term investment in firms with high environmental scores. On the other hand, domestic institutional investors tend to encourage long-term corporate investment through social activities rather than environmental activities. This may suggest disparities in the

interests of institutional investors in environmental and social (E/S) activities, as well as a potential bias in the areas of publicly available information. In other words, it is suggested that this is because globally established common indicators and information disclosure rules for environmental activities, such as CO₂ emissions, have led to a widespread common understanding of environmental activities.

7.6.2 CO₂ and Other Emissions and Institutional Ownership Ratios

Finally, we examine the relationship between other environmental performance indicators, such as CO₂ emissions and other emissions, and shareholder ownership ratios.

In the first regression analysis, we employed the ratios of institutional ownership for each type of firm as the dependent variable and conducted a panel analysis using fixed effects model for every environmental performance indicator, and control variables, such as firm size (*lasst*), leverage (*lev*), ROA (*roa*), growth potential (*gsale*), company history (*age*), stock turnover (*turnover*), and expenditure on environmental measures (*EnvExpendre*). Specifically, we conducted a panel analysis using fixed effects for stock turnover (*turnover*), environmental expenditures (*EnvExpendre*), and ROA (*ROA*). All explanatory variables for environmental performance measures are lagged one period. The institutional ownership ratios for each type are: institutional investor ratio (*instiINV*), foreign investor ratio (*F_InstiINV*), long-term institutional investor ratio (*Long*), short-term institutional investor ratio (*Short*), top10 investor ratio (*top10*), foreign big three investor ratio (*Gbif3*), domestic big three investor ratio (*Dbif3*), growth equity investor ratio (*growth*), value equity investor ratio (*value*), indexer investor ratio (*indexer*), and institutional investor ratio by country of origin (*UK*, *Asia*, *EU*, *Nordic*, *Europe*, *North America*, *South America*).

Table 7.4 presents the regression results for the levels of CO₂ emissions and the stake share of institutional investors by characteristics. The analysis was conducted for the periods before and after 2015, when the Paris Agreement was signed (no reported). The results for CO₂ intensity and CO₂ emissions before 2015 of the Paris Agreement indicate that institutional investors in the value investor ratio, indexer investor ratio, and investors from Asia and Northern Europe tend not to invest in companies with high total CO₂ emission levels (CO₂ intensity) in the previous period or tend to divest from such companies. However, they did not show a significant response to the results on waste and wastewater, other than CO₂ emissions (no reported).

And after 2016, after the Paris Agreement, as shown in Panel A Table 7.4, there is a significant negative relationship (Table 7.4, shaded area in Panel A) between the ratio of investors from Nordic countries or EU and the CO₂ emission level of total CO₂ emissions (CO₂ intensity), and the trend of holding shares in companies with

Table 7.4 Level of carbon emissions and the ratio of institutional ownership

A

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	institutional investors	foreign institutional investors	Long	Short	top10	foreign big3	domestic big3	growth	value	indexer	UK	Asia	EU	north Europe	North America
L.CO2re	0.0014*** (2.938)	0.0005 (1.562)	0.0010** (2.335)	0.0004** (2.495)	0.0009** (2.561)	2.30e-05 (0.236)	0.0007*** (4.609)	0.0006** (2.212)	5.20e-05 (0.164)	0.0001 (1.564)	0.0006** (2.269)	-8.92e-05 (-1.208)	-7.46e-05* (-1.876)	-7.81e-05*** (-3.015)	0.0001 (0.816)
L.CO2scp1re	4.60e-07*	5.97e-08 (1.916)	4.74e-07** (2.196)	-1.59e-08 (-0.310)	2.62e-07 (1.429)	7.52e-08 (1.229)	1.80e-07*** (2.797)	2.97e-07* (1.931)	-3.51e-08 (-0.772)	4.07e-08 (1.319)	-3.40e-08 (-1.030)	-4.15e-09 (-0.0796)	-1.83e-08 (-0.894)	-1.17e-09 (-0.118)	1.24e-07** (1.814)
L.CO2scp2re	9.70e-07	-9.66e-08 (0.571)	5.33e-07 (0.385)	4.55e-07 (1.070)	5.00e-07 (0.472)	3.37e-08 (0.154)	1.86e-07 (0.418)	4.80e-07 (0.501)	-4.02e-08 (-0.139)	7.77e-09 (0.0574)	1.31e-07 (0.550)	-7.23e-08 (-0.409)	-1.30e-08 (-0.166)	2.95e-08 (0.419)	-1.70e-07 (-0.364)
L.CO2scp3re	7.03e-08 (1.033)	2.08e-08 (0.604)	8.64e-08 (1.526)	-1.71e-08 (-0.831)	1.10e-08 (0.244)	4.52e-08*** (4.940)	-1.90e-08 (-0.865)	-8.74e-09 (-0.198)	3.18e-08 (1.540)	1.99e-08** (2.388)	-2.84e-09 (-0.224)	-1.31e-08 (-1.001)	5.74e-09 (1.361)	-4.42e-09 (-1.355)	4.19e-08* (1.812)

B

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	institutional investors	foreign institutional investors	Long	Short	top10	foreign big3	domestic big3	growth	value	indexer	UK	Asia	EU	north Europe	North America
D.CO2re	-0.004** (-1.997)	-0.0011 (-0.620)	-0.0023* (-1.691)	-0.0017* (-1.860)	-2.34e-06 (-0.00195)	-0.0006** (-2.552)	-0.0009* (-1.723)	-0.0039*** (-4.000)	0.0003 (0.626)	-8.99e-05 (-0.451)	-3.45e-05 (-0.0398)	0.0013 (1.548)	-0.0003* (-1.959)	0.0001 (1.378)	-0.0022*** (-3.194)
D.CO2scp1re	3.54e-07 (0.413)	4.91e-07 (0.499)	3.99e-08 (0.0529)	3.36e-07 (1.450)	5.41e-07 (0.640)	-3.70e-08 (-0.449)	-1.42e-07 (-0.980)	-3.67e-07 (-1.160)	-1.77e-07 (-0.760)	1.34e-07** (2.179)	3.17e-07** (1.800)	6.36e-07 (0.857)	-4.80e-08 (-1.052)	-2.32e-08 (-0.519)	-3.33e-07* (-1.952)
D.CO2scp2re	-2.88e-06 (-0.474)	-4.88e-06 (-1.459)	1.79e-07 (0.0356)	-3.12e-06 (-1.536)	-1.20e-07 (-0.0327)	-9.34e-07 (-1.077)	9.00e-07 (0.644)	1.31e-07 (0.0369)	-2.10e-07 (-0.151)	-2.64e-07 (-0.588)	-4.11e-07 (-0.396)	-4.26e-07 (-0.498)	-6.51e-07 (-1.448)	-1.02e-07 (-0.497)	-3.33e-06 (-1.454)
D.CO2scp3re	1.77e-07 (1.505)	1.07e-07 (1.548)	8.20e-08 (0.957)	9.68e-08* (1.860)	1.35e-07* (1.809)	5.24e-09 (0.347)	2.23e-08 (0.629)	6.36e-08 (0.933)	5.79e-08 (1.553)	1.40e-08 (1.462)	4.59e-08* (1.733)	1.76e-08 (0.926)	-1.77e-09 (-0.130)	5.25e-09 (1.043)	4.17e-08 (0.731)

These tables are extraction and summary of the results of the analyses of each indicator of carbon emissions and the shareholding ratio of each type of institutional investor. The dependent variable is the ownership ratio of each type of institutional investor, and the independent variables are the level of each indicator of carbon emissions one period ago or the amount of change in each indicator of carbon emissions of the previous period. *** indicates significance at the 1% significance level, ** at the 5% significance level, and * at the 10% significance level. In parentheses below the coefficients are t-values. The shaded area indicates a significantly negative coefficient

low CO₂ emission level, and there is a notable trend of divestment from companies with high levels of CO₂ emissions. On the other hand, for the other institutional investors, the relation between the ratio of every type of institutional investors and total CO₂ emissions (CO₂ intensity) are significantly positive. This result indicates that institutional investors rather hold shares in firms with high CO₂ emissions levels. This is consistent with Azar et al.'s (2021) finding that the big three concentrate their engagement in large companies with high CO₂ emissions, as well as Dimson, Karakas, and Li's (2015) view that institutional investors engage companies with poor ESG performance. After the Paris Agreement in 2016, many types of institutional investors are likely to be engaging with and holding shares in companies with high carbon emission levels. According to research pointed by Pedersen, Fitzgibbons, and Pomorski (2021), Nordic and EU investors typically exhibit a strong focus on ESG factors among institutional investors. It can be worried that the divestment of shares with high carbon emissions by these investors may lead to an undervaluation of such equities, which may subsequently be purchased lower price on by other institutional investors. If such transactions to buy undervalued stocks are taking place, the share of value-type investors should increase, but the results show that the stake share of value-type investors is not significant. The trend in investment behavior is shifting towards long-term growth-oriented holdings rather than short-term investments. Also conversely, the share of growth-type investors, which invest in long-term future growth, are increasing.

The relationship results between the Scope 1 of total CO₂ emission level (CO₂ intensity) is significant, but the results for Scope 2 and Scope 3 are not significant. Investors focus on only indicator as the total CO₂ emissions (CO₂ intensity). According to Griffin et al. (2021), the market's ability to determine prices is impeded when the costs associated with processing information are high. Then, it seems reasonable to consider that investors exhibit a preference for specific indicators rather than considering all indicators in terms of the cost.

Next, we examine the relationship between the "change" in CO₂ emissions per year and the stake share of each type of institutional investor. Only results presented the outcomes after the Paris Agreement in 2016. As shown in Panel B Table 7.4, the stake share of many types and large institutional investors, especially in Europe, is significantly negative with the change in carbon emissions (but mainly only with the change in total CO₂ emissions (CO₂ intensity)) (Table 7.4, Panel B, shaded area). It is clear that many of these institutional investors own a large number of stake shares in firms that are reducing their total CO₂ emissions. In summary, after the Paris Agreement, a broad range of institutional investors hold shares in firms with high total CO₂ emissions (CO₂ intensity) (conversely, shares in firms with low total CO₂ emissions are held only by investors from Europe and Northern Europe), with a particular holding share of concentration in firms with bigger change (reductions) in total CO₂ emissions. This suggests a greater predilection to hold shares in firms that have significant potential to reduce emissions and are actually on a reducing trend. Share ownership differs significantly by institutional characteristics, and after the Paris Agreement, institutional investors appear to support the environmental strategies of firms that have room to reduce CO₂ emissions based on the assumption of engagement.

7.7 Conclusion

This chapter analyzes the relationship between institutional owner shares with nonhomogeneous characteristics and ESG. We also incorporated as much of the literature review as possible.

In terms of innovation, which serves as a mediating factor in the realm of ESG, we explored the influence of foreign investment and the shareholdings of long-term institutional investors on corporate long-term investments made through ESG. Foreign investors are the investors as Activist. The results show that foreign investors promote long-term investment in firms when environmental activities are embedded in ESG criteria, and that long-term institutional investors have additional effects. It appears that foreign investors play a crucial role in shaping the long-term investment decisions of Japanese firms through the utilization of ESG mechanisms.

We also focus on total CO₂ emissions as a measure of potential climate change based on CO₂ emissions and find that the heterogeneity in investor characteristics leads to significant differences in investing actions before and after the Paris Agreement. The institutional investors from Scandinavia and the EU seem to adopt the divestment approach. Conversely, the other institutional investors concentrated their holdings in companies with high total CO₂ emission levels and large reduction potential, which they believe have significant room for future reductions.

While global standards for environmental (E) factors made it easier for a heterogeneity group of investors to access this information and disclose it, foreign investors are not largely responsive to social (S) factors. There is a need for standardization of the same level of criteria and information disclosure as for environmental activities, so that a heterogeneity of investors can make judgments. In addition, it is interesting to see how actual trading and the resulting returns are affected by European and other investors' equity holding strategies, rather than analyzing them solely from the perspective of equity ownership. These are remaining issues and will be the subject of future research.

7.8 Comments by Kazuhiko Ohashi: Relationship Between the Actions of Investors and Companies Surrounding ESG

7.8.1 Introduction

ESG investment, which demands consideration for Environmental, Social, and Governance from companies, has rapidly increased in importance as an investment principle for institutional investors since the announcement of the Principles for Responsible Investment (PRI) by the United Nations in 2006. On the other hand, ESG requires companies to make decisions with a new aspect of consideration for the environment and society, and there are many points that are not clear

theoretically or empirically about how it affects corporate value. In response to this, the Shirasu-Yang paper views ESG activities as a method of extended governance, and after reviewing recent research on institutional investors and ESG activities, it empirically analyzes the impact of the presence of institutional investors on long-term corporate investment and the relationship between corporate CO₂ emissions and the actions of institutional investors. More specifically, for Japanese companies engaged in ESG activities, it scrutinizes the relationship between Japanese companies and institutional investors in recent ESG activities by analyzing the impact of stock ownership by domestic and foreign, long-term and short-term institutional investors on corporate investment in tangible and intangible assets and human investment, and the relationship between corporate CO₂ emissions and the stock ownership ratio by type of institutional investor.

Shirasu-Yang paper not only provides an overview of the relationship between institutional investors' stock ownership and corporate actions from the perspective of ESG, but also analyzes how the relationship with corporate activities differs depending on the type of institutional investor in the Japanese market, deepening our understanding of this issue. After briefly reviewing the results of this empirical research, it considers the perspective of analyzing the relationship between investor behavior and corporate activities surrounding ESG by introducing some related research.

7.8.2 The Relationship Between Institutional Investors and Companies: Long-Term Investment, CO₂ Emissions, and ESG

It is widely acknowledged that corporate investment decisions are influenced by the monitoring of institutional investors who are shareholders, but the details of the impact of the heterogeneous characteristics of institutional investors on corporate actions—that is, what kind of institutional investors are influencing long-term investment in tangible and intangible assets by companies—are not well understood. On the other hand, ESG activities are seen as a method of extended governance that holds responsibility towards all stakeholders, and they influence the way institutional investors monitor. Therefore, the Shirasu-Yang paper focuses on the relationship between institutional investors' stock ownership and corporate investment in the recent Japanese market, analyzing (1) the impact that foreign investors and long-term institutional investors in particular have on long-term investments in tangible and intangible assets by companies in relation to ESG activities, and (2) how the relationship between a company's CO₂ emissions and the proportion of stock ownership varies depending on the type of institutional investor. The main results are as follows:

1. Regarding the impact of institutional investors' stock ownership on long-term investments in tangible and intangible assets by Japanese companies conducting

ESG activities, it was found that the higher the ownership ratio of foreign investors is, the more long-term investment in intangible assets increases, that the higher the environmental (E) score of the company is, the stronger this tendency is, that the higher the ownership ratio of long-term institutional investors is, the more long-term investment in intangible assets increases, and that for social (S) factors, the increase in the ownership ratio of domestic institutional investors (not foreign investors) increases long-term investment in intangible assets.

2. Regarding the relationship between the CO₂ emissions of Japanese companies and the stock ownership ratio of different types of domestic and foreign institutional investors, it was found that the impact of Japanese companies' CO₂ emissions on institutional investors' stock ownership became clear after the Paris Agreement came into effect in 2016, that European and Nordic institutional investors own stocks of companies with low CO₂ emission levels, while other investors tend to own stocks of companies with high CO₂ emission levels, and that many types of investors own stocks of companies that are working to reduce CO₂ emissions, suggesting that institutional investors may be engaging with companies that have a large potential for CO₂ reduction.

The Japanese market environment since 2014, which is the subject of their analysis, corresponds to the sample period when the Stewardship Code was established and the economy was booming, making it easy for institutional investors to influence managers. Also, since the GPIF's signing of the PRI in 2015, ESG activities in Japan have been accelerating. In this sense, the Shirasu-Yang paper can be said to have been able to analyze a period when the relationship between institutional investors involved in ESG activities and Japanese companies was highlighted. On the other hand, if more data were available, there would have been points that could have been delved into. For example, ESG investments are often said to reduce corporate risk, but it would be desirable to confirm not only the current investment amount but also the impact on the risk characteristics of the cash flows that the investment will generate in the future. The shareholding ratio of institutional investors is interpreted to indicate that there may be engagement with companies that have large room for CO₂ reduction, but it would be desirable to scrutinize what kind of engagement activities are actually taking place (Case studies are acceptable). These points are future issues to be confirmed when new data becomes available. In any case, this paper is considered to be a meaningful study that deepens our understanding of ESG activities by specifically showing how the impact on companies differs due to the different types of institutional investors in the Japanese market.

7.8.3 Perspectives on the Relationship Between Investors and Companies Surrounding ESG

As stated in the Shirasu-Yang paper, there are various routes and methods through which investors influence companies around ESG, and various studies have been conducted accordingly. Therefore, here, I would like to introduce two studies that analyzed the impact of differences in corporate and investor forms on their relationship from different aspects, and consider perspectives for understanding the relationship between investors and companies involved in ESG.

For that purpose, first, let's mention Shive and Forster (2020), which analyze the differences that different corporate forms bring to ESG activities and investor influence. More specifically, they classify U.S. companies into public and private companies, further divide private companies into companies with sponsors such as funds and independent companies, and explore how these differences affect corporate ESG activities, specifically greenhouse gas emission reduction. The focus on private companies is due to the fact that the number of public companies in the United States has halved in the past 20 years, increasing the need to analyze the behavior of non-listed companies. On the other hand, regulations differ between public and private companies, and even among private companies, managers may have different incentives if there is a push from sponsors or not. Whether these things affect corporate ESG activities or not, they analyze focusing on corporate actions for greenhouse gas emission reduction.

From empirical analysis of the U.S. market from 2007 to 2016, Shive and Forster (2020) find that independent private companies emit less greenhouse gases than public companies, that there is no difference in emissions between private companies with sponsors such as funds and public companies, that the greater the shareholdings of investment trusts are and the more directors there are in public companies, the less emissions are, and that the higher the degree of stock price return response to earnings announcements is, the more emissions are. These are considered to be consistent with hypotheses such as managers taking ESG-compliant actions as they bear personal responsibility for corporate management, companies being monitored by investors and exposed to reputation risk have less emissions, and companies that are given incentives for short-term behavior have more greenhouse gas emissions.

The results obtained by Shive and Forster (2020) suggest that in addition to the differences between public and private companies, the relationship between investors and managers, and the way they monitor and engage, have a significant impact on a company's ESG activities. The same is expected to occur in markets outside the United States, but when analyzing this, it is necessary to consider the characteristics of managers' incentives and investors' monitoring structures in each country. By attempting a similar analysis for the Japanese market while keeping this in mind, we believe that a more detailed understanding of the relationship between investor behavior and corporate activities surrounding ESG can be obtained.

Next, we discuss Barber, Morse, and Yasuda (2021), which empirically answer the question of whether investors will accept lower expected returns for ESG investments that simultaneously seek purposes other than maximizing corporate value, such as solving environmental and social issues. This question is a fundamental issue regarding ESG investments, but there are various results about the performance of general funds, and no clear conclusion has been reached. Therefore, Barber, Morse, and Yasuda (2021) focus on impact investments that explicitly pursue not only financial returns but also environmental and social impacts, and verify whether there is a difference in the expected returns demanded by investors between impact investments and regular investments. Specifically, they focus on private equity funds with clear investment objectives and verify whether there is a difference in the expected returns demanded by investors between impact funds (venture capital funds that make impact investments) and regular VC funds.

From empirical analysis using data from 1995 to 2014, Barber, Morse, and Yasuda (2021) show that investors who invest in impact funds accept lower expected returns compared to when they invest in regular VC funds. Furthermore, they analyze the differences in the decrease in expected returns accepted by different types of investors and found that investors with clear missions such as development organizations and foundations, and those who have signed the PRI, accept a larger decrease in expected returns, while investors under regulations that oppose investments based on nonmonetary motives (such as the ERISA and UPMIFA laws) accept a smaller decrease in expected returns.

These results suggest that ESG-active investors, such as those who invest in impact funds, accept lower expected returns than regular investments for the resolution of environmental and social issues, that the investor's mission has a significant impact on their ESG investments, and that U.S.-style fiduciary responsibilities like the ERISA law may constrain ESG investments. This suggests that what is sought from ESG investments varies by the type of investors and the investment destinations, and that a more detailed analysis of such heterogeneous characteristics of investors is useful for understanding the impact of ESG investments.

7.8.4 Conclusion

The importance of ESG investments, which demand consideration for the environment and society, is increasing day by day. On the other hand, to achieve its goal of realizing a better environment and society, it is extremely important to understand how ESG investments are actually affecting through what kind of circuit—in other words, what kind of incentives are given to investors, funds, companies, etc., what kind of actions they take, and what kind of results they get. The Shirasu-Yang paper is one attempt at this, but it will also be necessary to explore this issue from various other perspectives. For the Japanese market as well, we hope that a better understanding of the various issues surrounding ESG investments will be advanced as more detailed data becomes available in the future.

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Chapter 8

Japanese Corporate Governance



Institutional Complementarity and Evolution of Financial and Internal Governance

Konari Uchida

Abstract This chapter analyses the governance of Japanese firms based on two aspects of governance structure: financial governance and internal governance. The key questions are whether they are complementary or not and, if so, whether such complementarity persists over time. The author identifies firms with a relatively high level of debt borrowing and a high level of shareholding by financial institutions in 1984 as Type J firms and the opposite as Type N firms. The results of the empirical analysis confirm that Type J firms maintain their policy appointing the winner of the internal promotion tournament to the top management even after the 2000s. Meanwhile, the proportion of debt financing has declined significantly over time. These results suggest that the commonly held view that financial governance complements internal governance is not necessarily true. On the other hand, examining governance in terms of financial institutions' shareholdings shows that their function of supporting the continuation of promotional tournaments is still evident. In his comments for Uchida, "The Japanese Governance Model Today," Hideaki Miyajima examines the complementarity between institutions and its robustness from the broader perspective of the diversity of capitalism. Based on the empirical findings by Uchida, Miyajima argues that the unique mechanisms that underpin the performance of Japan's promotion tournament system need to be clarified.

8.1 Introduction

The literature suggests that the traditional Japanese corporate governance (hereinafter, Japanese-style governance) is characterized by dependence on bank borrowing, especially on a specific bank called the main bank, and cross-shareholding. During

A paper including analysis and discussion that could not be published in this chapter is available as TCER Working Paper J-20. <https://www.tcer.or.jp/wp/pdf/j20.pdf>

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the period of high economic growth, Japanese companies built long-term relationships with their main banks since they had limited access to the bond market and had to rely on bank borrowings. Also, cross-shareholdings were formed as a defense measure against hostile takeovers, and Japanese managers have been released from shareholder activism. Hereinafter, this financial governance structure will be referred to as financial governance.

On the other hand, the Japanese-style governance also has characteristics in terms of internal management (hereinafter, internal governance). Specifically, corporate board of directors is occupied by insiders (Miyajima 2011). Among employees, lifetime employment and seniority systems are adopted, and long-term tournaments for promotion are held. The positions of directors and managers have been considered as goals (prizes) for the tournament winners. External labor market is not fully developed, and it is rare that personnel who have achieved good outcomes outside the company is appointed as managers. In the Japanese style internal governance, managers are generally promoted inside the firm after a long selection process from the time of joining the company. Thus, Japanese-style governance has characteristics in both financial and internal management aspects, and it has been pointed out that both have institutional complementarity (Aoki et al. 1995). It is documented that the financial governance sustains the internal governance.

In this chapter, we will examine the Japanese-style governance, specifically: (i) whether the Japanese-style financial and internal governance continues in recent years, (ii) whether the Japanese-style financial and internal governance has institutional complementarity, and (iii) whether this institutional complementarity continues in recent years. The existence of the term “Japanese-style governance” implies that its characteristics in the financial or internal management aspects have continued over a long period. We will verify whether the Japanese-style financial governance and internal governance continue today, and if they do, whether they continue independently or continue because they have institutional complementarity. Such an analysis allows us to understand the inherent nature of Japanese-style governance and consider recent changes as well as appropriate governance structures for the future. Since the collapse of the bubble economy, we have witnessed the dissolution of cross-shareholding and main bank relationships, and at least the financial governance seems to have significantly weakened. If the financial governance and internal governance have institutional complementarity, the weakening of Japanese-style financial governance should weaken internal governance, that is, it should trigger the end of long-term tournaments. Alternatively, the promotion tournament may be able to continue while weakening financial governance, if the Japanese-style financial governance and internal governance are extricable. This chapter attempts to clarify these points.

Compared to internal governance, financial governance is easier to identify with financial data. In this chapter, we identify companies that have the characteristics of Japanese-style financial governance (Type J companies) using the bank debt ratio (borrowing/total assets) and the ownership of financial institutions (excluding ownership by trust accounts) as of fiscal year 1984. Also, we define companies that had the opposite characteristics in 1984 as Type N companies. The following analyses

compare Type J companies and Type N companies after the bubble economy period. Japanese-style internal governance assumes a long-term tournament, so inertia should work for a certain period. Therefore, if financial and internal governance have institutional complementarity, Type J companies identified from the financial characteristics in 1984 should show the characteristics of Japanese-style internal governance in subsequent periods. On the other hand, if the availability of internal funds increases and alternative financing methods become available, financial governance can be easily resolved. After confirming this point by analyzing the bank debt ratio and financial institutions' ownership of Type J companies, we will verify whether Japanese-style internal governance is also weakening, or whether internal governance continues despite the weakening of Japanese-style financial governance.

The structure of this chapter is as follows. In Sect. 8.2, we will describe the characteristics and institutional complementarity of Japanese-style governance. In Sect. 8.3, we will explain the samples and data. In Sect. 8.4, we will present the empirical results. In Sect. 8.5, we will summarize and conclude this research, and discuss future prospects.

8.2 Characteristics and Institutional Complementarity of Japanese-Style Governance

The traditional Japanese business theory suggests that Japanese companies have a lower degree of employee specialization compared to US companies, and that information sharing and coordination among employees are sources of competitiveness (Aoki 1992). It was important to encourage employees to invest in company-specific skills such as coordination skills, and lifetime employment and seniority-based wage systems, characterized by deferred wages, provided such incentives (Osano 2005). This incentive scheme is consistent with the fact that the board of directors of Japanese companies is occupied by insiders. The position of directors or managers in Japanese internal governance served as a prize in the promotion tournament (Coles and Uchida 2018), providing incentives for employees to contribute to company performance and make company-specific investments.

On the other hand, in terms of finance, until the 1970s, bond issuances were restricted and public equity offerings were not common. As such, issuing bonds or new shares was not a realistic means of fund raising for most of Japanese companies, which had a greater demand for capital investment than the availability of internal funds. Firms needed to rely on bank borrowing, and they tended to continuously borrow the maximum amount from their main banks (Uchida 2003). The main bank, as a delegated monitor, monitored the company (Aoki 1995), and provided financial support in the event of financial distress, reducing the company's bankruptcy risk (Sheard 1995). Financial institutions, including the main bank, also held the company's shares and functioned as the core of cross-shareholding. Interlocking shareholders were silent stable shareholders, and the managers of Japanese companies had great discretion.

The Japanese-style financial governance effectively complemented the internal governance, that is, incentive mechanism through long-term tournaments. Employees will lose the incentive to strive for future prize acquisition, if they perceive that the rules of the tournament may be changed due to bankruptcy, takeovers, or demands from shareholders. In other words, a financial governance that suppresses the transfer of control rights has institutional complementarity with the Japanese-style internal governance (Aoki et al. 1995).¹

While the Japanese-style internal governance inherently has inertia that continues for a certain period, the financial governance can easily be eliminated if the financial market condition allows. It is documented that the bank-centered corporate governance also has costs (Rajan 1992; Weinstein and Yafeh 1998). Since the amendment of the Foreign Exchange Law in 1980, which allowed to issue corporate bonds overseas, firms decreased the dependence on bank debt, mainly among large corporations (Miyajima 2011). However, if the Japanese-style financial governance is essential to maintain the internal governance, the financial governance will continue as long as companies maintain the internal governance. On the other hand, if there was a strong institutional complementarity, Japanese companies would have to end the long-term tournament once the financial governance weakened.

In the next section, we will investigate whether the financial and internal governance continue and whether the institutional complementarity exists using data from the late 1980s. It is critical to take environmental changes into account that could affect the continuation of Japanese-style governance. The late 1980s witnessed the emergence of a bubble economy, motivating firms to conduct large equity finance. After the collapse of the bubble economy, the non-performing loan problem in the banking sector may have decreased the trust in main bank system to avoid bankruptcy risk. In the late 1990s, companies implemented restructuring, which could have reduced the credibility of the long-term tournament. Furthermore, since the late 1990s, banks have released cross-held shares, weakening the Japanese-style financial governance significantly. Also, since the Tokyo Stock Exchange mandated listed companies to appoint independent directors or auditors in 2009, a series of governance reforms have been implemented to enhance the monitoring function of the board of directors (e.g., Corporate Governance Code). Taking these environmental changes into account, the following analyses will be conducted for the bubble economy (1987–1989), post-bubble economy (1991–1996), banking crisis (1997–2003), mid-2000s (2004–2007), and post-Lehman shock (2009–2018).

¹Abe (2002) shows that Japanese companies with stable shareholders have a slow rate of employment adjustment. Abe and Hoshi (2007) indicate that companies with a high proportion of foreign ownership are less likely to implement long-term service awards.

8.3 Sample and Data

We collected non-consolidated financial data of Japanese listed companies from 1984 to 2018 from Nikkei NEEDS FinancialQUEST. Stock price data was obtained from Nikkei NPM data and combined with the financial data. While standard financial variables and stock price data are available from the 1984, corporate governance variables such as the CEO/director appointment date and the number of directors were obtained from Nikkei NEEDS-Cges and Toyo Keizai Director Data from the fiscal year 2002.

We define Type J companies as those that have both the bank debt ratio (borrowings/total assets) and the financial institutions' ownership (excluding the trust account shareholding ratio) in 1984 higher than the median. In the early 1980s, accumulation of internal funds were likely to allow to choose whether to continue or reduce their bank dependence. Therefore, companies that had a high bank debt ratio and financial institutions' ownership during this period are likely to voluntarily keep the financial governance for purposes such as maintaining Japanese-style internal governance. These firms are appropriate materials to analyze the continuity of Japanese-style governance and the institutional complementarity of the financial and internal governance. Examples of Type J companies include Tokyo Electric Power and Mitsubishi Corporation. Also, companies with a bank debt ratio and financial institutions' ownership both lower than the median are classified as Type N companies. Examples of Type N companies include Sony and Hitachi Metals. The following analysis will only use Type J and Type N companies as samples.

Table 8.1 shows the characteristics of Type J and Type N companies in fiscal year 1984. Between Type J and Type N companies, there is about a 30% difference at the time of classification in the bank debt ratio (about 38% vs. about 8%) and about a 23% difference in the leverage (total liabilities/total assets) (about 81% vs. about 58%). While Type J companies use a large amount of debt, they owe about half of their debt to banks, which they can renegotiate with. As such, employees were able to maintain their expectations of a prize. There is also about a 24% difference in the

Table 8.1 Characteristics of sample companies as of FY 1984

	Type J	Type N	Type J–Type N (t-value)
Borrowing/total assets	0.382	0.083	44.85***
Financial institutions' shareholdings	0.385	0.142	−44.57***
Total liabilities/total assets	0.815	0.580	23.25***
Bonds/total assets	0.032	0.020	−3.58***
ROA	0.042	0.075	11.21***
Total assets (million yen)	301218.8	40925.69	−7.29***
Number of samples	452	467	

Note: The mean values for fiscal year 1984 are presented for each type of company. In the final column, I report t-values calculated for the mean difference tests of the respective indicators between the two groups. The values reported for “financial institutions' shareholdings” is the ratio of financial institutions' shareholdings. The financial institutions' ownership excludes ownership by trust accounts. ROA = operating income/total assets. *** is significant at the 1% level

financial institutions' ownership (about 38% vs. about 14%), and if Type J companies were conducting long-term tournaments, financial institutions could have supported their continuation as stable shareholders. Also, Type J companies had significantly lower ROA (operating profit/total assets) than Type N companies at the time of classification in 1984 (about 4% vs. about 7%).

In addition, the number of Type J and Type N companies for which data was available in 2018 was 293 (survival rate 64.8%) and 286 (same 61.2%), respectively. Despite their high dependence on debt and low profitability, Type J companies may have been able to avoid bankruptcy through long-term relationships with their main banks and cross-shareholding.

8.4 Empirical Results

8.4.1 Financial Governance

In the late 1980s, Japanese companies were able to raise a large amount of funds through equity finance while achieving good performance. Therefore, companies found it possible to reduce their bank borrowing and financial institutions' ownership. However, if long-term relationships with banks and cross-shareholdings with financial institutions are essential to maintain the Japanese-style internal governance, the financial governance should also continue. In this section, we analyze whether Type J companies, which had high bank debt dependence and financial institutions' ownership as of 1984, still have the same characteristics after the bubble economy.

Table 8.2 shows the average bank debt ratio for each period. As of the bubble economy period, the average bank debt ratio of Type J companies has significantly

Table 8.2 Borrowing ratio for each period

	(1)	(2)	(3)	(4)	(5)
Period (fiscal year)	FY1987–1989	FY1991–1996	FY1997–2003	FY2004–2007	FY2009–2018
Type J average	0.322	0.295	0.307	0.236	0.235
Type N average	0.094	0.105	0.124	0.093	0.103
Mean difference (t-statistics)	43.34***	48.14***	44.17***	30.62***	39.27***
Type J dummy	0.183***	0.151***	0.156***	0.121***	0.0966***
(t-statistics)	20.01	15.02	15.11	13.76***	10.74

Note: The upper part shows the average value and the difference test result of the bank debt ratio (borrowing/total assets) of Type J and Type N companies. The Type J dummy presents the coefficient of the Type J dummy (a dummy variable that takes a value of 1 for Type J companies and 0 for Type N companies) in the regression of the bank debt ratio (without adopting the capital structure variables and financial institutions' ownership as independent variables). *** is significant at the 1% level

decreased to 32.2%, which is probably due to their equity finance during the bubble economy. Although the bank debt ratio of Type J companies exceeded 30% during the period from 1997 to 2003 when the non-performing loan problem was serious, it has significantly decreased since the mid-2000s, and reached 23.5% in the period from 2009 to 2018. On the other hand, the bank debt ratio of Type N companies has consistently been around 10%, and the difference between the two types of companies is statistically significant in all periods. These figures suggest that the Type J companies significantly decreased bank debt dependence, although their bank debt ratios are still high.

The bank debt ratio is influenced by various factors such as company size, profitability, and tangible asset holdings. Since the mean difference test does not take into account the differences in characteristics between the two types of companies, the mean difference test can generate overestimated results. In order to analyze whether the bank debt ratio of Type J companies is still high even considering the characteristics of the companies, a regression analysis of the bank debt ratio was conducted including the Type J dummy (a dummy variable that takes a value of 1 for Type J companies and 0 for Type N companies) and company characteristic variables as independent variables. The capital structure variables and financial institutions' ownership, which are used to identify the type of companies, are not included in the independent variables to capture how high bank debt ratio Type J firms have relative to Type N firms. All regression analyses use one-year lagged data for independent variables. The lower part of Table 8.2 consistently indicates that the coefficient of the Type J dummy is significantly positive, and Type J firms had 18% higher bank debt ratio in the late 1980s than Type N companies. The coefficient of the Type J dummy decreases over time, and it is about 9.6% after 2009. This result is consistent with the result of the mean difference test.

This regression consistently carries significantly negative coefficient on ROA (untabulated), indicating that companies with high profitability tend to lower their borrowings. While main bank relationships reduce bankruptcy costs, companies with high availability of internal funds reduce bankruptcy costs by decreasing their debt, rather than relying on bank borrowing. In fact, the leverage of Type J companies, which was 81.4% on average in 1984 (57.9% for Type N companies), had dropped to 56.7% (40.0% for Type N) by 2018. Also, the coefficient of the cash holdings is significantly negative, indicating that companies with ample liquidity on hand reduces their dependence on bank debt.

Table 8.3 shows the average financial institutions' ownership for each period. It was 38.5% in fiscal year 1984, and then exceeded 40% in fiscal years 1987–1989 and 1991–1996. Despite the large amount of equity finance during the bubble economy, financial institutions rather increased their presence as stable shareholders. On the other hand, due to the collapse of the bubble economy, banks began selling their cross-held shares in the late 1990s (Miyajima 2011; Miyajima and Kuroki 2007). In Table 8.3, the mean financial institutions' ownership of Type J companies dropped to 34.5% in the early 2000s, and declined to 25.6% in fiscal years 2009–2018. The financial institutions' ownership of Type N companies follow a similar trend, showing around 15–21%. Although Type J firms consistently show

Table 8.3 Mean financial institutions' ownership

	(1)	(2)	(3)	(4)	(5)
Period (fiscal year)	FY1987–1989	FY1991–1996	FY1997–2003	FY2004–2007	FY2009–2018
Type J average	0.410	0.406	0.345	0.294	0.256
Type N average	0.186	0.213	0.194	0.175	0.153
Mean difference (t-statistics)	62.974***	72.02***	52.03***	30.43***	44.01***
Type J dummy (t-statistics)	0.177*** 29.48	0.158*** 24.45	0.116*** 17.25	0.092*** 12.78	0.0835*** 12.20

Note: The upper part shows the mean value and the mean difference test results of the financial institutions' ownership (excluding the ownership by trust accounts) between Type J and Type N companies. The Type J dummy is the coefficient of the Type J dummy (a dummy variable that takes a value of 1 for Type J companies and 0 for Type N companies) in the regression of the financial institutions' ownership (without including the capital structure variables and financial institutions' ownership as independent variables). *** indicates significance at the 1% level

significantly higher financial institutions' ownership, the difference has shrunk from about 24% in 1984 to about 10% in 2009–2018, indicating that cross-shareholdings by financial institutions have significantly weakened.

To confirm whether the same trend can be observed even when controlling for company characteristics, a regression of the financial institutions' ownership was conducted. Again, the bank debt ratio, which is adopted to identify Type J and N companies, is not adopted as an independent variable to estimate how high financial institutions' ownership Type J firms have relative to Type N companies. The lower part of Table 8.3 consistently shows that Type J dummy has significantly positive coefficients, indicating that Type J companies continue to have relatively high financial institutions' ownership. However, the difference between the two types of companies decreased from about 17.7% during the bubble economy (1987–1989) to about 11.6% in 1997–2003, and further declined to about 8.3% in 2009–2018. Since the collapse of the bubble economy, the Japanese-style financial governance has significantly weakened in terms of the stable shareholdings by financial institutions.

8.4.2 Internal Governance

The previous analysis showed that Japanese-style financial governance has significantly weakened while Type J firms still have higher bank debt and financial institutions' ownership. This section compares the internal governance of Type J

Table 8.4 Career of managers: years after joining

Career	Years from joining the company to becoming a director		Years from joining the company to becoming the manager	
	(1)	(2)	(3)	(4)
Period	FY2002–2007	FY2009–2018	FY2002–2007	FY2009–2018
Type J average	18.59	21.372	25.758	27.440
Type N average	9.67	13.056	17.448	20.345
Mean difference (t-statistics)	22.61***	23.74***	17.61***	18.615***
Type J dummy (t-statistics)	0.620 5.52***	0.504 4.71***	0.412 4.05***	0.293 3.23***

Note: The top part shows the average number of years from the incumbent manager's joining the company to becoming a director or manager, and the mean difference test results between Type J and Type N companies. The Type J dummy shows the coefficient of the Type J dummy (1 for Type J companies, 0 for Type N companies) in the regression of the natural logarithm of 1 plus the corresponding number of years (without adopting capital structure variables and financial institutions' ownership as independent variables). *** indicates significance at the 1% level

and Type N companies using data from 2002. Since the Japanese-style internal governance regards the director and manager positions as the prize of a long-term tournament, managers should be promoted to these positions after a long selection period from joining the company. If the Japanese-style financial governance and internal governance are complementary, managers of Type J companies should spend longer periods in the firm than those of Type N companies.

Table 8.4 shows the number of years from the incumbent manager's joining the company to becoming a director or manager in each period. Since individual directors' data is available from 2002, we conduct the analysis for the periods of 2002–2007 and 2009–2018. In 2002–2007, managers of Type J companies became directors about 18 years after joining the company, while managers of Type N companies became directors less than 10 years after joining.² The period from joining the company to becoming a manager is also longer for managers of Type J companies, and the same trend is observed for incumbent managers in 2009–2018.

The career of a manager may also be influenced by company characteristics. To investigate whether the managers of Type J companies have undergone a long period of selection, we conduct a regression of the natural logarithm of 1 plus the number of years from the incumbent manager's joining the company to his appointment as a director or manager, including the Type J dummy and company characteristics as independent variables. The bank debt ratio and financial institutions' ownership, which are used to identify these types of companies, are not included in the independent variables. The bottom of Table 8.4 consistently shows that the coefficient of the Type J dummy is significantly positive, indicating that the managers of

²The analysis combines data from the fiscal years 2002–2003 and 2004–2007.

Type J companies have been selected after a longer period of time, even when controlling for company characteristics.

Type J companies, defined by their financial characteristics as of fiscal year 1984, have the characteristics of Japanese-style internal governance in the 2000s and beyond. This result means that the financial and internal management aspects of Japanese-style governance had institutional complementarity. On the other hand, Table 8.4 indicates that the number of years from the incumbent manager's joining the company to his appointment as a director or manager is rather increasing, despite the weakening of the Japanese-style financial governance. This fact means that high borrowing dependence and high financial institutions' shareholdings are not indispensable for maintaining Japanese-style internal governance, and can be maintained by alternative means.

This fact raises a new question. What firms are maintaining Japanese-style internal governance? To address this issue, we replicate the regression of managers' carrier variables by replacing the Type J dummy by the bank debt ratio, bond ratio (bonds/total assets), and financial institutions' ownership. The results are shown in Table 8.5. The coefficient of the bank debt ratio is significantly negative in all estimations, indicating that the bank debt dependence, which was once an important component of the Japanese-style financial governance does not complement Japanese-style internal governance in recent years. In the high growth era, companies had to rely on bank borrowing to finance their projects and reduce bankruptcy costs by maintaining relationships with main banks. Once firms became able to reduce debt due to financial liberalization and accumulation of internal funds, however, Japanese firms reduced leverage to sustain the Japanese-style internal governance. It is also known that main banks send executives to financially distressed companies and promote restructuring (Kang and Shivdasani 1997). The intervention of the main bank in management means a decrease in the value of the prize for the winner of the long-term tournament. Thus, companies that adopt Japanese-style governance may have an incentive to reduce borrowings. However, this trend may have caused the lack of monitor, which became a serious governance problem.

On the other hand, it is important to maintain a stable shareholder structure to restrict control rights transfers, which can significantly change the rule of long-term tournament. Table 8.5 consistently shows that the coefficient of the financial institutions' ownership is significantly positive, indicating that stock ownership by financial institutions and promotion tournaments still complement each other. Despite the fact that unwinding of cross-shareholdings since the late 1990s significantly decreased the financial institutions' ownership, companies maintaining the Japanese-style internal governance still maintain a certain level of ownership by financial institutions. Furthermore, the coefficients of the cash holdings and the logarithm of total assets are significantly positive in all estimations, suggesting that large companies with ample liquidity tend to appoint winners of longer-term tournaments as managers. This result is consistent with the view that it is necessary to reduce the risk of bankruptcy to maintain Japanese-style internal governance.

Table 8.5 Regression analysis of management career

Dependent variable	Ln(1+ “years from joining the company to becoming a director”)		Ln(1+ “years from joining the company to becoming the manager”)	
	(1)	(2)	(3)	(4)
Period	FY2002–2007	FY2009–2018	FY2002–2007	FY2009–2018
	OLS	OLS	OLS	OLS
Borrowing/total asset	−0.362** (0.149)	−0.532*** (0.122)	−0.409*** (0.151)	−0.548*** (0.121)
Bonds/total asset	0.824*** (0.304)	−0.179 (0.318)	0.790*** (0.295)	−0.379 (0.305)
Financial institutions’ shareholdings	3.028*** (0.211)	3.937*** (0.243)	2.830*** (0.195)	3.102*** (0.223)
Cash/total asset	0.523** (0.218)	0.241* (0.129)	0.809*** (0.216)	0.240* (0.132)
Tangible fixed assets/total asset	0.159 (0.137)	0.356*** (0.118)	0.276* (0.142)	0.567*** (0.117)
Tobin’s Q	−0.153*** (0.0279)	−0.122*** (0.0129)	−0.195*** (0.0307)	−0.141*** (0.0138)
ROA	−0.910** (0.354)	−0.443** (0.183)	−0.592 (0.382)	−0.260 (0.211)
Ln(total assets)	0.146*** (0.0206)	0.126*** (0.0161)	0.0933*** (0.0201)	0.122*** (0.0150)
Constant	0.0217 (0.407)	0.0338 (0.319)	1.465*** (0.300)	1.117*** (0.228)
Number of samples	17,306	31,506	17,296	31,506
R ²	0.213	0.275	0.171	0.240

Note: Ln means natural logarithm. Numbers in parentheses are standard errors. ***: Significant at the 1% level, **: Significant at the 5% level, *: Significant at the 10% level

On the other hand, the coefficient of Tobin’s Q is significantly negative. Long-term tournaments may not be effective for companies with rich growth opportunities and large intangible assets.

8.4.3 Management System

The previous section investigated the relationship between financial governance and long-term tournaments. This section investigates the relationship between the financial governance and the management system that makes long-term tournaments effective. To motivate employees through promotion tournaments, it is necessary to make employees perceive a certain probability of winning a prize by offering many prizes such as managerial and director positions. We define the number of

directors and executive officers (hereinafter referred to as management layer) as the prize of the long-term tournament, and compare the number (size of management layer) between the two types. Many Japanese companies have reduced the number of directors since the board of directors reform at Sony in 1997. The reduction of directors means a decrease in the prize of the long-term tournament, which may lower the incentives of employees. On the other hand, if the executive officer system is introduced in line with the reduction of the board of directors, the number of prize positions can be maintained (Uchida 2011). Therefore, we also compare the introduction rate of the executive officer system between the two types of companies.

Table 8.6 shows that 47.8% of Type J firms adopt the executive officer system in fiscal years 2002–2007, while 35.8% of type N does so. The difference in the adoption rate is statistically significant. In fiscal years 2009–2018, both types have increased the adoption of the executive officer system, but the adoption rate of type J companies exceeds 70%, which is significantly higher than the rate for type N companies (59.35%). Type J companies also have significantly larger size of the management layer than type N companies in both periods.

The introduction of the executive officer system and the management layer size may be also influenced by factors such as firm size. To analyze whether there is a difference between the two types of companies after controlling for firm characteristics, we conducted a regression of the executive officer system dummy (1 for companies adopting the executive officer system, 0 for non-adopting companies) and the natural logarithm of the management layer size. Table 8.6 shows that the coefficient of the Type J dummy is significantly positive, indicating that Type J companies are more likely to adopt the executive officer system and tend to have a larger management layer than Type N companies, after controlling for company characteristics. This result suggests that the adoption of the executive officer system is determined in consideration of the long-term tournament, and provides additional evidence of the institutional complementarity of financial and internal governance.

Next, we replicate the regression analysis by replacing the Type J dummy by the bank debt ratio, bond ratio, and financial institutions' ownership to examine which financial characteristics are associated with the management system. Columns (1) to (4) of Table 8.7 present that the coefficient of the financial institutions' ownership is significantly positive, indicating that companies with stable shareholder structures tend to adopt the executive officer system and have a larger management layer size. The ownership by financial institutions plays an important role in building a management system suitable for the long-term tournament.

8.4.4 Monitoring Board

Japanese firms have strengthened the monitoring function of the board of directors in recent years. This trend is accelerated by the launch of the Corporate Governance Code in 2015. The demand for a monitoring board may reduce the director position as a prize in the promotion tournament, potentially weakening the incentive effect on

Table 8.6 Management systems

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Executive officer	Executive officer	Management layer size	Management layer size	Outside directors	Outside directors	Audit committee
Period	FY2002–2007	FY2009–2018	FY2012–2007	FY2009–2018	FY2012–2007	FY2009–2018	FY2009–2018
Type J average/ratio	0.478	0.730	8.284	12.699	0.318	0.771	0.205
Type N average/ratio	0.358	0.593	5.429	8.761	0.331	0.738	0.205
Mean difference (t-stat/z-stat)	5.10***	9.11***	9.87***	14.75***	0.50	2.58***	0.00
Type J dummy	0.345	0.577	0.088	0.091	-0.429	-0.212	0.320
t-stat/z-stat	1.74*	3.09***	1.56	2.10**	-2.10**	-1.31	1.33

Note: The top part shows the proportion of companies that have the corresponding characteristics and the proportion difference test results between Type J and Type N companies. The management layer size (columns (3) and (4)) indicates the mean value of the total number of directors and executive officers (excluding dual role persons) and its mean difference test results between Type J and N firms. The Type J dummy is the coefficient of Type J dummy (1 for Type J firms and 0 for Type N firms) in the logit regression of the dummy variable that takes a value of 1 for companies with the corresponding characteristics (without adopting capital structure variables and financial institutions' ownership as independent variables). For the management layer size (columns (3) and (4)), it is the coefficient of the Type J dummy in the regression of the natural logarithm of the total number of directors and executive officers. ***, Significant at the 1% level, **: Significant at the 5% level, *: Significant at the 10% level

Table 8.7 Regression analysis of management system

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	Dummy: Executive officer	Dummy: Executive officer	Ln(management layer size)	Ln(management layer size)	Dummy: Outside directors	Dummy: Outside directors	Dummy for audit committee
	Logit	Logit	OLS	OLS	Logit	Logit	Logit
Period	FY2002-2007	FY2009-2018	FY2002-2007	FY2009-2018	FY2002-2007	FY2009-2018	FY2009-2018
Borrowing/asset	0.516*	0.0744	0.0805	-0.0731	-0.436	-0.332	0.0450
	(0.275)	(0.215)	(0.0800)	(0.0560)	(0.295)	(0.215)	(0.275)
Bonds/asset	0.325	-1.015*	-0.371**	-0.374**	0.766	0.541	-0.275
	(0.640)	(0.616)	(0.180)	(0.154)	(0.643)	(0.626)	(0.840)
Financial institutions' shareholdings	0.717*	1.791***	0.359***	0.427***	-1.507***	-0.406	0.0791
	(0.379)	(0.397)	(0.111)	(0.0966)	(0.427)	(0.355)	(0.500)
Cash/total asset	0.0467	-0.510**	0.0396	-0.0848	-1.798***	-0.959***	-0.709**
	(0.439)	(0.233)	(0.123)	(0.0661)	(0.491)	(0.270)	(0.284)
Tangible fixed assets/ total asset	-1.301***	-0.725***	-0.0315	-0.0455	-0.434	-0.833***	-0.0899
	(0.296)	(0.199)	(0.0816)	(0.0518)	(0.292)	(0.199)	(0.244)
Tobin's Q	-0.0228	-0.0465*	-0.0468**	-0.00916	0.259***	0.220***	-0.0133
	(0.0879)	(0.0258)	(0.0214)	(0.00824)	(0.0816)	(0.0556)	(0.0295)
ROA	0.482	-0.672*	0.296	0.210*	-0.665	-1.225***	1.019*
	(0.888)	(0.373)	(0.216)	(0.112)	(0.838)	(0.408)	(0.575)
Ln(total assets)	0.356***	0.374***	0.186***	0.165***	0.256***	0.309***	-0.192***
	(0.0417)	(0.0305)	(0.0111)	(0.00811)	(0.0422)	(0.0284)	(0.0343)
Constant	-4.191***	-4.880***	0.502***	0.668***	-5.231***	-3.524***	-1.204
	(0.452)	(0.645)	(0.136)	(0.146)	(1.202)	(0.722)	(1.058)
Number of samples	5745	32,914	7047	24,653	5769	32,914	13,025
R ²			0.301	0.328			

Note: The numbers in parentheses are standard errors. ***, Significant at the 1% level, **, Significant at the 5% level, *, Significant at the 10% level

employees. This fact raises the question of how Type J companies respond to the movement for monitoring boards. Table 8.6 presents the proportion of companies appointing outside directors (columns (5) and (6)). In the fiscal years 2002–2007, when the demand for a monitoring board was not as strong as recent years, both Type J and Type N companies had about 30% of outside directors, and this difference is not statistically significant (column (5)). Given that large companies tend to appoint outside directors, however, this result may imply that Type J companies were reluctant to appoint outside directors. To examine this issue, a logistic regression of the outside director dummy was conducted, including the Type J dummy and control variables as independent variables. The lower part of Table 8.6 (column (5)) shows that the coefficient of the Type J dummy is significantly negative, suggesting that Type J companies were less likely to appoint outside directors in the 2000s when controlling for company characteristics. This result is consistent with the idea that Type J companies refrain from appointing outside directors who do not fit the long-term tournament. Also, the logistic regression replacing the Type J dummy by capital structure variable/financial institutions' ownership (Table 8.7, column (5)) provides significantly negative coefficients to the financial institutions' ownership. Again, the result suggests that financial institution shareholders have complementarity with the Japanese-style internal governance. However, in the fiscal years 2009–2018, when the government's recommendation for a monitoring board was strengthened, the proportion of Type J companies appointing outside directors became slightly higher than that of Type N companies. The logistic regression analysis no longer detects a significant coefficient on the Type J dummy (Table 8.6, column (6)).

Also, there is no significant difference between the two types of companies in the likelihood of adopting audit committees, which were introduced in 2016 to further strengthen the monitoring function of the board of directors (Table 8.6, column (7)). In recent years, strengthening the monitoring role of the board has become inevitable for companies, and firms increasingly follow the practice regardless of the maintenance of Japanese-style internal governance. Especially for Type J companies, the board of directors should strengthen the monitoring function because main bank monitoring significantly weakened due to the reduction in firms' borrowings.

8.4.5 ROA

Japanese-style governance releases managers from shareholder pressure and has been criticized for the low priority on shareholder value maximization. Long-term tournaments may create incentives to expand the firm size, which potentially reduce asset efficiency. Indeed, Table 8.1 shows that the ROA of Type J companies was significantly lower than that of Type N companies in 1984. As such, this section investigates the relationship between Japanese-style governance and ROA after the bubble economy period.

Table 8.8 ROA in each period

	(1)	(2)	(3)	(4)	(5)
Period	FY1987–1989	FY1991–1996	FY1997–2003	FY2004–2007	FY2009–2018
Type J average	0.039	0.024	0.020	0.034	0.025
Type N average	0.057	0.038	0.027	0.036	0.029
Mean difference (t-statistics)	12.62***	14.24***	6.77***	1.31	4.07***
Type J dummy	−0.014	−0.013	−0.011	−0.004	−0.002
(t-statistics)	−6.04***	−7.27***	−5.31***	−1.74*	−0.91

Note: The upper part shows the mean ROA (operating income/total assets) and its mean difference test results between Type J and Type N companies. The Type J dummy is the coefficient of the Type J dummy (1 for Type J companies, 0 for Type N companies) in the regression of ROA (without adopting capital structure variables, financial institutions' ownership, and ROA as independent variables). ***: Significant at the 1% level, *: Significant at the 10% level

Table 8.8 shows the ROA of sample companies for each period. During the bubble economy (column (1)) and fiscal years 1991–1996 (column (2)), Type J firms have more than 1% lower ROA than Type N companies. Even in the period from 1997 to 2003, when Japanese companies implemented restructuring, Type J firms show 0.7% lower ROA than Type N firms (column (3)). To analyze whether the ROA of Type J companies is relatively low after controlling for the firm characteristics, we implement a regression of ROA adopting the Type J dummy and company characteristic variables as independent variables. The coefficients of the Type J dummy in columns (1) to (3) are significantly negative, and we observe a 1.1–1.4% difference in ROA between the two types of companies.

However, in fiscal years 2004–2007 and 2009–2018, the difference in the mean ROA between the two groups has narrowed to 0.2–0.4% (columns (4), (5)). The regression of ROA also shows the ROA difference declines to 0.4% in 2004–2007, and becomes insignificant in 2009–2018 (0.2%). As a result of restructuring following the collapse of the bubble economy, the asset efficiency of Type J companies is no longer low relative to Type N companies.

8.5 Conclusion

In this chapter, we identified Type J companies with characteristics of Japanese-style financial governance using the bank debt ratio and financial institutions' ownership in 1984, and analyzed whether they maintained these characteristics after the bubble economy period, and whether they tended to appoint winners of long-term tournaments as managers in recent years. The period from the incumbent manager's

joining the company to becoming a director or manager is significantly longer for managers of Type J companies, and this characteristic continues until the 2010s. This was also observed in the latter half of the decade. This result suggests that the financial and internal management aspects of Japanese-style governance have institutional complementarity, and that Japanese-style internal governance still works as an incentive mechanism for employees.

On the other hand, the financial characteristics of Type J companies have changed significantly over time. The bank debt ratio of Type J companies has significantly decreased, and it recently has a significantly negative relationship to the period from the incumbent manager's joining the company to becoming a director or manager. This result indicates that a high bank debt ratio is not essential for maintaining Japanese-style internal governance. Unprofitable Type J companies cannot reduce debt and have no choice but to maintain main bank relationships to decrease bankruptcy risk. After financial liberalization, however, a certain number of Type J companies have improved their performance and increased the availability of internal funds, resulting in a policy shift to reduce the debt ratio itself.

Since the late 1990s, the unwinding of cross-shareholdings and the regulation on banks' shareholdings have significantly reduced the financial institutions' ownership of Type J companies. However, even in recent years, companies with a high financial institutions' ownership tend to host long-term tournaments, suggesting that financial institutions still support the internal governance as stable shareholders.

Miyajima (2011) classified the governance structure of Japanese companies into Type I hybrids, Type II hybrids, and traditional Japanese companies based on the principal component analysis using 2002 data. Traditional Japanese companies have relationship-oriented characteristics in both finance and organizational architecture (internal governance in this chapter), while the Type I hybrid combines market-oriented finance and relationship-oriented organizational architecture. Among these, traditional Japanese companies correspond to our Type J companies with low profitability. These firms have high debt ratio even in recent years. On the other hand, some Type I hybrid companies correspond to our Type J companies with high profitability. These companies have reduced bankruptcy risk by lowering their debt ratio. Also, some reputable companies such as Toyota Motor Corporation, Canon, and Kao were not classified as either Type J or Type N companies despite their high financial institutions' ownership, since they had a low dependence on bank debt as of 1984. These companies are classified as Type I hybrids in Miyajima (2011).

An important issue regarding Japanese-style governance is whether governance reform implies convergence to the shareholder capitalism model. Japanese managers have become more aware of shareholder value than before due to the increase in foreign shareholders and institutional shareholders, driven by the dissolution of cross-shareholdings and the trend for monitoring boards. However, the analysis of this chapter shows that a certain number of companies still maintain long-term tournaments at least in the 2010s, and stable stockholdings by financial institutions support this system. In this sense, we cannot conclude that Japanese-style governance has transitioned to the shareholder capitalism model at this point. All we witness is a significant change in the financial governance to maintain the Japanese-

style internal governance, while firms commonly consider shareholder value to a certain extent. As long as Japanese companies maintain the long-term tournament, this structure is likely to continue. However, even at this point, companies with high Tobin's Q tend less to appoint managers through the long-term tournament. In recent years, the number of job transfers to large companies and regular worker positions have increased,³ and the awareness of employees participating in the long-term tournament may be weakening. In the future, if companies with high growth and large intangible assets increase their presence and the job transfer market becomes active, the characteristics of Japanese-style internal governance may weaken, and in the financial aspect, a governance structure that values shareholder wealth will become prevailing.

8.6 Comment by Miyajima Hideaki: The Current State of the Japanese Governance Model

8.6.1 Debate Over the Japanese Governance Model

The peak of the debate on the Japanese governance model was in the late 1980s. Aoki (1988) formalized the institutional characteristics of the Japanese corporate system, such as the main bank system, cross-shareholding, a board of directors composed of insiders, and motivating employees through promotional tournaments (rank hierarchy), and the relationships (complementarities) between these institutions. Aoki's argument is based on the actual situation of Japanese firms in the 1980s in mind, when the international competitiveness of Japanese business reached its historical peak, and the "Japan-US reversal" was realistically discussed in the media. He argued that the institutional basis of the Japanese economy, which enabled rapid growth until the 1980s, was a mechanism based on various, long-term relationships among stakeholders, different from the market-based mechanism in the United States. The understanding that each capitalist country has different institutional characteristics attracted international attention at the time when the issue of competition between capitalism and socialism was settled by the fact of the collapse of socialism itself, and it became one of the important topics in economics in the 1990s.

However, since the late 1990s, with the revival of the US economy and the rapid progress of globalization, the Anglo-American corporate system has been considered as an uncontestable model that hardly allows any other competitors. Even if we concentrate on corporate governance, which is the focus of this chapter, it was expected that the corporate systems of each country, each with its own characteristics, would converge to a shareholder sovereignty system driven by rapid IT and financial globalization, and this convergence was also promoted as a policy.

³Ministry of Internal Affairs and Communications Statistics Bureau website. <https://www.stat.go.jp/data/roudou/topics/topi1230.html>

Along with these movements, in the 1990s, even in academia that focused on the diversity of capitalism, the influence of arguments emphasizing the superiority of the US-style corporate system strengthened. Hansmann and Kraakman (2004) declared that the norm of shareholder supremacy had triumphed over competing corporate law theories, arguing for the end of the history of corporate law. Moreover, a series of studies on the legal origins of various countries, starting with LaPorta et al. (1998), clarified the positive effects of minority shareholder protection seen in common law countries on the development of financial systems and economic growth, greatly influencing subsequent research. Empirical research in the 2000s emphasized that foreign institutional investors were the driving force behind the standardization of governance systems in each country, and that activist funds contributed to efficiency improvements through management discipline. On the other hand, in Japan too, the characteristics of Japanese-style governance changed significantly with the collapse of the bubble economy and the subsequent banking crisis. The dismantling of the main bank system, the dissolution of cross-shareholding, and the reform of directors (introduction of the executive officer system) progressed. We characterized these changes as the emergence of a hybrid structure where the Anglo-American capital market-based mechanism in finance and ownership structure and the relationship-based mechanism in employment and organization are combined (Jackson and Miyajima 2007). However, this characterization merely described the substantive changes, leaving unresolved issues such as whether this is a transitional phenomenon in the process of convergence to a capital market-based mechanism, or the result of a structural change, and if the latter, what mechanism supports the combination of different mechanisms. After the global financial crisis of 2008, both the global policy trends surrounding corporate governance and the academic view of them underwent a major shift again. In the UK and the USA after GFC, there was a growing recognition that excessive governance by shareholders led to short-sighted management, excessive risk-taking, a decline in the protection of other stakeholders other than stock owners, and even the cause of environmental problems such as global warming. The reforms to limit shareholder sovereignty progressed. In academia, while theoretical re-examination of shareholder supremacy advanced in the 2010s (for example, Hart and Zingales 2017), on the empirical side, rapid progress was made in analyses of the drawbacks of short-termism as well as environmental, social, and governance (ESG) investing.

The economic impacts of the global Covid-19 pandemic from the end of 2019 aggravated social inequality, in addition to the existing environmental destruction and climate change issues. In the post-Corona pandemic world, social norms surrounding the purpose of business corporations changed significantly, and the view emphasizing stakeholders gained its influence. Based on the perception of the situation regarding the real economy in the 2020s as discussed so far, Uchida's chapter set out to question the current state of Japanese-style governance. He attempts to achieve this goal by clarifying the complementarity between internal governance (promotion tournaments), which is the core of the Japanese governance system, and financial factors (fundraising and shareholding structure).

8.6.2 *Bankruptcy Risk and Rank Hierarchy*

Uchida identifies companies with the strong financial characteristics described above, Type J, and those with weak characteristics, Type N, taking Year 1984 when Japanese-style governance was about at its peak as a benchmark. He analyzes the long-term evolution of governance in both types of firms, focusing on the complementarity of internal and financial governance.

So, what is Uchida's main contribution in this chapter, and how should it be developed in the future research?

One of Uchida's contributions is to show that promotion tournaments (rank hierarchies) have a negative relationship with the firm's borrowing, measured by the ratio of borrowing to total assets. Based on previous cases of renegotiations and bailouts in times of financial distress, it has been assumed that a high dependence on firm borrowing complements the rank hierarchy. However, Uchida argues that such a conventional view is not necessarily supported and, moreover, it can be maintained by an alternative mechanism. One such a mechanism, he points out is that the bankruptcy risk itself has been reduced by Japanese firms' declining reliance on debt financing and rising cash holdings. Indeed, since the 2000s, the nominal interest rate has been declining at the macro level, and the reduction of corporate debt has been progressing rapidly, so his suggestion makes sense.

Though many Japanese firms are still dependent on bank borrowings, they have faced rapid changes in the economic environment since the 2000s. Despite this, the number of bankruptcies, liquidations, and other delistings of Japanese listed companies over the past 20 years has remained low, in contrast to the UK and the United States, where the eclipse of public firms has been observed. Therefore, the mechanisms to maintain the viability of firms may not be sufficient by simply reducing the dependence to bank borrowing or the ratio of debt to asset.

Future research should examine if bailouts by other firms (acceptance of third-party allotments) and friendly acquisitions between firms, which have increased since the late 1990s, should be considered as alternatives to conventional bailouts by main banks. The relative importance of the bailouts by non-financial corporations to the bailouts by financial institutions should be evaluated. Second, the more important point is the involvement of private equity and buyout funds in business reorganization, which has been increasing while drawing fluctuations, from the mid-2000s to mid-2010s. Generally, such market-based mechanisms are considered to be in conflict with the rank hierarchy. However, in Japan, it has been pointed out that funds are more likely to maintain employment more than business companies. How these new market-based mechanisms stand in relation to the rank hierarchy is an important issue for future research.

8.6.3 Stability of Control and Rank Hierarchy

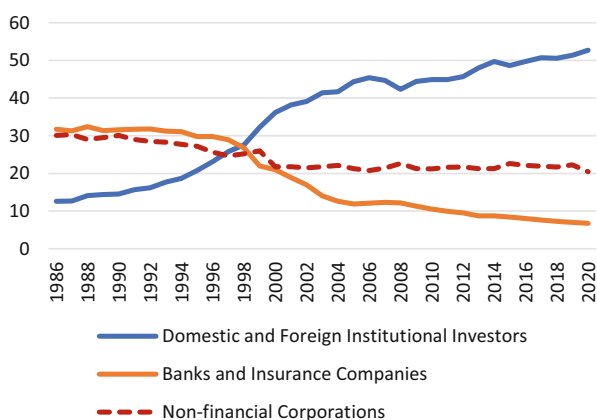
Another important point made by Uchida is the positive correlation between promotion tournaments (rank hierarchies) and the shareholding ratio of financial institutions. He emphasizes that there is still institutional complementarity between financial governance and internal governance. However, as shown in Fig. 8.1, this view is not entirely convincing, given the rapid decline in the total shareholding ratio of banks and insurance companies on an aggregate basis from over 30% in the early 1990s to 7% in 2020.

I do not necessarily disagree with the view that the characteristics of Japanese firms' internal governance are supported by the shareholding of financial institutions. My discomfort lies rather in the approach of limiting the ownership entities that support the rank hierarchy to banks and insurance companies. I would like to emphasize the importance of examining the possibility that the unique shareholding structure of Japanese firms supports the rank hierarchy in future research.

More specifically, first, it is desirable to focus on stable shareholders (insider shareholders), which include not only financial institutions but also corporate entities and employee shareholdings, as the ownership entities that support the rank hierarchy. In the logic of complementarity, stable shareholders exist to prevent hostile takeovers and activist interventions that could lead to management changes and employee restructuring, so there is no need to limit them to financial institutions. In fact, as shown in Fig. 8.1, the shareholding ratio of corporate entities has been surprisingly stable even in the 2000s. Hence, as the mechanism that supports the rank hierarchy from the ownership side, it is very likely that cross-shareholding between corporate entities has increased its importance.

Second, from the perspective of securing the management rights of insiders, it is necessary to consider share repurchases, which have rapidly increased since the early 2000s. Repurchasing shares from the public market can mitigate the dispersion of shareholdings. Also, share repurchases using off-hours trading on the Tokyo Stock

Fig. 8.1 Changes in the structure of stock ownership. (Note: Domestic and foreign institutional investors are the total of foreigners and trust bank holdings. Banks and insurance are the total of city banks, regional banks, life insurance, and property insurance companies. Source: Tokyo Stock Exchange and others “Survey of Stock Distribution”)



Exchange can avoid the dispersion of shareholdings that would have occurred due to the sale of insider shareholders (Franks et al. 2023).

Third, recent trend that should be examined as an alternative to the conventional mechanism is the role of passive funds among institutional investors, whose ownership has increased significantly in recent years. While activists and active funds exert pressure to dismantle the rank hierarchy through speech and withdrawal, index funds committed to long-term holding have less such pressure. Among “domestic and foreign institutional investors” in Fig. 8.1, the proportion of passive funds is increasing, and this trend is stronger among large-cap companies. Unlike the traditional silent shareholders, these passive investors are strongly committed to long-term holdings, despite the possibility of exercising voting rights and engagement. It will be an important future task to examine how these factors affect the characteristics of the rank hierarchy in Japanese companies.

8.6.4 Robustness of Internal Governance

Uchida’s chapter demonstrates that the characteristic of rank hierarchy in Japanese companies has strengthened over the past 20 years, by tabulating the variables related to promotion tournaments using the total number of directors and executive officers promoted internally. I consider this finding to be the main contribution of his chapter. The number of years from joining the company to becoming a manager or director has increased, and the proportion of managers promoted internally has increased over these 20 years. Moreover, this change is observed not only in Type J companies, but also in Type N companies. The change is equal or more pronounced for the latter (Table 8.4). According to Miyajima and Saito’s (2020) calculations firms including the Nikkei 225, the hiring of CEOs from outside has hardly increased in the past 10 years, so the external management market is still hardly functioning in Japan. Despite the change in the financial factors that have supported it so far, why the rank hierarchy is so strongly maintained is an important question raised in this chapter.

As a factor contributing to the current situation, this chapter points out the possibility that a different mechanism has been emerged in the financial aspect that is different from the conventional one. There is no doubt that clarifying this will be an important research task in the future. However, we should also explore the unique mechanism that supports the rank hierarchy. In this regard, Uchida points out factors such as the growth potential of firms, the importance of intangible assets, and the proportion of regular employment, which may weaken the rank hierarchy in the future. Indeed, companies with high growth potential tend to rely on the external market for recruiting management with financial incentives, and if their weight in the economy increases, the rank hierarchy may collapse. But even for startups, there is a possibility of a shift to long-term employment as they mature, and what has happened in startups over the past 20 years seems to be such a shift.

Also, the increase in the proportion of non-regular workers in the 2000s can be understood as a factor that strongly guarantees the employment and high wages of regular employees and maintains the rank hierarchy. In the future, the question of why the rank hierarchy continues to be maintained will need to be fully examined, taking into account factors such as business characteristics that define the importance of special skills in companies, and the necessity of global adjustment of their treatment within management due to cross-border M&As.

8.6.5 From “Convergence vs. Persistence of Heterogeneity” to Diversity

The original concept of diversity in capitalism was based on the recognition that there is a strong complementarity between different aspects of the firm system, such as finance and employment, and therefore, their characteristics persist, and if they change, it is assumed that they will change all at once. In the progress of globalization in the early 2000s, the main question was whether each country’s governance would converge to the Anglo-American market-based system, or whether it would maintain its uniqueness.

However, in reality, after the global financial crisis and the Corona disaster, the world seems to be moving in the same direction in terms of a combination of the shareholder sovereignty model and the stakeholder model. The United Kingdom and the United States, which are based on the market model, are leaning toward the stakeholder model. On the other hand, Japan still faces the challenge of establishing a system along the shareholder sovereignty model while redefining the traditional stakeholder model.

The complementarity between systems is not as strong as this chapter suggests. The rank hierarchy may be supported by a different system than before, which may be a market-based system. In that sense, there is also a possibility that different types of mechanisms coexisting. In addition, the assumption that the characteristics of a particular governance system will spread and homogenize within a country may not be realistic. For example, in the United States, entrepreneurial companies, management companies, and benefit corporations coexist, and their diversity is supposed to be a source of growth. The diversification of Japanese-style governance was also observed in the 2000s. The most important contribution of this chapter could be found to suggest the importance of the relationship between various systems/institutions and provide a new starting point for a complete re-examination in the future.

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Chapter 9

Enterprise Risk Management and Corporate Insurance



Issues and Practice Based on Survey on Risk Managers in Japan

Noriyoshi Yanase

Abstract This chapter focuses on the non-life insurance industry, with an emphasis on corporate insurance. It begins by providing a theoretical overview of the importance of corporate insurance as an enterprise-wide decision-making process. The chapter then presents the findings of an original survey conducted with risk managers responsible for corporate insurance purchasing/management, discussing the challenges and future prospects of corporate insurance in Japan. The survey results reveal that, even in Japan's leading companies, risk management departments are not fully integrated into the enterprise-wide financial decision-making process aimed at maximizing corporate value. As the non-life insurance industry's main postwar market, automobile insurance, becomes increasingly saturated, the corporate insurance sector may attract more attention in the future. The chapter emphasizes the need for developing organizations and personnel capable of understanding the importance of purchasing corporate insurance as an important part of financial decision-making, much like in the broader corporate sector. Comment for this chapter identifies two reasons why Japanese firms have struggled to adopt enterprise risk management (ERM) systems: internal and external challenges. Regarding external issues, it highlights shareholders' perceptions of risk financing and argues that the low survey response rate in this chapter may reflect these concerns.

9.1 Introduction

The non-life insurance market includes household insurance (personal lines) and corporate insurance (commercial lines). The non-life insurance industry in Japan was established mainly around corporate insurance, which consists of marine insurance and fire insurance for businesses. Corporate insurance groups centered on

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conglomerate capital played an important role in the prewar period. Subsequently, with the rapid economic growth after the war and the increase in household income, the share of household insurance expanded rapidly, especially due to the rapid growth of the automobile insurance market on the back of motorization. However, especially since the 2000s, while the automobile insurance market, the mainstream of the non-life insurance industry, has become saturated, the importance of corporate insurance, such as commercial general liability (CGL), directors' and officers' liability (D&O), and business interruption (BI), has increased.

In contrast to household insurance, corporate insurance covers a wide range of risks and is highly specialized, with coverage tailored to each company's risk management needs. Therefore, as the importance of corporate insurance in the Japanese non-life insurance industry increases, the question of why firms (the demand side of corporate insurance) need to purchase insurance should be discussed based on theoretical and empirical analysis.

In Japan, long-term and stable relationships have long been established through corporate groups centered on main banks and cross-shareholdings, which play the role of an "implicit safety net" for the risks faced by firms. In this environment, the risk management motives of individual firms are not expected to be proactive (e.g., Yanase and Limpaphayom 2017; Limpaphayom et al. 2019). On the other hand, with the significant changes in the business environment of Japanese companies (internationalization of shareholders, corporate governance reform, etc.), they are expected to implement risk management strategies to maximizing firm value, and corporate insurance is also required to be clearly positioned as part of the enterprise risk management (ERM). However, the actual situation of risk management and insurance purchasing by Japanese companies is not well understood due to insufficient disclosure of corporate insurance information.

The supply side of corporate insurance is also not well understood. Although the Japanese non-life insurance industry had been under strict supervision for a long time after World War II, the amendment of the Insurance Business Act in 1995 marked the beginning of deregulation (introduction of insurance brokers, etc.). Although the types of corporate insurance are also being expanded as deregulation progresses, the market share of insurance brokers in terms of net direct premiums written is still quite low (0.9% in fiscal 2022), a quarter of a century after the law was amended. This is partly due to the fact that the Japanese non-life insurance market is still dominated by transactions arranged primarily through insurance agencies affiliated with corporate groups or financial institutions (e.g., major banks). Nevertheless, a comprehensive understanding of the current landscape remains elusive.

The first half of this chapter provides a comprehensive review of existing studies on corporate demand for insurance. In the second half, I summarize the results of our survey of risk managers in large corporations and discuss the issues and prospects for corporate insurance in Japan.

9.2 Corporate Risk Management and Insurance

Corporate insurance is one of the risk management tools (Fig. 9.1). Corporate risk management consists of risk control and risk financing. Risk control is defined as methods that reduce expected losses by affecting the frequency (likelihood) or severity (magnitude) of expected losses, and is divided into loss prevention, which reduces the frequency of expected losses, and loss mitigation, which reduces the severity of expected losses. Specific risk control methods include hard approaches, such as investing in earthquake and fire-resistant facilities, and soft approaches, such as business continuity plans (BCP: Business Continuity Plan).

On the other hand, risk financing is defined as methods of raising funds to offset incurred losses and is classified into risk retention and risk transfer. Risk retention refers to a company’s continued responsibility for part or all of the payment of losses. Therefore, the capital for risk retention comes either from retaining the cash flow generated by the company internally (internal financing) or from external financing to cover losses after the event. Methods of internal financing include, for example, establishing reserves, provisions and self-insurance and managing them with highly liquid assets such as cash and deposits or establishing a captive outside the company. In addition, methods of external financing include borrowing from banks after the event, issuing corporate bonds or new shares, and establishing a commitment line. Risk transfer refers to the transfer of risk to third parties, such as insurance companies and/or capital market investor, and insurance is a traditional method of risk transfer. More recently, in addition to corporate insurance, methods using derivatives and securitization have emerged, such as insurance derivatives (weather derivatives) and catastrophe bonds (CAT bonds) for large natural catastrophe risks.

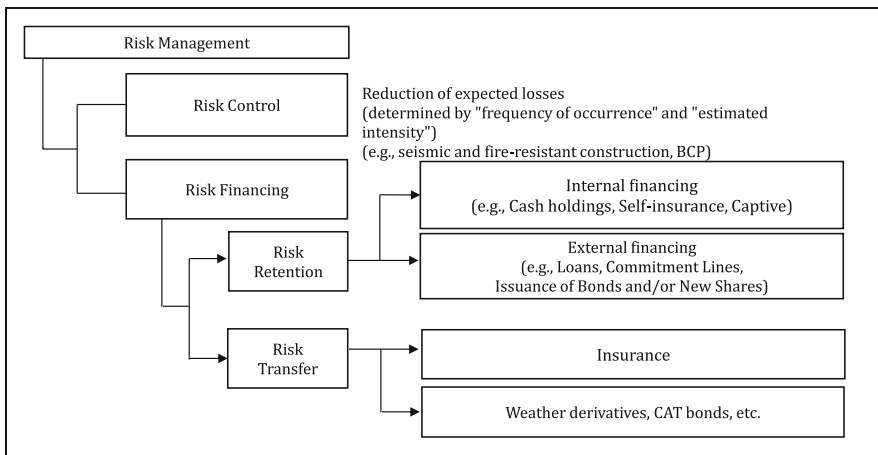


Fig. 9.1 Corporate risk management and insurance. (Source: Created based on Fig. 1.4 from Yanase, Ishizaka, and Yamasaki (2018))

9.3 Theoretical and Empirical Studies on Corporate Insurance Demand

By organizing the theories and trends of empirical research on corporate demand for insurance in corporate finance, we discuss the significant role of corporate insurance in the Japanese non-life insurance market after deregulation.

9.3.1 *Does Corporate Insurance Increase Firm Value?*

Does corporate insurance increase firm value? If so, does the effect of insurance demand on firm value vary with firm characteristics, such as capital structure and shareholder composition? If corporate insurance has an effect on the cost of capital and/or expected cash flows, it can increase firm value through these channels. However, it is well known that under perfect market conditions, where the Capital Asset Pricing Model (CAPM) is established, corporate insurance does not affect either the cost of capital and/or expected cash flows and is irrelevant to the value of the firm (e.g., Cummins 1976; Mayer and Smith 1982).

First, it is assumed that shareholders have already made sufficiently diversified investments through the capital market (assuming no diversification constraints). Second, it is assumed that corporate taxes, expected bankruptcy costs, transaction costs, and agency costs can be ignored. Under the first assumption, shareholders can eliminate the firm's unsystematic risks of the firm through their diversified portfolios, only systematic risks are reflected in the cost of capital. However, since insurable risks are generally due to firm-specific events, the use of corporate insurance to hedge risks is related to unsystematic risks but not to systematic risks, so that the corporate demand for insurance does not affect the cost of capital. Also, assuming that transaction and agency costs can be ignored, the insurance premium is assumed to be actuarially fair (no expense loading), so that the corporate demand for insurance does not affect expected cash flow.

There is no rational reason for firms to purchase insurance at an additional cost, since insurable risks can be eliminated through sufficiently diversified portfolios. In short, risk pooling in the insurance system and risk diversification in the capital markets perform essentially similar functions. In the real world, however, many firms purchase corporate insurance. Therefore, a number of existing studies (e.g., Mayers and Smith 1982), explain the gap with reality by relaxing the assumptions in the theoretical considerations.

9.3.2 *Channel Through Cost of Capital*

Corporate insurance does not affect the cost of capital in a situation without diversification constraints. However, it is not necessarily the case that firms in the

real world are composed of diversified shareholders. For example, shareholders of unlisted firms cannot freely buy and sell their own shares, and so they cannot make efficient diversified investments, and unsystematic risks of them remain. In such a case, there is a channel to increase the value of the firm by reducing the cost of capital by eliminating unsystematic risks through the use of corporate insurance as a hedge. Therefore, differences in shareholder composition can have a significant impact on a corporate demand for insurance.

For example, managers have a relationship with the firm for a fixed period of time while shareholders can rebuild their relationship with the firm at any time through stock trading. Thus, managers can be considered stakeholders subject to high diversification constraints. Therefore, the higher the degree of stock ownership by managers, the higher the incentive for the corporate demand for insurance should be. On the other hand, in the case of firms composed of shareholders with a low degree of diversification constraints, such as institutional investors who can make sufficiently diversified investments, the incentive is expected to be low.

9.3.3 Channel Through Expected Cash Flow

Corporate insurance does not affect the expected cash flow in a situation where transaction costs and agency costs can be ignored. However, if the existence of expected bankruptcy costs is recognized, it is possible to reduce the potential financial difficulties through the use of corporate insurance and have a positive impact on the expected cash flow. As long as this positive benefit exceeds the additional cost of purchasing insurance, the net expected cash flow increases and the firm value increases (e.g., Mayers and Smith 1982, 1990; Smith and Stulz 1985). Therefore, firms with relatively high expected bankruptcy costs are expected to have higher incentives to demand insurance, all else equal.

In assuming value irrelevance as a benchmark, we assume a situation where agency costs between shareholders and creditors are not considered. In the real world, however, there is a conflict of interest between shareholders and other stakeholders regarding the distribution of the firm's future cash flows, and agency costs arise. These agency costs affect the investment incentives for shareholders, especially in firms facing financial difficulties. That is, in firms with severe financial constraints, if internal funds are depleted as a result of covering random losses, it becomes difficult to invest in future growth opportunities unless they rely on expensive external financing. This reduces the net present value of future growth opportunities, and many promising investments are likely to be postponed. Especially for companies with large future growth opportunities, the value of mitigating this underinvestment problem is high, and the motivation to secure the availability of internal funds by using risk transfer instruments such as corporate insurance increases (e.g., Mayers and Smith 1987; Froot et al. 1993; Géczy et al. 1997).

Furthermore, from the perspective of reducing agency costs between shareholders and managers, there are cases where the motivation for risk transfer, including

corporate insurance, is explained by focusing on the manager's compensation system (e.g., Smith and Stulz 1985; Han 1996; Graham and Rogers 2002). As a mechanism to mitigate agency problems between shareholders and managers, the effectiveness of incentive compensation such as performance-based rewards are being discussed. Theoretically, risk-averse managers should demand compensation for the uncertainty of their own rewards when accepting performance-based rewards. This additional increase in compensation would be expected to reduce the firm's expected cash flow. Thus, the firm would have an incentive to stabilize its cash flow by transferring risk to reduce the uncertainty of the manager's compensation.

The motivation for risk transfer, including corporate insurance, can also be explained by the existence of corporate taxes (e.g., Graham and Smith 1999; Graham and Rogers 2002). Corporate taxes are generally progressive, with the tax rate increasing as taxable income increases. In this case, if the volatility of pre-tax profits can be reduced through risk transfer, it is possible to save the cumulative tax payment over several periods, which can increase the expected cash flow and potentially affect the firm value. In addition, with appropriate risk transfer, it is also possible to benefit more from the tax saving effect of deducting the cost of using debt (interest payments). The Modigliani-Miller (MM) proposition on capital structure focuses on the trade-off between tax savings and expected bankruptcy costs and shows the existence of an optimal capital structure that maximizes firm value. Here, if expected bankruptcy costs can be reduced through risk transfer, more benefits can be derived from the deductibility of debt interest. Increasing debt capacity also creates a channel for affecting shareholder value through tax savings (e.g., Graham and Rogers 2002).

In addition, the real services provided by insurance companies have been discussed as a characteristic factor in corporate demand for insurance (e.g., Mayers and Smith 1982; Anand et al. 2021). By purchasing insurance, companies can enjoy the value of various additional services associated with the insurance product, such as the risk control services. These include consulting services related to loss prevention and mitigation before an accident occurs, as well as loss mitigation services to limit the expansion of loss amounts after an accident occurs.

If a company implements risk control services itself or purchases the service solely from a specialist, the cost burden may be higher than the additional insurance premium (or part of it) paid to the insurance company as a fee for risk control services. If a company implements risk control services in-house or purchases the service solely from a specialist, the cost may be higher than the expense loading paid to the insurance company as a fee for risk control services. This is because, first, insurance companies can achieve economies of scale and scope in their risk control activities by comprehensively handling risk control services for multiple companies. Another reason is that risk control services and insurance claims are provided as an integrated service, which reduces agency costs between the service provider and the claimant. In other words, the higher the level of risk control in a firm, the lower the expected claims payment, which provides an incentive for insurance companies to provide efficient risk control services. Thus, the value of the services provided by insurance companies is also an important motivation in explaining the corporate demand for insurance.

9.3.4 Trends in the Empirical Studies

While early progress was made in developing a theory of corporate demand for insurance, the accumulation of empirical studies has been slow due to limited on the disclosure of information on the cost of risk, such as insurance premiums. A prominent study by Mayers and Smith (1990) focused on the insurance industry as the only sector for which premium data are systematically available from disclosure documents. They conducted the first empirical study of the demand for reinsurance by US non-life insurance companies. Using the ratio of reinsurance premiums to the total of direct written premiums and reinsurance premiums as a proxy for reinsurance demand, they find that mutual insurance companies have a greater demand for reinsurance than stock insurance companies. This is because in the case of mutual insurance companies, the market for insurance contracts is limited. So the degree of diversification of the company owners (shareholders) is limited in comparison with stock insurance companies, and there are limits to the function of elimination of unsystematic risk through diversified investment in the capital market. Since that study, there has been a growing body of empirical research on the demand for reinsurance by insurance companies (e.g., Cole and McCullough 2006; Yanase and Limpaphayom 2017; Anand et al. 2021).

Despite the limited data sources, empirical studies on the corporate demand for insurance has recently also been conducted in addition to research on the demand for reinsurance. A relatively large number of these studies have focused on D&O insurance, which covers legal liability incurred by corporate officers (directors, etc.) in the performance of their duties. And in Japan, a provision on D&O insurance (Article 430-3) was newly enacted in the revised Corporate Law enacted in December 2019.

Core (1997) conducted an empirical study of corporate insurance demand, focusing on D&O insurance, in response to the introduction of mandatory detailed disclosure of D&O insurance in Canada. Then a number of empirical studies have been conducted in line with the growing interest in corporate governance research (e.g., Chalmers et al. 2002; Lin et al. 2011; Boyer and Stern 2014; Boyer and Tennyson 2015; Gillan and Panasian 2015).

Since empirical research on corporate demand for insurance is difficult to conduct, most published analyses are limited to a specific industry (reinsurance demand) or a specific type of insurance (D&O insurance). As a result, most studies of other types of corporate insurance are based on non-public information from contracts with companies or surveys based on questionnaires (e.g., Hoyt and Khang 2000; Aunon-Nerin and Ehling 2008; Zou 2010; Asai 2019).

In recent years, there have been studies on the additional effects of industrial structure, such as conglomeration and corporate group, on corporate demand for the insurance (reinsurance). Regan and Hur (2007) examine the difference in insurance

demand between conglomerate and non-conglomerate companies in South Korea. Yanase and Limpaphayom (2017) also examine the relationship between corporate group (“keiretsu”) and reinsurance demand in the Japanese non-life insurance industry.

9.4 Risk Management and Corporate Demand for Insurance in Japan

9.4.1 Survey of Risk Managers at Large Japanese Corporations

The previous section provided a systematic review of the theoretical framework and trends in empirical research on corporate insurance demand. The following questions arise here. What is the current state of corporate insurance purchasing in Japan? And do Japanese companies have a system for making enterprise-wide corporate insurance decisions from a value maximization perspective? In this section, I will provide an overview of the results of two recent survey studies (fiscal 2011 and fiscal 2021) conducted to understand the actual situation of risk management and corporate insurance at large Japanese companies and make some considerations.

9.4.2 Survey for Fiscal Year 2011

The survey for the 2011 fiscal year was conducted by Marsh Japan and Marsh Broker Japan from December 2011 to January 2012, in the immediate aftermath of the Great East Japan Earthquake. The survey was sent to the top 2000 companies by sales (excluding finance and insurance), and responses were received from 160 companies.

The surveyed companies are characterized by an average sales volume of 656.9 billion yen, with approximately 30% of the companies having sales volume exceeding approximately 500 billion yen. Compared to the average of companies listed on the First Section of the Tokyo Stock Exchange, a significant proportion of the companies are large and consist of large companies. The respondents belong to the human resources and general affairs department (38%), compared to the finance and accounting department (22%), which may be involved in financial decisions for the entire company. In traditional Japanese companies, insurance management is often handled by the general affairs department as part of asset management, suggesting that the human resources and general affairs departments account for a high percentage of the responses.

Table 9.1 summarizes the results of a question on the purpose of non-life insurance purchasing. Six options are provided for the question “What do you prioritize when purchasing non-life (corporate) insurance?”, with ① to ③

Table 9.1 Purpose of corporate demand for insurance

Purpose of non-life insurance purchasing		N	Most important	Important	Consideration	A little consideration	Not at all	Most important + Important
①	Securing funds for asset recovery	154	29%	45%	19%	6%	1%	74%
②	Minimization of the negative impact on profits	154	27%	48%	18%	4%	4%	75%
③	Protection working capital in the event of a disaster	152	4%	26%	37%	25%	8%	30%
④	Support for the response to an accident	152	8%	45%	30%	13%	3%	53%
⑤	Requests from financial institutions, business partners, and government agencies	150	3%	18%	35%	27%	17%	21%
⑥	Accountability to shareholders	151	5%	28%	47%	14%	6%	33%

Source: by the author

emphasizing the risk financing function, ④ emphasizing the service value of insurance. Also, ⑤ is a requirement for business execution that requires insurance arrangements (operational necessity) and is a somewhat passive reason for purchase. Also, if corporate insurance is positioned from a company-wide perspective as part of financial decision-making, there is a possibility that they are aware of the accountability to shareholders, so option ⑥ is set from that point.

The most important purpose is ① “Securing Funds for Asset Recovery” (29%) and ② “Minimization of the Negative Impact on Profits” (27%), suggesting that the risk financing function is the most important. In addition, in terms of the importance ratio (most important + important), the risk financing function (“Minimization of the Negative Impact on Profits” (75%), “Securing Funds for Asset Recovery” (74%)) stands out, but following them, ④ “Support for the Response to an Accident” (53%) is also answered at a high rate, which is interesting. On the other hand, the importance ratio of ⑥ “Accountability to Shareholders” is only 33%, suggesting that despite the fact that the majority of the survey respondents are relatively large-listed companies, they may not be positioning corporate insurance from a company-wide perspective as part of financial decision-making.

Table 9.2 shows the take-up rates by line of business. The rates for “Property” insurance and “Liability” insurance are extremely high at 96% and 97%, respectively, and the rates for “Marine & Domestic Transportation” insurance is also high at 80%. On the other hand, the rates for “Profit” insurance and “Earthquake” (EQ) insurance are relatively low at 44% and 36%, respectively, suggesting some variation across firms in terms of insurance demand.

In recent years, there has been concern that business interruption due to natural catastrophes (e.g., earthquakes, wind and water damage) can cause significant losses to business operations, suggesting that the take-up rate of profit insurance, which covers losses due to business interruption, is relatively low, even among large companies.

What are the characteristics of the firms that purchase these policies? Table 9.3 compares the characteristics of firms that have purchased profit insurance and EQ insurance with those that have not. It shows that firms that have purchased EQ insurance are large in terms of sales and total assets, but there is no difference in the size of firms that have purchased profit insurance. On the other hand, it can be seen that companies with a high ratio of capital investment (capital investment amount/sales) and cash flow profitability (operating cash flow/sales) tend to purchase profit insurance. In other words, there is a tendency for insurance demand to be high in companies with high investment willingness and profitability, which is consistent with the theoretical expectation that the level of growth opportunities positively affects insurance demand.

Furthermore, it is interesting to note that for both EQ insurance and profit insurance, (1) firms with a high proportion of foreign shareholders tend to purchase, (2) the respondents of these firms tend to be in the finance and accounting department, and (3) these firms have the use of multiple insurance distribution channels. Thus, the basis for positioning corporate insurance as an enterprise-wide decision may be market discipline by foreign shareholders, financial literacy of insurance/risk managers (human resources to respond appropriately to market discipline), and a

Table 9.2 Take-up rates by line of business

	Take-up rates by line of business										
	Whole sample		By sales size (JPY)				By department of the respondent				
			More than 500 billion		Less than 500 billion		ERM-type		Silo-type		
N	Take-up rate	N	Take-up rate	N	Take-up rate	N	Take-up rate	N	Take-up rate	t-test	
Property	151	96%	56	98%	95	95%	59	100%	92	93%	**
Profit	151	44%	55	55%	96	39%	58	50%	93	41%	
Liability	152	97%	56	100%	96	95%	59	97%	93	97%	
Marine & domestic transportation	151	80%	56	84%	95	78%	59	76%	92	83%	
Earthquake	138	36%	53	49%	85	27%	51	47%	87	29%	**

Note: The ERM-type includes departments involved in enterprise-wide decision-making (e.g., finance and accounting, business administration departments), while the silo-type includes departments involved in individual operations (e.g., human resources, general affairs, legal departments). * indicates a significance level of 10%, ** indicates 5%, *** indicates 1% indicates the significance level (test of difference in mean values of both groups)

Source: by the author

Table 9.3 What types of companies purchase profit and/or EQ insurance?

What types of companies purchase profit and/or EQ insurance?										
Characteristics	Profit insurance					EQ insurance				
	Purchased		Not purchased		t-test	Purchased		Not purchased		t-test
	N	Mean	N	Mean		N	Mean	N	Mean	
Sales (million yen)	62	769,421	76	568,308		44	1,312,187	82	394,578	**
Total assets (million yen)	61	828,640	75	425,810		44	1,146,638	80	384,174	***
Interest-bearing debt/total assets	56	25%	61	20%	*	37	23%	70	21%	
Operating cash flow/sales	56	9%	61	7%	**	37	9%	70	7%	*
Capital expenditures/sales	56	6%	59	3%	***	36	4%	69	4%	
R&D expenses/sales	52	4%	50	4%		33	5%	63	3%	*
Foreign shareholders ratio	55	22%	61	15%	***	36	24%	70	15%	***
Finance and accounting department	67	34%	84	12%	***	49	37%	89	13%	***
Multiple insurance distribution channels	62	61%	73	36%	***	45	58%	72	38%	**
No. of insurance companies used	66	3.0	83	2.7		47	3.0	84	2.8	

Note: Sales and Total Assets are expressed in millions of JPY. * indicates a significance level of 10%, ** indicates 5%, *** indicates 1% indicates the significance level (test of difference in mean values of both groups)

Source: by the author

willingness to use multiple insurance distribution channels to proactively manage risk.

Because corporate insurance covers many of the risks inherent in the nature of each business, it is highly customized to each company's risk profile. As a result, the distribution channel is strongly based on a close relationship with the insurance company. For a long time after the war, the Japanese corporate insurance market has been characterized by companies purchasing insurance through insurance agencies with which the company had a close relationship: agencies within its own corporate group ("in-house agent") and/or agencies affiliated with its main banks. However, with the revision of the Insurance Industry Act in 1995, the introduction of Western-style insurance brokerage systems, etc., it is becoming possible for companies to

actively participate in the design of insurance products. So, what is the current situation?

Table 9.4 (Panel A) shows the use of distribution channels, including insurance agents and brokers, in the survey. It shows that 46% of firms deal with only one counterparty (for insurance agencies 64% of firms deal with only one counterparty). Regarding insurance brokers, 73% of respondents chose “No answer/No response,” indicating that they were likely not using insurance brokers. This suggests that even large companies were not fully using insurance brokers in Japan around 2011. So, what type of insurance distribution channels do firms use? According to Table 9.4 (Panel B), 69% of firms use insurance agents within their own group (“in-house agent”), and this trend is confirmed regardless of whether the insurance intermediary channel is single (77%) or multiple (72%). However, among those using multiple insurance distribution channels, the use of foreign agent/broker (e.g., AON, Marsh) is also increasing. This suggests that insurance distribution channels have diversified in recent years.

How many insurance companies do business with? Table 9.5 shows that about 80% of companies deal with more than one insurance company. This trend is confirmed regardless of whether the insurance intermediary channel is single or multiple. So, what are the key considerations when selecting an insurance company? Table 9.6 shows that a high percentage of companies cite ① “Capital Relationship/ Non-Insurance Business Relationship”, and ② “Long-term Insurance Business Relationship” as reasons, regardless of the number of insurance distribution channels. On the other hand, for ③ to ⑧, which are related to the attractiveness of the company’s insurance products themselves, a slightly higher percentage is confirmed for companies using multiple insurance intermediary channels, but it is also confirmed that they are low in the overall selection reasons.

The survey results indicate that, even after the 1995 amendment to the Insurance Business Act, the traditional practice of allocating shares among affiliated insurance companies may have persisted in transactions involving multiple insurers. This practice, which prioritizes insurance agencies within the same group, is based on factors such as capital relationships, business ties, and long-term transaction histories. From this perspective, even around 2011, more than 15 years after deregulation in the mid-1990s, even relatively large-listed companies may not have included corporate insurance coverage as part of their financial decisions from an overall corporate perspective, suggests that even relatively large-listed companies may not have included corporate insurance coverage as part of their financial decisions from an overall corporate perspective.

9.4.3 Survey for Fiscal Year 2021

The survey for fiscal 2021 was conducted by the author in July 2021 among risk managers of large Japanese companies with the cooperation of the Japan branch of PARIMA (Pan-Asian Risk and Insurance Management Association), Marsh Broker

Table 9.4 Use of insurance distribution channels

Use of insurance distribution channels		Panel B: Characteristics of distribution channels				
Panel A: No. of counterparties		Insurance agent (N = 154)	Insurance broker (N = 154)	Whole sample (N = 154)	No. of distribution channels	
No. of counterparties	Either/Both (N = 154)			Characteristics	Single (N = 71)	Multiple (N = 65)
1	46%	64%	17%	In-house agent (own group)	77%	72%
2	24%	13%	5%	Bank-affiliated	7%	22%
3	9%	6%	2%	Trading companies-affiliated	4%	11%
4	3%	2%	2%	Foreign agent/broker	3%	45%
5	3%	0%	1%	Independent agents/broker	4%	23%
6	2%	1%	0%	Other	1%	6%
7	1%	0%	0%			
No response/No answer	12%	14%	73%			

Source: by the author

Table 9.5 Number of insurance companies

Number of insurance companies			
No. of insurance companies	Whole sample (N = 154)	No. of distribution channels	
		Single (N = 71)	Multiple (N = 65)
1	14%	20%	6%
2	23%	27%	22%
3	20%	13%	32%
4	40%	39%	40%
N/A	3%	1%	0%

Source: by the author

Table 9.6 Selecting an insurance company: key considerations

Key considerations when selecting an insurance company			
Reasons	Whole sample (N = 154)	No. of distribution channels	
		Single (N = 71)	Multiple (N = 65)
① Capital relationship/non-insurance business relationship	67%	73%	63%
② Long-term insurance business relationship	49%	48%	55%
③ High-quality claims experience/support for the response to an accident	45%	37%	57%
④ Flexibility of insurance terms and conditions	27%	23%	32%
⑤ Insurance premium adequacy	44%	38%	49%
⑥ Financial stability of the insurance company (e.g., rating)	21%	18%	26%
⑦ Understanding of the client’s business and risk profile	34%	31%	45%
⑧ Ability to suggest a product/service	28%	20%	40%
⑨ Others	1%	0%	2%

Source: by the author

Japan, Marsh Japan, and AIG General Insurance. The survey was conducted via the Internet, and data was collected from 57 companies. Valid responses were received from 49 listed companies and 8 unlisted companies.

The characteristics of the surveyed companies are as follows: 54% of the total sample are companies with sales of over 500 billion yen, 37% are companies with sales of over 1 trillion yen, and the proportion of companies in industries such as electrical/precision, machinery, automobiles/transportation, materials/chemicals, etc. is particularly high. In addition, 40% of all companies have an overseas sales ratio of 50% or more, which is significantly higher than the average for companies listed on the Tokyo Stock Exchange.

The characteristics of the survey sample show that it consists of large, traditional manufacturing companies with a particularly high proportion of overseas sales among Japanese companies. In terms of respondent demographics, 28% of the total sample comes from the finance/accounting department, followed by 25% from human resources/administration and 21% from risk management (only about 1% in the 2011 survey). Also, when the sample is limited to companies with sales of 500 billion JPY or more, 45% of respondents are from “Finance & Accounting” departments (32% in 2011), while 7% are from “Human Resources & General Affairs” departments (35% in 2011), suggesting that “Finance & Accounting” departments may be increasingly involved in corporate insurance purchases, especially in larger companies.

Next, I examine the current situation regarding the overall risk management system: (1) how well the risk management committee functions, (2) the extent to which corporate risk management policies, rules, and manuals are systematically in place, (3) the extent to which risk managers are involved in communicating with shareholders. The risk management committee is established to centrally manage the risks of the entire company or group of companies, and in the 2021 survey, about 70% of companies have already established a committee, and more than 90% of companies with a committee meet regularly, on average 4.1 times a year (about once every three months). Regarding the formulation of risk management rules and manuals, more than 70% of companies have established risk management policies, and more than 80% of companies have formulated rules and manuals. These trends are more pronounced among large companies with sales of more than 500 billion yen.

Thus, while the formal establishment of risk management systems appears to be well advanced, it is difficult to assess whether they are actually working. The results of a survey of 50 companies that had already formulated rules and manuals also showed that 74% of the companies analyzed and assessed risks (risk identification, risk mapping, prioritization of risk management methods, etc.) and that 68% periodically reviewed the target risks (Table 9.7). However, only about 30–40% of companies have formulated corporate policies for risk quantification, risk control, and risk financing. Given that the survey is targeted at large companies, this is somewhat low. This suggests that while risk management systems are formally in place as part of enterprise-wide decision-making, they are not yet sufficiently operational in practice.

Also, I examine the extent to which risk managers are involved in communicating with shareholders. Disclosure of business risks in annual reports began in the fiscal year ended March 2004. Since the fiscal year ended March 2020, the disclosure content has been expanded to include explanations of risk management in addition to the disclosure of risks themselves. Therefore, the 2021 survey asked how involved risk managers are in the work related to business risk disclosure (Table 9.8). The results showed that less than 30% of the total respondents were “Fully involved,” and even when those who were “Somewhat involved” were included, the rate was about 50%. In theory, since the purpose of a corporate risk management/corporate insurance demand is to increase firm/shareholder value, communication with

Table 9.7 Risk management rules and manuals

Risk management rules and manuals			
Contents	Whole sample (N = 50)	By sales size (JPY)	
		More than 500 billion (N = 28)	Less than 500 billion (N = 22)
Risk analysis and assessment	74%	75%	73%
Periodic review of risks	68%	68%	68%
Risk quantification	30%	36%	23%
Risk control and risk financing	40%	46%	32%
Others	2%	4%	0%

Source: by the author

Table 9.8 Risk manager-shareholder communication

Risk manager-shareholder communication			
Degree of involvement	Whole sample (N = 50)	By sales size (JPY)	
		More than 500 billion (N = 28)	Less than 500 billion (N = 22)
Fully involved	28%	29%	27%
Somewhat involved	21%	29%	12%
Not very involved	26%	19%	35%
Not involved at all	23%	23%	23%
Not at all aware	2%	0%	4%

Source: by the author

shareholders should play an important role. However, it was confirmed that the communication between risk managers and shareholders is not necessarily sufficient in the real world.

So, is the process of purchasing corporate insurance, which has traditionally played an important role as a means of risk financing, systematically implemented as part of enterprise-wide decision-making? The need for corporate insurance is largely related to the response to risks associated with individual business activities. In some cases, it is implemented by the business units within the scope of their authority and control. Corporate demand for insurance is largely related to the response to risks associated with individual business activities. As a result, the decision to purchase corporate insurance is often made by each business unit within its authority and control, rather than from an enterprise-wide perspective. In this case, insurance management may span multiple departments, potentially leading to “partial optimization”. On the other hand, there are also cases where the responsible

Table 9.9 Decision to purchase and manage corporate insurance

Decision to purchase and manage corporate insurance					
Purchasing	Management	Whole sample (N = 50)	By sales size (JPY)		(Reference) 2011 survey (N = 155)
			More than 500 billion (N = 31)	Less than 500 billion (N = 26)	
One department	Centralized management by a single department	54%	52%	58%	54%
Multiple departments	Centralized management by a single department	16%	16%	15%	19%
Multiple departments	Management by multiple departments	30%	32%	27%	26%

Source: by the author

department manages insurance management as part of enterprise-wide decision-making, with the goal of “total optimization”.

Table 9.9 shows the results of the responses regarding the decision to purchase and manage corporate insurance in Japan. According to the results, 54% (31 companies) of all companies “Purchased by One department and Centralized management by a single department”. And, 70% (40 companies) “Centralized management”, regardless of whether it is purchased by one department or not. The term “Centralized management” refers to the unified, enterprise-wide management of insurance purchasing.

Then, who manages corporate insurance? Table 9.10 shows that among companies with “Centralized management”, The “Finance & Accounting” department has the highest proportion of responsibility at 38%, followed by the “Human Resources & General Affairs” department at 33%. Interestingly, the proportion of responsibility for “Centralized management” by the “Finance & Accounting” department is 67%, while the proportion of responsibility by the “Human Resources & General Affairs” department is only 10% in the sample of large companies (with sales of 500 billion yen or more).

In contrast, among companies with sales of less than 500 billion yen, the “Human Resources & General Affairs” department has the highest proportion of “Centralized management” at 58%, while that of the finance and accounting department is quite low at 5%. In the 2011 survey, approximately 60% of companies had centralized insurance purchasing in the “Human Resources & General Affairs” department. In recent years, however, an increasing number of companies, especially large ones, have centralized insurance purchasing in the “Finance & Accounting” department, which is responsible for enterprise-wide financial strategies. Therefore, it can be

Table 9.10 Department responsible for corporate insurance

Department responsible for corporate insurance				
Department	Whole sample (N = 40)	By sales size (JPY)		(Reference) 2011 survey (N = 114)
		More than 500 billion (N = 21)	Less than 500 billion (N = 19)	
Finance & Accounting	38%	67%	5%	29%
Human Resources & General Affairs	33%	10%	58%	57%
Corporate Planning	8%	5%	11%	4%
Risk Management	8%	10%	5%	–
Legal	8%	0%	16%	8%
Purchasing	3%	5%	0%	–
Insurance Administration	5%	5%	5%	–

Source: by the author

suggested that the decision to purchase and manage corporate insurance is shifting from the silo-type to the ERM-type, especially in large companies.

How are insurance purchasing and management decisions formalized and organized from an enterprise-wide perspective? One way to understand this is to look at the extent to which corporate insurance purchasing policies are formulated and documented. In the 2021 survey, therefore, respondents were asked ① what risks they would insure against (“Coverages and Limits”) and ② under what terms (coverage, payout limits, self-insured retention, etc.) they would insure (“Terms and Conditions”).

Table 9.11 (Panel A) presents the results of the “Coverages and Limits” responses. It shows that 18% of companies have both “Formulated and Documented” basic policies (2011 survey: 13%), while 32% have at least “Formulated” them (2011 survey: 23%). While the figures for companies with sales of less than 500 billion yen are 4% and 19%, respectively, the figures for large companies (with sales of 500 billion yen or more) are 29% and 42%.

On the other hand, Table 9.11 (Panel B) presents the results of the “Terms and Conditions” responses. It shows that 11% of companies have both “Formulated and Documented” basic policies (2011 survey: 9%), while 20% have at least “Formulated” them (2011 survey: 21%). While the figures for companies with sales of less than 500 billion yen are 4% and 12%, respectively, the figures for large companies (with sales of 500 billion yen or more) are 16% and 26%.

Thus, even compared to 10 years ago, there are still only a few large companies that have both formulated and documented basic policies. This suggests that while the decision to purchase and manage corporate insurance itself is moving toward an ERM-type decision, there are still issues in terms of ERM maturity.

Table 9.11 Formulation and documentation of corporate insurance purchases

	Whole sample (N = 57)	By sales size (JPY)		(Reference) 2011 survey (N = 156)
		More than 500 billion (N = 31)	Less than 500 billion (N = 26)	
(Panel A) Coverages and limits				
Formulated and documented	18%	29%	4%	13%
Formulated, but not systematically documented	14%	13%	15%	10%
Criteria in place, but reviewed on a case-by-case basis	33%	32%	35%	33%
No criteria	35%	26%	46%	44%
(Panel B) Terms and conditions				
Formulated and documented	11%	16%	4%	9%
Formulated, but not systematically documented	9%	10%	8%	12%
Criteria in place, but reviewed on a case-by-case basis	47%	52%	42%	35%
No criteria	33%	23%	46%	44%

Source: the author

9.5 Conclusion

As the business environment surrounding Japanese companies undergoes significant changes, the role of corporate insurance is also expected to evolve. In particular, the growing presence of institutional and foreign investors is dramatically changing the shareholder composition of traditional Japanese companies. With the ongoing corporate governance reforms, there is a growing need to integrate corporate risk management, including the purchase of insurance, into enterprise-wide decision-making, which is expected to increase as companies face greater accountability to shareholders.

In light of these changes, are Japanese companies adapting their risk management and insurance strategies? Our survey of risk managers suggests that even among large companies representative of the Japanese economy, risk management and insurance purchasing are not yet fully integrated into enterprise-wide decision-making frameworks. To address this, companies need to move away from viewing financial decision-making and insurance purchasing as separate functions. Instead, they urgently need to develop organizational structures and talent capable of understanding these areas in an integrated manner.

Meanwhile, the non-life insurance sector may also undergo a reorientation. The market for personal automobile insurance, which has been one of the largest segment since the postwar period, is now saturated. As a result, non-life insurers are under increasing pressure to redefine the role of corporate insurance within ERM frameworks that enhance shareholder value based on the specific business characteristics

of their clients. Consequently, the development of organizations and professionals who recognize the financial importance of corporate insurance purchases is becoming crucial for the non-life insurance industry. From an ERM perspective, numerous studies on corporate insurance demand provide valuable insights into positioning insurance purchases as financial decisions. Academically, there is a need to accumulate empirical research on corporate insurance demand. Looking ahead, systematically organizing risk management and insurance-related data—such as corporate insurance premiums—will be essential for advancing both research and industry practices.

9.6 Comments by Takashi Yamasaki: Current State of Demand for Corporate Insurance and Related Research Topics

9.6.1 Motivation and Objectives of the Yanase Paper

Yanase’s paper, “Enterprise Risk Management and Corporate Insurance Issues and Practice Based on Survey on Risk Managers in Japan” focuses on corporate insurance in the non-life insurance industry (hereinafter referred to as “P&C insurance”). Non-life insurance can be classified into insurance for households and insurance for businesses based on the target customers. Yanase’s paper discusses the P&C insurance industry with a focus on corporate insurance.

Originally, the Japanese non-life insurance industry emerged against the backdrop of the policy of industrial growth and economic development. In the prewar period, it developed mainly in the area of corporate insurance, such as marine insurance and fire insurance for business customers. In the postwar period, automobile insurance had become the main product of non-life insurance companies (hereafter, P&C insurers) as Japanese motorization progressed. However, in the twenty-first century, the number of vehicles owned in Japan has stopped growing due to the effects of population ageing and associated changes in social structure. Hence, the business of automobile insurance has also reached a plateau. In addition, the future of automobile insurance is uncertain due to the development of automated driving technology, and the Japanese P&C insurance industry has entered a phase of seeking new business opportunities.

Yanase argues that one of the keys to break through the current situation of the Japanese P&C insurance industry is the development of corporate insurance. Since corporate insurance has existed for the P&C insurance industry since its formative period, it has long been the focus of academic research, especially in the field of marine insurance policy clauses. On the other hand, studies focusing on insurance demand factors on the corporate side based on finance theory are relatively new, and there are only a few studies that have comprehensively surveyed the results to date.

As Yanase notes in his paper, firms are interested in having access to funding when risks materialize (risk finance), which is not necessarily achieved only by purchasing insurance. When the P&C insurance industry develops corporate insurance (or risk management services) and alternative risk finance products for the

future business, an important perspective is to elucidate the mechanism by which risk finance, including insurance, affects corporate value. Therefore, Yanase first theoretically examines the relationship between the firm's purchase of insurance and the firm value.

9.6.2 Risk Cost and Firm Value

Whether corporate insurance or risk finance increases corporate value becomes clearer when the concept of "cost of risk" is introduced. The cost of risk is a general term for costs incurred due to the presence of risks. If financial markets are imperfect, a variety of risk costs are manifested due to a variety of factors.¹ The existence of risk costs reduces a firm's expected net cash flow (NCF), thereby eroding the firm's value. Table 9.12 summarizes the main factors that the existence of risk can affect corporate value because of capital market imperfections.

Given the various conflicts arising from capital market imperfections, risk financing, including insurance, is expected to reduce the cost of risk and increase the future NCF of the firm. On the other hand, it should be noted that there are always additional costs associated with the implementation of risk management. For example, additional premiums² for insurance purchases and commissions for the purchase of derivatives are typical additional costs associated with risk management, which reduce a firm's NCF. If the risk does not exist, there is no need to implement risk management. In other words, the additional cost of risk management is considered a type of risk cost that arises from the existence of risk. Therefore, in order to maximize corporate value through risk management, it is necessary to determine the level of risk management so that the cost of risk can be minimized by determining the benefit (increase in expected NCF) and the additional cost (decrease in expected NCF) of risk management.

As mentioned in Yanase's paper, by purchasing insurance, firms can receive risk control services provided by insurance companies. The reduction in the expected loss of risk exposure due to risk control services is a feature that cannot be obtained with other risk finance methods. This point is also suggested by the fact that in the survey Yanase has conducted, many firms seek "know-how and support in dealing with accidents" as the purpose of purchasing insurance. Therefore, the further

¹Strictly speaking, market imperfection is not a necessary element for the existence of risk costs, since risk costs include the expected value of possible losses. However, the main subject of discussion in corporate finance literature mainly focuses on risk financing that deals with future uncertainty, not risk control to reduce expected losses. So I continue my discussion on risk cost without considering the issue on expected losses.

²Insurance premiums (operating premiums) presented by insurance companies consist of net premiums, which are the expected value of claim payments, and additional premiums, which correspond to expenses and profits of the insurance company. Of these, the additional premium is the additional cost of risk management (for details, see Yanase, Ishizaka, and Yamazaki (2018)).

Table 9.12 Key factors that may incur risk costs and may affect the corporate value

Original factors	Risk costs	Results
Financial distress/ bankruptcy	Direct bankruptcy costs	Fees for court proceedings; fees for bankruptcy trustees, lawyers, accountants, etc.
	Indirect bankruptcy costs	Decrease in demand for products, employee turnover, renegotiation of contracts with business partners, etc.
High leverage/ information asymmetry	Agency costs between shareholders and creditors	Asset replacement problems, Debt overhang (underinvestment problem)
Costs of issuing securities, Information asymmetry	Costs for external financing	Underinvestment problem
Management risk aversion Management compensation system Information asymmetry	Risk premium to management Agency costs between shareholders and management	High compensation for management
Progressive corporate tax	Tax cost	Expected payment increase in corporate taxes
Implementation of risk management	Additional risk management costs	Additional premiums, derivatives fees, etc.

enhancement of risk consulting services for companies is one of the directions that the corporate insurance business should pursue in the future. However, how to increase the value of insurance services is an issue for the Japanese non-life insurance industry too.

9.6.3 Implications from Yanase’s Survey Research

Yanase first provides an overview of existing empirical studies on the impact of firms’ insurance purchases on corporate value. However, due to the limited availability of data on premiums paid by firms, existing research does not have sufficient depth to examine the theoretical prediction, except in specific areas such as reinsurance business or directors and officers liability insurance (D&O insurance). If researchers want to examine the current situation, the best ways are to use historical data or to conduct survey research on companies on their own. For this reason,

Yanase carry out his own survey on corporate insurance demand targeting large Japanese firms in an effort to understand the current situation.

The survey results reveal that top management of only a very small fraction of large Japanese firms understand and systematically utilize the overall cost of risks. This seems to be especially true for insurance purchasing decisions. One of the reasons for this is that the establishment of a system to comprehensively manage corporate risk is still in its infancy. The progress of risk management systems in Japanese firms over the 10-year period between the 2011 Survey and the 2021 Survey shows some development toward a company-wide risk management system, but no major structural changes have yet occurred.

There are both internal and external problems that have prevented Japanese firms from taking a major step toward a company-wide risk management system. One internal problem is the relatively low priority given to insurance-related decisions within companies. Since insurance premiums are determined by multiplying the amount of losses to be covered by the accident rate, the amount of money involved in insurance purchasing is relatively small as a matter of decision-making. Since financial decisions are often based on the size of actual costs incurred, insurance purchasing decisions are often made at a lower level than the Chief Financial Officer (CFO). In addition, insurance contracts are highly specialized and difficult to evaluate objectively unless one is well versed in the field. For example, insurance brokers (middlemen), who stand between non-life insurance companies and companies, are expected to play a role in filling in the gaps in expertise, but the market for insurance brokers in Japan is thin, and in reality, many former employees of non-life insurance companies have been appointed as risk managers in charge of insurance purchasing.

An external problem is that there is no direct or indirect involvement of shareholders in insurance purchasing decisions. In fact, the survey results suggest that this is the case, as few firms cite “accountability to shareholders” as the purpose of purchasing non-life insurance. On the other hand, according to a survey of foreign firms in Giambona et al. (2018), more than 80% of the respondents answered that “Satisfy Shareholders’ Expectations” is important in risk management decision-making. This indicates that overseas companies are building risk management systems with shareholders in mind. In recent years, Japanese firms have also been emphasizing shareholder returns from the viewpoint of corporate governance, but it seems that they are not yet fully aware of the importance of risk financing, including insurance. This may be due to the fact that shareholders do not pay much attention to corporate risk finance, in addition to the problem on the corporate side.

9.6.4 Future of Corporate Insurance Research

On the other hand, the small number of responding firms in this survey is a serious concern. Compared to Hanaeda and Serita (2020), who also conducted a survey of CFOs on corporate financial decision-making, the number of responding firms in

their survey was 445. The number of responding firms to the survey conducted in the Yanase paper was 160 in the 2011 survey and 57 in the 2021 survey, less than half of the total. Apparently, the results of this survey are not necessarily representative of all Japanese firms. Therefore, if the survey on insurance demand of Japanese firms is to be continued in the future, it may be necessary to revise the survey method, for example, by simplifying the questions in order to obtain a higher responding rate.

However, the most important implication from the survey research is that the small number of responding firms is probably due to the fact that Japanese firms have not established a company-wide risk management structure, reflecting the fact that no one in charge is familiar with all risk costs, including premiums. As mentioned in the previous section, this is not necessarily a problem only on the corporate side, but also an issue of shareholders' perception of risk finance.

In this regard, the first thing that needs to be done is to disseminate the importance of corporate decisions on insurance purchasing to companies, investors and regulators to ensure that they fully understand the importance of such decisions. This will facilitate disclosure of the various risk cost, including premium data, which in turn will improve the published data used to validate theoretical conjectures about corporate insurance demand.

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Part V
Misallocation of Capital and Its
Macroeconomic Implications

Chapter 10

Corporate Financing in Japan: Coexistence of Zombie Firms and Zero-Leverage Firms



Yusuke Imani, Iichiro Uesugi, and Yukihiro Yasuda

Abstract This chapter investigates the connection and interaction between two types of firms: zombie firms, which have excessive debt and cannot survive without support from financial institutions, and zero-leverage firms, which have no borrowing or hold cash and deposits more than interest-bearing liabilities. The existence of both of these firms represents a distinct feature of the Japanese financial system since the 1990s. The authors first report the evolution of the ratio of zombie and zero-leverage firms to all Japanese firms. They then examine the impact of zombie firms on non-zombie firms and the relationship between zombie firms and effectively zero-leverage firms. The empirical analysis reveals that zombie firms often have a negative impact on the real economic activities of non-zombie firms and that non-zombie firms in industries with a high proportion of zombie firms tend to become effectively zero-leverage. While previous studies have examined the externalities of zombie firms, this chapter is the first to examine the effect of the zombie firms on zero-leverage firms. Based on the recent experience that government support programs during the COVID-19 pandemic focused on small- and medium-sized enterprises, the discussant Tsuruta points out that future research should examine the effect of unlisted zombie firms on non-zombie firms and the government's efficient support in the presence of the negative externalities of zombie firms.

*Some of the discussions and analyses in this chapter are based on and developed from Chapter 1 of Uesugi (2022). The unique feature of this chapter lies in its analysis of the developments of zombie firms and zero-leverage firms, using a larger database, and in its examination of the external effects of zombie firms on the real activity of both listed and unlisted firms, particularly in relation to their zero-leverage status.

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10.1 Introduction

This chapter provides an overview of the characteristics and changes in the financing of Japanese firms from the 1990s to the present. The financing environment for Japanese firms over the past 30 years has been affected by major shocks such as the collapse of the real estate and stock market bubbles, the problem of non-performing loans and the banking crisis in the 1990s, the global financial crisis, and numerous natural disasters including the Great East Japan Earthquake. It has also been influenced by long-term economic and social trends such as economic stagnation and the aging population.

In this context, it is important to understand how funds have been provided to Japanese firms through loans, bonds, and equities and what kind of investment and payout policy firms have taken while raising funds. Therefore, we first roughly overview the long-term trends in the demand for funds by all firms in Japan by measuring a savings-investment surplus. We then examine how this surplus corresponds to changes in interest-bearing debt, cash and deposits, investments and loans to other firms, dividends, and other items on the firms' balance sheet.

In addition to understanding the trends in the financing of Japanese firms, it is important to closely investigate the firms that are located at both ends of a spectrum regarding the debt dependence. Specifically, we focus on firms with extremely high and low dependence on interest-bearing debt, namely, zombie firms burdened with excessive debt and cannot survive without financial support, and effectively zero-leverage firms whose interest-bearing debt is less than their cash and deposits. We empirically analyze the proportion of zombie firms and effectively zero-leverage firms in the entire economy, their impact on the economy, and the relationship between these firms for both listed and unlisted firms.

Regarding zombie firms, their existence was first pointed out in the Japanese listed firms in the 1990s. Researchers have been concerned about the proportion of zombie firms in the whole economy and their characteristics. Further, due to the concern that zombie firms may have caused the stagnation of the Japanese economy, negative spillover effects of zombie firms on other firms have also drawn attention. After the global financial crisis that started in the fall of 2008, attention to zombie firms increased in Europe and emerging countries, and since the beginning of the COVID-19 pandemic in early 2020, large-scale business support programs were provided worldwide mainly for small- and medium-sized enterprises, which might have kept zombie firms alive in the economy. Against these backgrounds, we will examine the development in the proportion of zombie firms in the economy and the extent to which it affects the real economy through the impact on investment, employment, and productivity of non-zombie firms. We focus on both listed and unlisted Japanese firms in the analysis.

At the same time, it is noteworthy that since the 2000s, when the Japanese economy continued to stagnate, the proportion of zombie firms rather decreased until the COVID-19 pandemic. On the other hand, firms with interest-bearing debt less than or equal to their cash and deposits, so-called effectively zero-leverage

firms, have increased their presence. If the presence of these zombie firms has affected real economic activities, it is necessary to clarify how it is linked to the increase in effectively zero-leverage firms through the financing of firms other than zombies. Based on these concerns, we will also examine the extent to which the existence of zombie firms leads to the emergence of effectively zero-leverage firms among non-zombies.

The main findings in this chapter are as follows. For Japanese firms as a whole, when measuring the degree of savings-investment surplus calculated from the balance of real investment and internal funds, it has turned from investment surplus to savings surplus around the mid-1990s. And this trend has continued up to the present. As a result of this savings surplus, the interest-bearing debt ratio of the corporate sector had gradually decreased until the COVID-19 pandemic. Although financing through corporate bonds has steadily increased, it has not reversed the trend of the gradual decline in the dependence on interest-bearing debt. New stock issuance has also decreased. On the other hand, dividends, investments and loans to other firms, including investments and loans made in overseas, have steadily increased, and cash and deposits have also increased since the 2010s.

The proportion of zombie firms that are highly dependent on interest-bearing debt and have difficulty continuing their business without the support of financial institutions has been decreasing before the COVID-19 pandemic, after rising during the Japanese financial crisis from the late 1990s to the early 2000s and the global financial crisis after the fall of 2008. On the other hand, the proportion of effectively zero-leverage firms increased throughout the period.

Analyzing the impact of zombie firms on non-zombie firms, we reveal that the existence of zombie firms often has a negative impact on the real activities of non-zombie firms, such as investment, employment, and productivity. Furthermore, it is found that non-zombie firms belonging to industries with a high zombie firm ratio tend to become effectively zero-leverage, especially for relatively large unlisted firms and small listed firms.

The structure of this chapter is as follows. In Sect. 10.2, we provide an overview of the financing trends of Japanese firms using Financial Statements Statistics of Corporations by Industry (*Hojin Kigyō Tokei* in Japanese). In Sect. 10.3, we define zombie firms and effectively zero-leverage firms, and show the development of their ratios in the corporate sector. In Sect. 10.4, we focus on zombie firms, introduce the theoretical background of their existence and the previous empirical analyses, and propose empirical hypotheses. In Sect. 10.5, we explain the framework of our empirical analysis, and in Sect. 10.6, we present the results. In Sect. 10.7, we present conclusions and future issues.

10.2 Financing for Japanese Firms

When looking at the financing conditions for firms in Japan, it is important to first understand the average trends of how much real investment the firms are making and how much internal funds they have relative to their investment. If the real investment exceeds the internal funds, it is an investment surplus, and it is necessary to finance the difference (increase in interest-bearing debt, issuance of new shares, withdrawal of cash and deposits). On the other hand, if the internal funds exceed the investment, it is a savings surplus, and it is necessary to reduce the financing (repayment of interest-bearing debt, dividends and stock repurchase, increase in cash and deposits).

Therefore, we first look at the degree of investment and savings surplus in Japanese firms since the 1990s using Financial Statements Statistics of Corporations by Industry (hereafter FSSCI). Next, using FSSCI and other data, we confirm how the corporate sector responds in the balance sheet according to the investment and savings surplus. In particular, we focus on how the dependence on interest-bearing debt, such as loans from financial institutions and corporate bonds, has changed.¹

10.2.1 Development of Investment and Savings Surplus

First, we calculate the internal funds held by firms and the real investment they make from the balance sheet information of the corporate sector in Japan and overview the development of the savings surplus. Specifically, based on the method shown by Nakamura (2017), we use the FSSCI to compare internal funds and real investment. Internal funds and real investment are defined as follows.

$$\begin{aligned} \text{Internal Funds} &= \text{Current Net Income} - \text{Extraordinary Income} + \text{Extraordinary} \\ &\quad \text{Loss} + \text{Depreciation Expenses} - \text{Increase in Required Working Capital} \\ \text{Real investment} &= \Delta (\text{Tangible fixed assets (land and other tangible fixed} \\ &\quad \text{assets)} + \text{Intangible fixed assets}) + \text{Depreciation expenses} \end{aligned}$$

Figure 10.1 shows whether Japanese firms as a whole are in excess investment or in excess savings from fiscal year 1990 to fiscal year 2020. The internal funds and real investment are each divided by the total assets at the end of the previous year, and the internal funds are represented by a bar graph extending upward, real investment by a bar graph extending downward, and a line graph represents the difference between the two. Looking at the bar graph, internal funds are between 2% and 6% of total assets every fiscal year, and the level is gradually rising with fluctuations. Real investment exceeded 6% of total assets in the early 1990s, while it rapidly decreased and has stayed at the low level since then.

¹For changes in the degree of savings surplus and dependence on borrowing in Japanese firms, see Usugi (2022), which provides an overview of trends from the 1980s to fiscal 2019.



Fig. 10.1 Development of savings investment difference/total assets in FSSCI. (Source: Calculated by the author based on Annual FSSCI which is reported by the Ministry of Finance (MOF))

Looking at the line graph in the same figure, the corporate sector was initially in excess investment, and in the fiscal year 1990, the real investment ratio significantly exceeded the internal fund ratio by -3.8 percentage points. However, reflecting the rapid decrease in real investment due to the collapse of the bubble, the degree of excess investment substantially shrank. With the increase in internal funds, the excess investment turned into excess savings in fiscal year 1996. The subsequent excess savings margin expanded to about 2% in the 2000s and has been stable since then. Even in fiscal year 2020, when the economy was affected by the COVID-19 pandemic, there was no substantial decline in the excess savings margin.

10.2.2 *Changes in the Balance Sheet of Japanese Firms Corresponding to Excess Savings*

Excess savings in the corporate sector are adjusted by changes in other items in the balance sheet. Changes in the balance sheet in the direction of absorbing excess savings include a decrease in interest-bearing debt, such as borrowings from financial institutions and corporate bonds, dividends, an increase in cash and deposits, and an increase in investments and loans to other firms. All of these do not need to occur concurrently. For example, even under excess savings, borrowings may increase. If

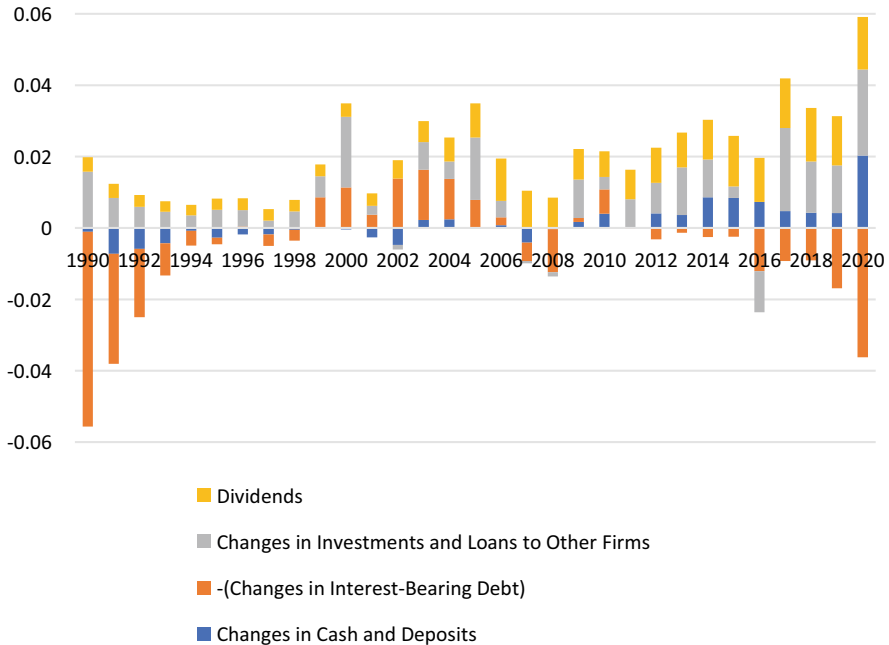


Fig. 10.2 Changes in the balance sheet corresponding to excess savings investment in FSSCI. (Source: The authors' calculation based on the Annual FSSCI)

so, however, either one or all of the other three items, cash and deposits, dividends, or investments and loans to other firms should increase.

We observe these changes using the same statistics of FSSCI as in Fig. 10.1. As items to adjust excess savings or excess investment, we focus on changes in interest-bearing debt, changes in cash and deposits, changes in investments and loans to other companies, and dividends and observe their development in Fig. 10.2. In the early 1990s, when there was excess investment, interest-bearing debt increased substantially, as did investments and loans to other firms, while cash and deposits decreased. The share of dividends was small.

After the mid-1990s, when the corporate sector turned into excess savings, we observe that the extent of an increase in interest-bearing debt gradually shrank before starting to decrease. There was almost no change in cash and deposits, and the extent of an increase in investments and loans also diminished. The decrease in interest-bearing debt continued until the global financial crisis occurred in 2008. On the other hand, the share of dividends gradually increased after the 2000s.

In the 2010s, interest-bearing debt started to increase rather than decrease, and its extent gradually widened in the latter half of the decade. Note that in fiscal 2020, when firms rushed to obtain funds to deal with economic uncertainties during the COVID-19 pandemic, the increase in interest-bearing debt was comparable to that in the early 1990s. Also, the increase in cash and deposits in fiscal 2020, which

followed a gradual increase in the 2010s, was particularly large, reaching 2% of total assets.² Economic fluctuations did not substantially affect the amount of dividend which steadily increased over time. In a similar manner, the extent of an increase in investments and loans to other firms also expanded.³

10.2.3 Declining Dependence on Interest-Bearing Debt (Borrowings + Corporate Bonds)

Next, we focus on the trend of interest-bearing debt, which is the most important means of financing, among the other items in the balance sheet.⁴ In Fig. 10.3, we use FSSCI and examine changes in the dependence on interest-bearing debt, which consists of corporate bonds, borrowings from financial institutions, and other borrowings, from 1990 to 2020, when the COVID-19 pandemic hit the economy. The dependence gradually increased until the late 1990s followed by a decline since then. The dependence temporarily rose to some extent during the global financial crisis

²The increase in cash and deposit holdings during a crisis is thought to be mainly due to precautionary motives. Since Pinkowitz and Williamson (2001) showed that firms hold a lot of cash and deposits due to the presence of financial institutions with strong bargaining power, many studies have focused on the impact of firm-bank relationships. Nakajima and Sasaki (2016) focus on the phenomenon of Japanese firm's cash and deposit ratios rising again since the 2010s, and show that firms with access to the bond market hold more cash and deposits for precautionary motives for future investment needs, while firms that depend on banks for financing may hold cash and deposits to maintain good relationships with financial institutions. Sasaki and Suzuki (2019) demonstrated that, among listed firms, those whose financial institutions are in poor condition are increasing their cash and deposits, indicating that the soundness of the financial institution is more important than its bargaining power as a determinant of a firm's cash and deposit holdings. Shikimi (2019) pointed out that in emerging markets, companies with close relationships with financial institutions tend to hold less cash and deposits, while smaller firms with close relationships with financial institutions tend to hold more, suggesting the possibility of a hold-up by financial institutions.

³Regarding the dividend policy of Japanese firms, Hanaeda and Serita (2008) conducted a survey for firms on the issues of corporate finance including their own share repurchases. They showed that the amount of the payouts is stable, which is consistent with the results we obtain here. More specifically, they found that dividends respond not to temporary profit fluctuations but to the expected growth in the long-term profits. They also found that dividend decisions are made independently of investment decisions and that there is a very strong preference among firms to avoid reductions in dividends. Suzuki (2020) showed that the proportion of listed firms paying dividends has been increasing, albeit with fluctuations, since 2000.

⁴Regarding equities, a source of financing other than debt, Suzuki (2020) used data on the amount of equity finance and the total amount of own share repurchases to show that the dependence on equity in the financing of listed firms is decreasing. While the amount of total equity finance in Japan exceeded 5 trillion yen every year during the period from 2003 to 2006, it fell to 1.7 trillion yen in 2019. On the other hand, the amount of firms' own share repurchase, which had been declining until 2013 after the global financial crisis, turned to increase, reaching a record high of 6.75 trillion yen in 2019.

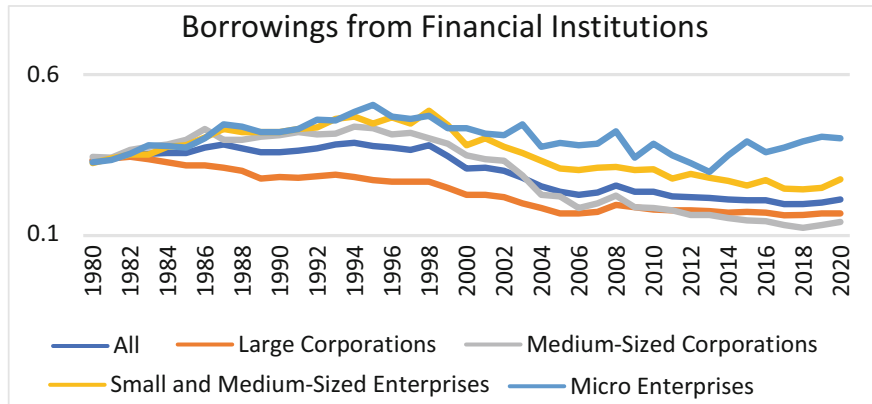
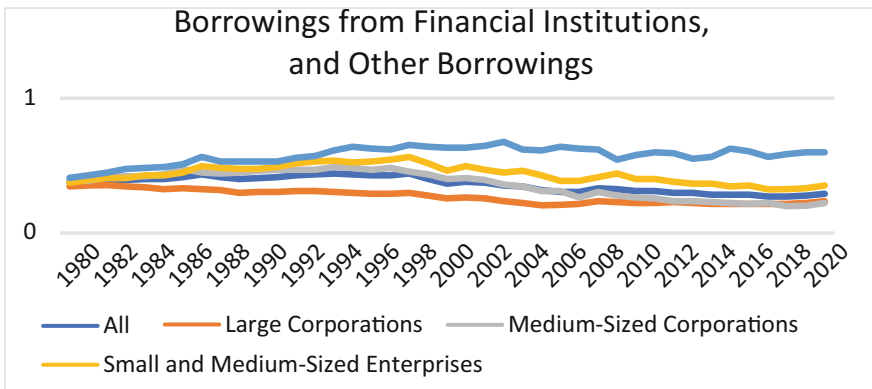
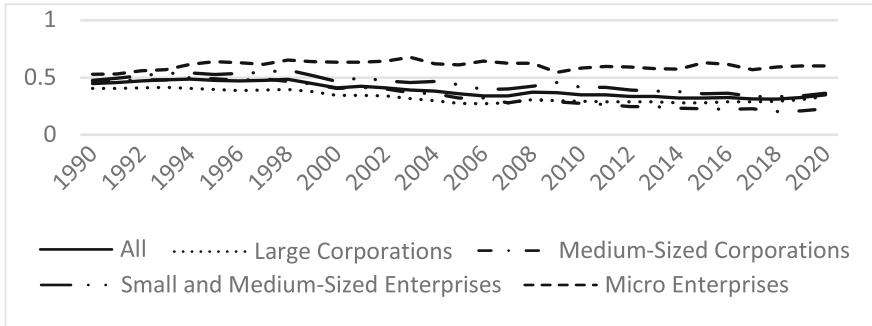


Fig. 10.3 Development of interest-bearing debt/total assets in FSSCI. (Note: Interest-bearing debt consists of borrowings from financial institutions, other borrowings, and corporate bonds. Large corporations have a capital of 10 billion yen or more, medium-sized corporations have 100 million to 1 billion yen, small- and medium-sized enterprises have 10 million to 100 million yen, and micro enterprises have less than 10 million yen. Source: The authors’ calculation based on the FSSCI)

after the fall of 2008 and the COVID-19 pandemic, but they have not changed the overall trend.⁵

Furthermore, when we look at the development by firm size, the difference in the dependence on interest-bearing debt between firms of different sizes has become more sizable. The margin of difference between the most dependent firm size and the least dependent firm size was only about 15 percentage points in fiscal 1990, while it was almost 40 percentage points in fiscal 2020. Specifically, for large firms the dependence remained almost the same until the late 1990s, followed by a constant decline until the global financial crisis. After the crisis, it has turned into a gradual increase. The development has been affected by a series of financial deregulations or liberalization in Japan. The deregulation in corporate financing induced large firms to shift their funding sources to the bond and equity markets, resulting in a significant decrease in dependence on bank borrowing and an increase in dependence on corporate bonds. The annual new issuance amount of ordinary bonds remained below 6 trillion yen in fiscal 2004 but has increased with fluctuations since then, reaching just under 15 trillion yen in fiscal 2021.⁶ On the other hand, for small and medium enterprises, the dependence on interest-bearing debt increased until the late 1990s and has declined overall until recently. For small firms, the dependence has remained high since the late 1990s.

10.3 Zombie Firms and Zero-Leverage Firms

In the previous section we overviewed the development of the interest-bearing debt ratio for average Japanese firms. What is also important is the heterogeneity among firms of the same size. Even as the average interest-bearing debt ratio decreases, some firms are with excessively high debt ratios and in negative net worth, while some other firms have cash and deposits more than interest-bearing debt. When adverse shocks such as economic downturns hit the economy, firms that are heavily dependent on debt may face a discontinuous impact in the form of corporate

⁵It is notable that the dependence on interest-bearing debt continues to decrease in Fig. 10.3 despite the increase in interest-bearing debt balance since the mid-2010s as shown in Fig. 10.2. This is due to the fact that the increase in total assets for firms in Japan is larger than the increase in interest-bearing debt for these firms.

⁶Please refer to the annual report on the issuance amount of straight corporate bonds by the Japan Securities Dealers Association.

bankruptcies or closures. On the other hand, firms with excessively low debt ratios for reasons that cannot be explained by economic theories may react differently to changes in the economic environment.⁷

In what follows, we focus on zombie firms, which face difficulties in continuing their businesses without support from financial institutions, as firms with excess debt. On the other hand, we focus on firms that are considered to have effectively zero leverage, with current assets such as cash and deposits exceeding interest-bearing debt. We first explain about the criteria for identifying zombie firms and effectively zero-leverage firms and then calculate the shares of these firms in the firm sector.

10.3.1 Identification of Zombie Firms

The definition of a zombie firm is a firm that would find it difficult to continue its business without support from financial institutions. Caballero, Hoshi, and Kashyap (2008), Fukuda and Nakamura (2011), and Nakamura and Fukuda (2013) have established specific criteria based on this definition to identify zombie firms and calculate their share in the entire firm sector.

Caballero, Hoshi, and Kashyap (2008) define zombie firms using only the criterion of whether they receive support from financial institutions (hereinafter the CHK criteria). They calculate the minimum lending interest rate $R_{i,t}^*$ for the highest quality borrowers, and consider firms that borrow at an interest rate below this level to be zombie firms, as they are thought to receive subsidies from banks in the form of interest rate reductions. $R_{i,t}^*$ is defined as:

$$R_{i,t}^* = r_{t-1}BS_{i,t-1} + rl_{prime,t-1}BL_{i,t-1} + cb_{min,t-1}Bonds_{i,t-1}, \quad (10.1)$$

where r_{t-1} is the annualized short-term prime rate, $BS_{i,t-1}$ is the amount of short-term borrowing at the end of the fiscal year $t-1$, $rl_{prime,t-1}$ is the average long-term prime rate over the past five years, $BL_{i,t-1}$ is the sum of long-term borrowing and long-term borrowing to be repaid within one year at the end of the fiscal year $t-1$, $cb_{min,t-1}$ is the minimum coupon rate of convertible bonds (excluding zero-coupon bonds) over the past five years. $Bonds_{i,t-1}$ is the total of corporate bonds, convertible bonds, and corporate bonds and convertible bonds to be redeemed within one year at the end of the fiscal year $t-1$.⁸ If the actual interest payment for firm i is below the $R_{i,t}^*$ calculated by Eq. (10.1), the firm is considered to be a zombie firm.

⁷The reason for focusing on both zombie firms and zero-leverage firms follows Uesugi (2022). In addition, a novelty of analysis in this section is that large-scale databases are used to comprehensively examine the ratio of zombie firms and zero-leverage firms both for listed and unlisted firms.

⁸There are some observations with missing values for variables such as short-term borrowings, long-term borrowings, and corporate bonds. There are possibly two reasons: the balance is zero or

On the other hand, Fukuda and Nakamura (2011) and Nakamura and Fukuda (2013) point out that the presence of support from financial institutions alone may not accurately identify zombie firms due to the two types of errors. There is a possibility of errors where firms that are paying lower interest rates because of good performance are considered as zombie firms even though they are not. There is also a possibility of errors in which firms that pay higher interest rates because of poor performance are not considered zombies.

In order to avoid these errors, Fukuda and Nakamura (2011) and Nakamura and Fukuda (2013) attempted to correct for the error of healthy firms being considered zombies and the error of firms with poor performance being regarded as non-zombies by adding conditions to the CHK criteria. First, Nakamura and Fukuda (2013) exclude firms whose EBIT, earnings before interests and taxes, exceeds the minimum lending interest rate $R_{i,t}^*$ from the pool of zombie firms. They also exclude firms whose interest-bearing debt (including lease liabilities) is less than 20% of total assets. Secondly, Nakamura and Fukuda (2013) choose firms that satisfy the following three conditions: their EBIT falls below the minimum lending interest rate $R_{i,t}^*$, interest-bearing debt (including lease liabilities) exceeds 20% of total assets, and the growth rate of borrowings is positive. We define firms that meet either of these two conditions as zombie firms based on the Fukuda-Nakamura criteria (hereinafter the FN criteria).

Which of the CHK and FN criteria can accurately represent the zombie firm ratio for the entire period of our analysis? Uesugi et al. (2022a) make the case for the FN zombie ratio for the following two reasons. First, under the recent situation where lending with the interest rate below the prime rate has become common, the CHK criteria, which is based solely on the comparison of interest payments and minimum borrowing interest payments, is prone to mistakenly identifying good firms as zombie firms. Second, Uesugi et al. (2022a) refer to the result of a firm survey which identified firms with modified loan conditions. They find that firms that have modified their loan conditions are more likely to be zombie firms defined by the FN criteria than to be those defined by the CHK criteria. Hence, they state that zombie ratio based on the FN criteria is more in line with the original idea of zombie firms than the zombie ratio based on the CHK criteria at least in recent years. Following their argument, we will primarily use the FN criteria for the identification of zombie firms.

too small to be reported, or firms do not disclose the balance. In the analysis of this chapter, all these missing values are replaced with zero, so there is a potential downward bias for $R_{i,t}^*$ and the zombie ratio. However, the use of the FN criterion adopted in this chapter, which impose additional conditions such as the growth rate of borrowings and the dependence on liabilities in addition to the comparison of the minimum lending interest payment and the actual interest payment, may reduce the degree of bias for the zombie ratio.

10.3.2 Identification of Zero-Leverage Firms

The term “zero-leverage firm” refers to a situation where there is no outstanding debt in the balance sheet. Or it refers to a situation where a firm’s cash and deposit balance exceeds that of outstanding debt, in which case the firm can effectively repay the debt. In this subsection, we focus on effectively zero-leverage firms where the cash and deposits – (long-term liabilities + short-term liabilities) are positive. We also examine the evolution of the ratio of zero-leverage firms where the total balance of long-term and short-term liabilities is zero.

10.3.3 Development of Zombie Firm Ratio and Zero-Leverage Firm Ratio

First, we show the development of the zombie firm ratio based on the FN criterion, the effectively zero-leverage firm ratio, and the zero-leverage firm ratio for listed and unlisted firms. Panel A of Fig. 10.4 focuses on listed firms from fiscal 1991 to 2019, and Panel B focuses on unlisted firms from fiscal 2002 to 2018.

The zombie firm ratio for listed firms in the 1990s was high, and it was the highest in fiscal 1999 when the non-performing loan problem was severe. The ratio of effectively zero-leverage firms had been stable at around 25%, while that of zero-leverage firms had started to increase by the end of the decade. This could be due to the repayment of borrowings by some firms whose cash and deposits exceeded their loan amount outstanding.

In the 2000s up until the global financial crisis, there were concurrently a decline in the zombie ratio and an increase in the effectively zero-leverage ratio and the zero-leverage ratio. The changes in these ratios from fiscal 1999 to fiscal 2007 were –17 percentage points, +14 percentage points, and + 11 percentage points, respectively. After the zombie firm ratio resurged during the global financial crisis, there was again a decline in the zombie firm ratio and a gradual increase in the effectively zero-leverage firm ratio and the zero-leverage ratio until the COVID-19 pandemic.

The zombie ratio for unlisted firms after the 2000s was constantly higher than listed firms but stable until the global financial crisis. It then substantially increased during the crisis followed by a gradual decrease. The effectively zero-leverage firm ratio increased consistently throughout the period, while the extent of an increase in the zero-leverage firm ratio was relatively small.

Based on the observation of a simultaneous decline in the zombie ratio and an increase in the effectively zero-leverage ratio, we might speculate that firms that have escaped from the zombie status immediately became effectively zero leverage. Therefore, it may be important to examine how firms escaped from the zombie status for the purpose of understanding the determinants of zero leverage. To get a clue about this point, we compute a transition matrix of unlisted firms’ zombie and zero-

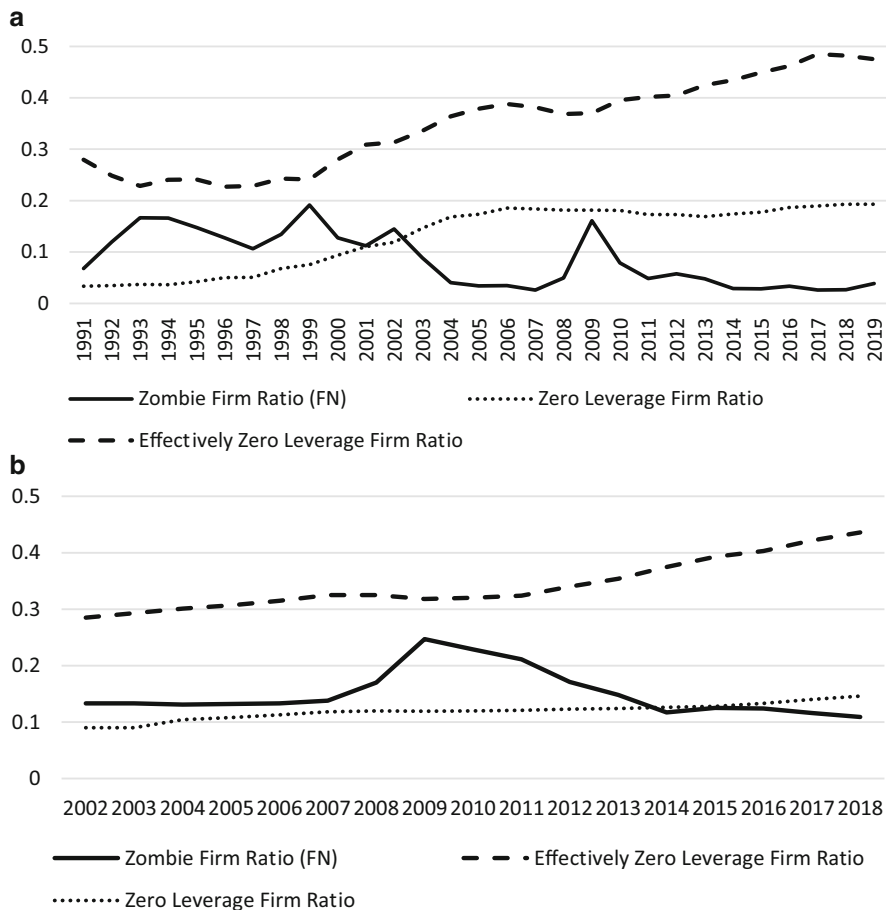


Fig. 10.4 Zombie firm ratio, effectively zero-leverage firm ratio, and zero-leverage firm ratio. (Source: Panel A: Calculated by the authors based on Nikkei NEEDS Financial QUEST. Panel B: Calculated by the authors based on Teikoku Databank COSMOS1)

leverage status between two periods 2002–2004 and 2016–2018. Table 10.1 shows the results.

There are four statuses of firms: zombie with effectively positive leverage, zombie with effectively zero leverage, non-zombie with effectively positive leverage, and non-zombie with effectively zero leverage.⁹ Among the zombie and not

⁹Conceptually, a firm can become zombie at the same time it is effectively zero leveraged as long as it simultaneously satisfies the criteria for zombie firms and for effectively zero-leveraged firms. However, considering the original definition of a zombie firm being the one that would have difficulty surviving without the support of financial institutions, it is hard to allow the presence of zombie firms that are not dependent on debts. Further, the share of such firms in the sample is less than 1%. Hence, we omit these firms from Table 10.1 and as a result, the sums of the shares of each rows and columns do not add up to 100%.

Table 10.1 Transition matrix of unlisted zombie firms and effectively zero-leverage firms

2002–04\2016–18	Zombie & non-effectively zero leverage	Non-zombie & non-effectively zero leverage	Non-zombie & effectively zero leverage	Total	
Zombie & non-effectively zero leverage	1722	5654	2951	10,425	11.1%
	16.5%	54.2%	28.3%	100.0%	
Non-zombie & non-effectively zero leverage	5146	30,375	17,757	53,644	57.1%
	9.6%	56.6%	33.1%	100.0%	
Non-zombie & effectively zero leverage	1277	5072	22,406	29,149	31.0%
	4.4%	17.4%	76.9%	100.0%	
Total	8227	41,314	43,580	94,019	
	8.8%	43.9%	46.4%	100.0%	

Note: There are also firms that are zombies and with effectively zero leverage. We omit these firms from the table because they are only less than 1% in the data. As a result, total sum of the elements presented in the table is not equal to 100%

effectively zero-leverage firms at the beginning of the analysis period, only a relatively smaller fraction (17%) of them continued to be in the same status in the end period, while a larger fraction (28%) became non-zombies and effectively zero leverage. Looking at this alone, it seems important to focus on the firms that transformed from zombies to effectively zero leveraged as the major subjects for a careful analysis.

However, in reality, most firms with zero leverage at the end of the period are already non-zombie firms at the beginning. In fact, the number of firms that were zombies at the initial stage but later became effectively zero leverage is only about 3000, while the number of firms that were initially non-zombies and became effectively zero leverage in the end exceeds 40,000. Considering these numbers, it seems quantitatively more important to investigate how non-zombie firms became zero leveraged rather than to examine how zombie firms transformed their status to effectively zero leveraged.

Considering these points, in the next section we will focus on non-zombie firms rather than zombies and examine how the presence of zombie firms affects the behavior of these non-zombies.

10.4 Previous Studies and Hypotheses on Zombie Firms and Zero-Leverage Firms

In this section, after reviewing previous studies on zombie firms and zombie lending and the studies on the determinants of zero-leverage status, we set the empirical hypotheses on the relationship between the zombie and the zero-leverage status.

10.4.1 Previous Studies on Zombie Firms

The first wave of studies on zombie firms and zombie lending focused on bank lending to listed firms in Japan through the 1990s to the early 2000s, when the collapse of asset price bubbles led to the problem of massive non-performing loans. The most seminal study to date is the study by Caballero, Hoshi, and Kashyap (2008), which identified zombie firms and examined their impact on the whole Japanese economy up to the early 2000s. Since then, the focus of the studies on zombie firms has shifted to include Europe, where the sovereign debt crisis following the global financial crisis emerged, and emerging economies such as China.¹⁰

Especially, since the start of the COVID-19 pandemic in 2020, there has been a growing interest in the zombie firms that faced substantial adverse impact under the pandemic but were able to survive thanks to the support not only from financial institutions but also from the government through generous business support measures such as loans, subsidies, and grants.

There are many empirical analyses on zombie firms with a variety of research topics including lending to zombie firms by financial institutions (Peek and Rosengren 2005; Acharya et al. 2021; Chopra et al. 2021; Li and Ponticelli 2022), the behavior of zombie firms themselves after becoming zombies (Fukuda and Nakamura 2011; Acharya et al. 2019), and the spillover effects of zombie firms on non-zombie firms (Caballero et al. 2008; Acharya et al. 2019; Acharya et al. 2022; Schivardi et al. 2022).

¹⁰In relation to the discussion on zombie firms, there is a discussion on zombie lending by financial institutions. There is a study (Kobayashi et al. 2002) that introduces the discussion of Berglöf and Roland (1997) and states that under the situation where the liquidation value of a firm decreases, a lending financial institution has an incentive to make additional loans to firms with poor performance. Subsequently, there are studies such as Bruche and Llobet (2014), Bhattacharya and Nyborg (2013), which focus on the soundness of banks, usually measured by the capital adequacy ratios, and present a theoretical model that financial institutions with lower soundness continue zombie lending to avoid loss recognition of bad loans to low-quality borrower firms.

10.4.2 Previous Studies on Zero-Leverage Firms

Research on zero-leverage firms began with the seminal study of Strebulaev and Yang (2013), who focused on listed firms in the United States. Subsequently, many studies have focused on various countries, including Japan, to understand the proportion of zero-leverage firms in the overall economy (Strebulaev and Yang 2013; Bessler et al. 2013; El Ghouli et al. 2018; Khoo and Durand 2017; Takami 2013; Miwa 2011; Tsuruta 2016; The Small and Medium Enterprise Agency 2016; Sakai and Uesugi 2021). Furthermore, analyses have been conducted on the determinants of zero-leverage firms (Strebulaev and Yang 2013; Devos et al. 2012; Bessler et al. 2013; El Ghouli et al. 2018; Takami 2013; Tsuruta 2016; Cuong et al. 2021).

10.4.3 Hypothesis Regarding the Spillover Effects of Zombie Firms

In this chapter, based on the content of previous studies, we examine the spillover effects that the existence of zombie firms has on non-zombie firms. In doing so, we will use the methods of Caballero, Hoshi, and Kashyap (2008), Acharya et al. (2019), and Acharya et al. (2022) to analyze the impact of the zombie firm ratio in an industry on the behavior of non-zombie firms. These studies argue that preserving zombie firms with financial support has a negative external effect on the economic activities of healthy non-zombie firms through the distorted competition. Excessive competition due to the presence of many zombie firms in the same industry reduces the investment and employment by non-zombie firms. From these discussions, it is expected that the higher the zombie firm ratio in an industry, the more the investment and employment of non-zombie firms in the industry will be suppressed.

The existence of zombie firms also affects the productivity of other firms. Zombie firms that should have exited continue to exist while receiving subsidies, resulting in excessive competition. Hence, only firms that can endure this competition and generate profits are able to remain in the market. This requires the productivity of incumbent non-zombie firms in industries heavily populated with zombies to be higher than the productivity in industries without zombies. This holds true not only for existing non-zombie firms but also for new entrant non-zombies. We may infer from here that the productivity of non-zombie firms is rather high in the industry where zombie firms are heavily populated. This is a unique point about the zombie hypothesis.

Alternatively, one may consider the opposite in the relationship between firm behavior and productivity and the density of zombie firms. Non-zombie firms may consider an environment with many low-quality and low-profitability zombies as having a competitive advantage. In this case, non-zombie firms may actively invest and increase employment, contrary to the predictions by Caballero, Hoshi, and

Kashyap (2008). As a result, the amount of investment and employment for non-zombie firms may be larger in industries with many zombie firms than in those with few zombies. Regarding the productivity, for healthy non-zombie firms, an environment of large number of zombie firms implies that their competitors are unproductive. Therefore, even non-zombie firms with low productivity are able to survive in the market.¹¹

From the above discussions, it is possible that the existence of zombie firms can have opposite spillover effects on non-zombie firms, so it is necessary to empirically test which of the predicted mechanisms is compatible with the reality. Therefore, we posit the following hypotheses for the capital investment, employment, and productivity:

Hypothesis 1-1: The higher the ratio of zombie firms, the less (more) investment by non-zombie firms in the same industry.

Hypothesis 1-2: The higher the ratio of zombie firms, the less (more) employment by non-zombie firms in the same industry.

Hypothesis 1-3: The higher the ratio of zombie firms, the higher (lower) the productivity of non-zombie firms in the same industry.

The ratio of zombie firms in the corporate sector was on an upward trend in the late 1990s to the early 2000s and during the global financial crisis and the current COVID-19 pandemic. On the other hand, the zombie firm ratio tended to decline slowly during other periods. During periods when the ratio of zombie firms decreased, the proportion of effectively zero-leverage firms, where cash and deposits exceed borrowings, increased.

Considering the above Hypothesis 1-1 and Hypothesis 1-2, the higher the ratio of zombie firms, the more excessive competition becomes, suppressing the growth of investment and employment of non-zombie firms and reducing the demand for funds. Furthermore, firms that have suppressed investment and employment growth due to congestion effects may increase their cash and deposit holdings due to increased uncertainty. Also, as Fukuda and Nakamura (2011) found, firms that have become non-zombies because of restructuring may continue to reduce their liabilities, increasing the tendency to become effectively zero leverage.

However, if non-zombie firms can gain a competitive advantage over low-quality zombie firms, non-zombie firms may instead actively invest and employ, increasing the demand for funds from these firms and potentially reducing the proportion of effectively zero-leverage firms. Alternatively, in industries with many zombie firms, productivity may be inherently low, and more borrowings may be needed to maintain cash flow, making it difficult for firms to become effectively zero leverage, regardless of whether they are zombies or non-zombies.

Whether any of the above tendencies can be observed is an empirical issue, so we set the following hypothesis:

¹¹Hoshi and Kashyap (2013) suggest that non-zombie firms, which have a competitive advantage over zombie firms, may engage in proactive investment and employment activities.

Hypothesis 2: The higher the ratio of zombie firms, the higher (lower) the likelihood of non-zombie firms in the same industry becoming effectively zero leverage.

10.5 Empirical Approach

10.5.1 Data

The subject for analysis in this chapter are listed firms in the first and second sections of the Tokyo Stock Exchange and unlisted firms, which are mostly small- and medium-sized enterprises. Financial data is based on unconsolidated financial data, with listed firms sourced from Nikkei NEEDS Financial QUEST, and unlisted firms recorded in the COSMOS1 database of Teikoku Databank.¹² The sample period for the analysis is from fiscal 2002 to 2018 for both listed and unlisted firms, in line with the range of data available for unlisted firms. Firms belonging to the banking, securities, insurance, and other financial sectors in the Nikkei medium classification are excluded from the analysis. Also, unlisted firms with sales or tangible fixed assets being less than 1000 yen are excluded.

10.5.2 Empirical Model

We formulate a model to estimate the effect of the existence of zombie firms within an industry on the real activities of non-zombie firms, following Caballero, Hoshi, and Kashyap (2008). That is, we analyze the behavior and performance of firm i in industry j in year t , based on firm-year level panel data, and estimate the following two equations:

$$Y_{ijt} = \beta_1 \text{nonz}_{ijt} + \beta_2 Z_{jt} + \beta_3 \text{nonz}_{ijt} \times Z_{jt} + \beta_4 D_t + \beta_5 D_j + \varepsilon_{ijt} \quad (10.2)$$

$$Y_{ijt} = \beta_1 \text{nonz}_{ijt} + \beta_3 \text{nonz}_{ijt} \times Z_{jt} + \beta_4 D_{jt} + \varepsilon_{ijt} \quad (10.3)$$

The dependent variable Y_{ijt} uses I/K (investment ratio of business assets, hereafter referred to as the investment rate), d_Ln_E (employment change rate), and $Ln_Sales - 2/3Ln_E - 1/3Ln_K$ (productivity), similar to Caballero, Hoshi, and Kashyap (2008). The investment amount I is the difference from the previous fiscal year of the amount of business assets, which is the sum of tangible and intangible fixed assets, with the depreciation expense being added back. K , which is used for

¹²For observations with a fiscal period of less than 12 months, we exclude them without making necessary adjustments in financial statement variables.

standardization, is the value of business assets in the previous fiscal year. The employment change rate d_Ln_E is the difference from the previous fiscal year of the natural logarithm of the number of employees at the end of the year. The proxy for productivity, $Ln_Sales - 2/3Ln_E - 1/3Ln_K$, is the value obtained by subtracting the natural logarithm of the number of employees at the end of the period $\times 2/3$ and the natural logarithm of tangible fixed assets $\times 1/3$ from the natural logarithm of sales.

Furthermore, we use the variables *zero_leverage* and *zero_leverage_ratio* to understand the extent to which the existence of zombie firms affect the financing of non-zombie firms. The former is a dummy variable that is 1 if the value obtained by subtracting the total of long-term liabilities and short-term liabilities from cash and deposits is positive, and 0 otherwise, representing an effectively zero-leverage status. The latter is the ratio of cash and deposits – (long-term liabilities + short-term liabilities) to total assets, indicating the degree to which it is effectively zero leverage.

As for the explanatory variables, $nonz_{ijt}$ is a dummy variable which takes the value of 1 if identified as a non-zombie firm based on the FN criteria, and 0 if identified as a zombie firm. Z_{jt} is the ratio of zombie firms in the industry to which the firm belongs, weighted by the amount of firms' assets. In other words, it is the ratio of the total assets of zombie firms in each industry to the total assets of all firms belonging to that industry.

In the analysis, as mentioned earlier, we split the sample into listed firms and unlisted firms, but for Z_{jt} in both samples we use the ratio of zombie firms among listed firms. We assume that the degree of influence of zombie firms that have a spillover effect on non-zombie firms is appropriately represented by the ratio of listed zombie firms, which are large in size.¹³

Based on the hypothesis in the previous section, the external effects of zombie firms are measured by the coefficient β_3 on the interaction term of the above equation. For example, if this coefficient is negative (positive) and statistically significant, it suggests that the existence of zombie firms has a negative (positive) external effect on non-zombie firms.¹⁴

¹³It is possible that competitors for unlisted SMEs are other SMEs but not listed firms and that the presence of listed zombie firms should have little impact on the behavior of unlisted firms. Imani, Uesugi, and Yasuda (2023), who provide additional empirical evidence to that presented in this chapter, find that in industries where SMEs tend to regard large firms as competitors, the spillover effect of listed zombie firms is more sizable.

¹⁴Schivardi, Sette, and Tabellini (2020) showed that when distinguishing between non-zombie and zombie firms based on firm performance, if the distribution of performance is symmetrical, the extent to which non-zombies outperform zombies mechanically decreases as the zombie firm ratio increases. The more similar the performance variable used to identify zombies and the variable used to measure post-performance, the more likely β_3 will automatically become negative. However, footnote 24 of Caballero, Hoshi, and Kashyap (2008) stated that the concern that the coefficient will mechanically become negative is small, citing that the results of similar analysis in the United States were not significant. Schivardi, Sette, and Tabellini (2022) used variables such as the lending share by banks with low soundness instead of the zombie firm ratio to alleviate this problem. On the other hand, Acharya et al. (2022), who comprehensively examined the external effects of zombie firms, continue to use Eq. (10.3) that includes the zombie firm ratio.

D_t , D_j , D_{jt} represent Year dummies, Industry dummies, and Industry×Year dummies, respectively. By including the fixed effects of industry×year, it is possible to control for shocks such as demand fluctuations over time specific to the industry. However, it should be noted that in this case, it is not possible to include Z_{jt} in the estimation.

For the test of Hypothesis 1, we add sales growth rate *salesgrowth* as a control variable not included in Eqs. (10.2) and (10.3) based on the previous research that employed the variable for a proxy for the firm's growth opportunities. For the test of Hypothesis 2, we add not only *salesgrowth*, but also variables often used in the analysis of the determinants of a firm's zero-leverage status as control variables. Specifically, these are ROA, tangible fixed asset ratio, and price-to-book ratio (for listed firms only).

Considering the distribution of descriptive statistics for the sample of listed firms, we perform winsorization at 5% for investment *I/K*, 1% for other dependent variables, and 1% for *salesgrowth* to remove the influence of outliers. On the other hand, for unlisted firms, we perform winsorization at 2.5% for the investment rate *I/K*, and 1% for other dependent and control variables in each sample.

10.6 Empirical Results

This section presents the results of the empirical analysis. In Sect. 10.6.1, we present the results of our examination of the impact of the existence of zombie firms on the real activities of firms, such as capital investment, employment, and productivity. In Sect. 10.6.2, we present the results regarding the impact of the existence of zombie firms on corporate financing, such as the effectively zero-leverage status.

10.6.1 The Impact of the Existence of Zombie Firms on Investment, Employment, and Productivity

Baseline Estimation Results

First, we explain the baseline estimation results in Table 10.2 for the impact of the existence of zombie firms on the real activities of non-zombie firms, in terms of investment rate, employment change rate, and productivity. The results of the estimation for the period from fiscal 2002 to 2018 for listed firms are shown in Panel A of the table, and the results for unlisted firms for the same period are shown in Panel B. The variable of most interest is the cross-term $nonz_{ijt} \times Z_{jt}$ in Eqs. (10.2) and (10.3), and we focus on the results for its coefficient.

The results for the externality of zombie firms on the investment rate, employment change rate, and productivity for non-zombie listed firms in Panel A of Table 10.2 are shown in columns (1)&(2), (3)&(4), and (5)&(6), respectively.

Table 10.2 Ratio of zombie firms and non-zombie firms' investment, employment, and productivity: baseline estimation

A. Listed firms	(1)	(2)	(3)	(4)	(5)	(6)
Variables	I/K	I/K	d_Ln_E	d_Ln_E	Ln_sales-2/3 Ln_E-1/3 LnK	Ln_sales-2/3 Ln_E-1/3 LnK
nonz	0.003 (0.85)	0.001 (0.20)	0.018*** (5.78)	0.016*** (4.90)	0.060*** (3.08)	0.064*** (3.22)
Z _{jt}	0.023* (1.73)		0.058*** (5.20)		0.582*** (8.39)	
nonz × Z _{jt}	-0.022* (-1.67)	-0.013 (-0.95)	-0.037*** (-3.30)	-0.028** (-2.43)	-0.749*** (-10.71)	-0.771*** (-10.54)
salesgrowth	0.144*** (34.90)	0.149*** (35.27)	0.240*** (69.86)	0.247*** (70.38)	0.545*** (25.07)	0.544*** (24.23)
Industry_dummies	YES	NO	YES	NO	YES	NO
Year_dummies	YES	NO	YES	NO	YES	NO
Industry × Year dummies	NO	YES	NO	YES	NO	YES
Observations	34,790	34,785	34,898	34,893	34,596	34,591
R-squared	0.048	0.035	0.147	0.129	0.032	0.021
B. Unlisted firms	(1)	(2)	(3)	(4)	(5)	(6)
Variables	I/K	I/K	d_Ln_E	d_Ln_E	Ln_sales-2/3 Ln_E-1/3 LnK	Ln_sales-2/3 Ln_E-1/3 LnK
nonz	-0.002*** (-2.95)	-0.004*** (-5.08)	0.014*** (30.10)	0.014*** (30.19)	0.188*** (118.69)	0.187*** (117.66)
Z _{jt}	0.004 (0.93)		-0.029*** (-10.94)		-0.040*** (-4.38)	
nonz × Z _{jt}	-0.006* (-1.68)	0.001 (0.27)	0.019*** (8.61)	0.019*** (8.32)	-0.026*** (-3.35)	-0.024*** (-3.05)
salesgrowth	0.189*** (228.50)	0.188*** (227.12)	0.110*** (231.65)	0.110*** (230.70)	0.470*** (284.82)	0.467*** (282.65)
Industry_dummies	YES	NO	YES	NO	YES	NO
Year_dummies	YES	NO	YES	NO	YES	NO
Industry × Year dummies	NO	YES	NO	YES	NO	YES
Observations	2,962,932	2,962,932	2,962,932	2,962,932	2,962,932	2,962,932
R-squared	0.025	0.026	0.023	0.024	0.124	0.125

Note: The numbers in parentheses are t-statistics. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level

The coefficient on the cross-term in the investment rate estimation is marginally but significantly negative when year and industry dummies are included, indicating that non-zombie firms in industries with a higher zombie ratio tend to have lower investment rates. However, this negative spillover effect becomes insignificant when controlling for the industry × year fixed effects.

The coefficient on the cross-term in the employment rate estimation is significantly negative in all cases. It is found that the employment rate change becomes smaller for non-zombie firms in industries with a high zombie ratio. Similarly, the coefficient on the cross-term in the productivity estimation is also significantly

negative. Non-zombie firms in sectors with a high zombie firm ratio tend to have lower productivity.

These results are consistent with those of Caballero, Hoshi, and Kashyap (2008) in that the signs of coefficients on the cross-terms in the investment and employment estimations are the same as theirs. On the other hand, in the productivity estimations, our result of negative coefficients on the cross-term is opposite to their results which showed positive coefficients.

The results for the externality of zombie firms on the investment rate, employment rate change, and productivity of unlisted firms in Panel B of Table 10.2 are shown in the same manner as Panel A of columns (1)&(2), (3)&(4), and (5)&(6). The results are similar to those in Panel A for investment rates and productivity but different for the employment rate change.

The coefficient on the cross-term in the investment rate estimation is marginally negative or insignificant. Non-zombie firms belonging to industries with a high zombie ratio tend to have lower investment rates. The size of the coefficients is slightly smaller than that for listed firms in Panel A. The coefficient on the cross-term in the productivity estimation is significantly negative in all cases. The size of the negative coefficients is smaller in absolute values for unlisted firms than for listed firms, probably due to the low productivity level for unlisted firms.

It is the impact on the employment whose results differ between unlisted firms and listed firms. Looking at columns (3) and (4), the coefficients on the cross-term are both positive, indicating that unlisted non-zombie firms belonging to industries with a high zombie firm ratio are more likely to observe a positive employment change. Hence, it is hard to say that a negative spillover effect of zombie firms is present in the labor market for unlisted firms. The mixed results of the negative impact on investment and the positive impact on employment for non-zombie firms could have been resulted from the technological change in zombie firms. Possibly due to the shift to capital-intensive technologies among zombie firms that were assisted by the financial institutions they transacted with, congestions in the capital market has caused a reduction in investments by non-zombie firms, while their employment rather increased in the absence of such congestions in the labor market.

10.6.2 The Impact of the Existence of Zombie Firms on Financing

Baseline Estimation Results

Next, in Table 10.3 we explain the baseline estimation results, using the effectively zero-leverage dummy and the effectively zero-leverage ratio as dependent variables, to explain the impact of the presence of zombie firms on the financing behavior of non-zombie firms. The baseline results estimated for listed firms from fiscal 2002 to 2018, similar to Table 10.2, are in columns (1) (the dependent variable is the effectively zero-leverage dummy) and (3) (effectively zero-leverage ratio) of

Table 10.3 The effects of zombie firm ratio on the effectively zero leverage for non-zombie firms

A. Listed firms		(1)	(2)	(3)	(4)
Variables	zero_leverage	zero_leverage	zero_leverage	zero_leverage_ratio	zero_leverage_ratio
nonz	0.196*** (15.06)	0.244*** (2.83)	0.165*** (29.64)	0.126*** (3.40)	0.126*** (3.40)
nonz × Z _{-jt}	0.025 (0.55)	0.903*** (3.09)	0.021 (1.07)	0.372*** (2.96)	0.372*** (2.96)
lnSize	-0.032*** (-19.13)	-0.025*** (-3.34)	-0.029*** (-39.77)	-0.029*** (-9.00)	-0.029*** (-9.00)
nonz × Z _{-jt} × lnSize		-0.074*** (-2.91)		-0.032*** (-2.93)	-0.032*** (-2.93)
nonz × lnSize		-0.005 (-0.63)		0.004 (1.09)	0.004 (1.09)
Z _{-jt} × lnSize		0.036 (1.60)		0.002 (0.22)	0.002 (0.22)
Controls	YES	YES	YES	YES	YES
Industry × Year dummies	YES	YES	YES	YES	YES
Observations	34,762	34,762	34,762	34,762	34,762
R-squared	0.132	0.133	0.381	0.382	0.382
B. Unlisted firms		(1)	(2)	(3)	(4)
Variables	zero_leverage	zero_leverage	zero_leverage	zero_leverage_ratio	zero_leverage_ratio
nonz	0.269*** (313.06)	0.233*** (42.76)	0.423*** (197.42)	3.020*** (223.75)	3.020*** (223.75)
nonz × Z _{-jt}	0.020*** (4.85)	-0.107*** (-3.69)	-0.476*** (-46.62)	-4.550*** (-63.23)	-4.550*** (-63.23)
lnSize	0.023***	0.025***	0.097***	0.315***	0.315***

(continued)

Table 10.3 (continued)

Variables	(1)	(2)	(3)	(4)
B. Unlisted firms				
zero_leverage	zero_leverage (151.92)	zero_leverage (57.28)	zero_leverage_ratio (253.40)	zero_leverage_ratio (290.04)
nonz × Z _{jt} × lnSize		0.011*** (0.480)		0.378*** (66.82)
nonz × lnSize		0.003*** (6.06)		-0.227*** (-196.76)
Z _{jt} × lnSize		-0.042*** (-19.65)		-0.508*** (96.27)
Controls	YES	YES	YES	YES
Industry × Year dummies	YES	YES	YES	YES
Observations	2,962,932	2,962,932	2,962,932	2,962,932
R-squared	0.160	0.160	0.124	0.138

Note: The numbers in parentheses are t-statistics. *** indicates statistical significance at the 1% level

Panel A of Table 10.3, and the results for unlisted firms for the same period are in columns (1) (the dependent variable is the effectively zero-leverage dummy) and (3) (effectively zero-leverage ratio) of Panel B. The variable of most interest is the cross-term of the non-zombie dummy and the zombie firm ratio within the industry $nonz_{ijt} \times Z_{jt}$, and we look at its coefficients. We also look at coefficients on other variables including the controls. There are two notable findings.

First, the baseline results in Panel A indicate that the coefficient on the interaction term is almost non-significant whether using the effectively zero leverage or the effectively zero-leverage ratio as the dependent variable. The coefficient on $nonz_{ijt}$, which indicates non-zombie firms, is always positive, suggesting that non-zombie firms are more likely become effectively zero-leverage firms than zombie firms. However, this tendency is not influenced by the proportion of zombie firms within the same industry.

Second, we observe different results for unlisted firms in Panel B. The sign of the coefficients on the interaction term differs depending on the dependent variables being employed. Looking at the results with the dummy dependent variable, the coefficient on the interaction term is significantly positive, which suggests that in non-zombie firms, the higher the ratio of zombie firms in their industry, the more likely they are to become effectively zero leveraged. On the contrary, the results with the ratio dependent variable show a significantly negative coefficient on the interaction term. Therefore, the baseline estimations in Panel B provide conflicting results regarding the spillover effects of the zombie firm ratio on the financing of unlisted non-zombie firms.

Estimation Results Considering the Difference in Spillover Effects by Firm Size

As far as the results of the baseline estimation are concerned, the impact of the existence of zombie firms on the financing of non-zombie firms is not clear. In fact, in Panel A, which looked at listed firms, the zombie firm ratio did not have a significant impact on the effectively zero-leverage status of non-zombie firms, and in Panel B, which looked at unlisted firms, the sign of the spillover effect differed depending on the dependent variable used.

Therefore, we conduct additional estimations considering the possibility that the difference in results between listed and unlisted firms reflects the difference in firm size. Specifically, we add $nonz_{ijt} \times Z_{jt} \times \ln Size_{ijt}$, which includes the logarithm of firms size measured by total assets, to $nonz_{ijt} \times Z_{jt}$, and verify whether the spillover effect of zombie firms on non-zombie firms changes depending on the size of the firms itself. The estimation results are shown in columns (2) (effectively zero-leverage dummy), (4) (effectively zero-leverage ratio) of Panel A and columns (2) (effectively zero-leverage dummy), (4) (effectively zero-leverage ratio) of Panel B in Table 10.3.

The combination of the signs of the coefficients on $nonz_{ijt} \times Z_{jt}$ and $nonz_{ijt} \times Z_{jt} \times \ln Size_{ijt}$ is exactly the opposite between Panel A and Panel B. Looking at listed firms, the coefficient of $nonz_{ijt} \times Z_{jt}$ is positive, and the coefficient of $nonz_{ijt} \times Z_{jt} \times \ln Size_{ijt}$ is negative. Among listed firms, the smaller the firm, the

stronger the tendency to become effectively zero leverage when it belongs to an industry with a high zombie firm ratio. In contrast, the degree to which they become effectively zero leverage due to the spillover effect weakens as the firm grows. Above a certain size, the direction of the spillover effect reverses, that is, the higher the zombie firm ratio, the less likely they are to become effectively zero leverage. Based on the coefficients on the two cross-terms, the threshold of firm size above which the spillover effect changes from promoting to suppressing virtual zero-leverage status is approximately 130 billion yen in total assets.¹⁵

Next, looking at unlisted firms, the coefficient of $nonz_{ijt} \times Z_{jt}$ is negative, and the coefficient of $nonz_{ijt} \times Z_{jt} \times \ln Size_{ijt}$ is positive. Among unlisted firms, it is difficult to become effectively zero leverage when they belong to an industry with a high zombie firm ratio. However, this trend weakens as the firms grow, and above a certain size, the higher the zombie firm ratio, the easier it is for non-zombie firms in that industry to become effectively zero leverage. Based on the coefficients on the two cross-terms, the threshold of firm size above which the spillover effect flips over its sign is approximately 17 million yen in total assets.¹⁶

Combining the results of Panels A and B, in the range from about 17 million yen to 130 billion yen in total assets, the probability and degree of non-zombie firms becoming effectively zero leverage in industries with a high zombie firm ratio increase, that is, the existence of zombie firms brings about a spillover effect in the direction of promoting the virtual zero-leverage status of non-zombie firms. On the other hand, even if there are many zombie firms, the ratio of becoming effectively zero leverage does not increase in very small non-zombie firms or large non-zombie firms.

There are possibly several mechanisms behind the increase in the proportion of effectively zero-leverage firms among non-zombie firms due to the spillover effect. Considering the tendency for the existence of zombie firms to have a negative external effect on the real activities of non-zombie firms in Table 10.2, the increase in the ratio of effectively zero-leverage firms among non-zombie firms can be considered as reflecting a decrease in funding demand due to a decrease in the level of activities in investment and employment.

However, even in industries with a high ratio of zombie firms, the growth rate of employment in non-zombie unlisted firms is high. This indicates that a certain number of firms that have substantial demand for funds choose to be effectively zero leverage. Furthermore, for listed firms, spillover effects on real activities do not depend on firm size (See Imani et al. 2023), which is different from the result where the spillover effect on the effectively zero-leverage ratio is dependent on firm size (Table 10.3 Panel A column (2)). These results suggest that non-zombie firms may

¹⁵Based on the coefficient shown in column (2) of Panel A in Table 10.3, it is calculated as $\exp(0.903/0.074) \approx 132,337$ (million yen).

¹⁶Based on the coefficient shown in column (2) of Panel B in Table 10.3, it is calculated as $\exp(0.107/0.011) \approx 16,769$ (thousand yen).

choose an effectively zero-leverage status for reasons other than the demand for funds reflecting real activities, such as a precautionary motive for holding cash and deposits.

10.7 Conclusion

In this chapter, we have focused on the financing of Japanese firms and overviewed its development. We have analyzed the ratio and economic impact of zombie firms, which emerged as a result of excess debt, and those of effectively zero-leverage firms which hold cash and deposits more than interest-bearing liabilities. We further examined their relationships. What distinguishes the analysis in this chapter from Caballero, Hoshi, and Kashyap (2008) is that we employed a different identification method for zombies based on the FN criterion, extended the sample to include unlisted firms, and implemented estimations for the period after the early 2000s. Although most of the analyses referred in this chapter are based on data before the COVID-19 pandemic, it is expected that the ratio of zombie firms and effectively zero-leverage firms should have substantially changed during the COVID-19 pandemic. On the other hand, it is possible that the estimated results for the spillover effects of zombie firms will not substantially change even if we include the period of the COVID-19 pandemic for estimations.

The results of the analysis in this chapter can be summarized as follows. First, in industries with a high ratio of zombie firms, investments, growth rate of employment, and the productivity for non-zombie listed firms are lower than those that belong to low zombie ratio industries. On the other hand, for unlisted firms, investments and the level of productivity are lower for non-zombies that belong to the industries with high zombie ratios, while the employment growth is higher for these firms. The results for investment and employment of non-zombie listed firms and investment of non-zombie unlisted firms are consistent with the theoretical hypothesis of and empirical results in Caballero, Hoshi, and Kashyap (2008). However, there is inconsistencies in our results with theirs in several respects. The results for productivity is different between our results and theirs. Also, the result for employment by non-zombie unlisted firms differed from what they found for non-zombie listed firms. The inconsistency with regard to the productivity might be resolved if we (as well as Caballero et al. 2008) reduce the possible measurement errors when estimating the total factor productivity. We may do this by adopting a more sophisticated way to construct the total factor productivity variable.

In relation to the effectively zero-leverage status of firms, it was found that large unlisted non-zombie firms and relatively small listed non-zombie firms tend to become effectively zero-leverage firms as the zombie firm ratio increases. The background to this phenomenon is thought to be a decrease in funding demand through the suppression of the real activities of non-zombie firms by the existence of zombie firms.

In this chapter, we have focused on the externalities of zombie firms and conducted an analysis focusing on the impact on non-zombie firms. On the other hand, it is also possible to conduct an analysis focusing on the changes in corporate behavior including zombie firms, and an analysis considering the mechanism by which the existence of zombie firms affects over time. For example, some studies have found that past experiences influence decision-making by applying the concept of behavioral economics. For example, Bouwman and Malmendier (2015) and Malmendier and Nagel (2011) have shown that memories of past bank failures and the Great Depression affect the risk-taking of banks and individuals. If we apply this framework to the study of zombie firms, the experience of being a zombie or the experience of surrounded by zombie firms could have influenced subsequent financial decisions of the firm, such as becoming zero-leverage, as institutional memory remains within the organization or within individual managers. It is our future task to implement subsequent studies on these issues.

10.8 Comment by Daisuke Tsuruta: Research Directions for Zombie Firms and Zero-Leverage Firms

10.8.1 Introduction

This section discusses the future research directions for zombie firms and zero-leverage firms in the economic crisis caused by the coronavirus pandemic (COVID-19 pandemic), while reviewing the paper “Corporate Financing in Japan: Coexistence of Zombie Firms and Zero-Leverage Firms” by Yusuke Imani, Ichihiro Uesugi, and Yukihiko Yasuda (hereinafter, Imani, Uesugi, and Yasuda paper). In recent years, the existence of zombie firms has attracted attention not only from an academic perspective but also from a practical perspective. For example, the Nikkei Newspaper dated July 28, 2022 published an article titled “Increase in ‘Zombie Firms’ Worldwide”, indicating a global increase in zombie firms.

In this context, the Imani, Uesugi, and Yasuda paper provides an overview of corporate financing in Japan since the 1990s, revealing the behavior of zombie firms and zero-leverage firms and their impact on the Japanese economy. The Imani, Uesugi, and Yasuda paper is divided into two main parts. The first part organizes the trends in financing of all Japanese firms, revealing the trends in investment and savings, the number of zombie firms, and the transition of zero-leverage firms. It shows that Japanese firms have shifted from investment surplus to savings surplus around the mid-1990s. Also, until the COVID-19 pandemic, there was a trend of decreasing interest-bearing liabilities of firms, the proportion of zombie firms decreased except during financial shocks, and the number of effectively zero-leverage firms tended to increase.

The latter part is an econometric analysis measuring the externality that zombie firms impose on non-zombie firms. Using a database of firm-level data, including

listed and unlisted firms, the analysis shows that (1) in industries with a high ratio of zombie firms, non-zombie firms have low investment and productivity, (2) estimation results of employment differ between listed and unlisted firms, and (3) the ratio of zombie firms within an industry has a positive effect on the probability of becoming a zero-leverage firm.

10.8.2 Contributions of the Imani, Uesugi, and Yasuda Paper

The contributions of the Imani, Uesugi, and Yasuda paper are as follows. First, it organizes the Financial Statements Statistics of Corporations by Industry Corporate over a long period and details the changes in the corporate financing of Japanese firms. Second, it focuses on the decline in the ratio of interest-bearing debt and pays attention to the two extreme cases of zombie firms and zero-leverage firms. In this context, it shows the transition of the ratio of zombie firms, the ratio of effectively zero-leverage firms, and the ratio of zero-leverage firms over a long period, targeting not only listed firms but also unlisted firms. In particular, as the Imani, Uesugi, and Yasuda paper shows, the ratio of effectively zero-leverage firms significantly increased from 2000 to the 2010s, but this fact and its causes have not been widely noticed. Especially before the COVID-19 pandemic, the ratio of effectively zero-leverage firms among listed firms had risen to 45%, indicating a shift from the bank-dependent system, which was considered a characteristic of Japan's financial system.

Third, one point to note is the quantitative analysis showing the impact of the zombie firm ratio on firms within the industry. At first glance, zombie firms and zero-leverage firms may seem contradictory, but the Imani, Uesugi, and Yasuda paper theoretically organizes and empirically analyzes how the zombie firm ratio within the industry affects zero-leverage firms. This can be said to be an approach not seen in analyses using Japanese data. In addition, they analyze the impact of the industry's zombie firm ratio on indicators such as investment, employment, and productivity. It is also a significant contribution that they conduct long-term analysis using not only listed firms but also unlisted firms.

10.8.3 Corporate Profits After the COVID-19 Pandemic

The Imani, Uesugi, and Yasuda paper targets data from fiscal 2002 to 2018, and does not analyze the impact of the shock caused by the spread of the COVID-19 pandemic after 2020. Given that the results of the Imani, Uesugi, and Yasuda paper contain very important implications for analyzing Japan's financial market after the COVID-19 pandemic, this section will overview the "the Financial Statements Statistics of Corporations by Industry, Quarterly Surveys" compiled by the Ministry of Finance

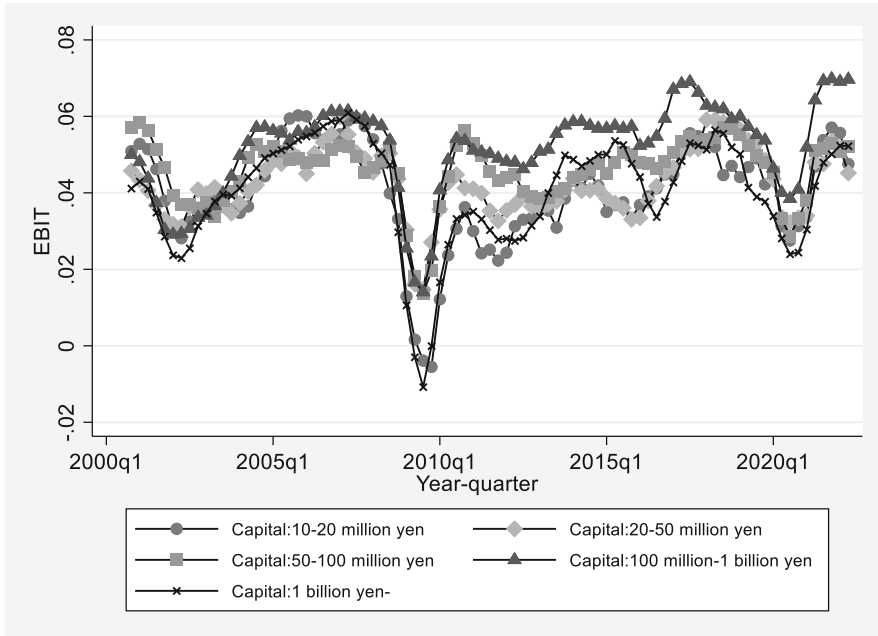


Fig. 10.5 Transition of EBIT by capital stock (manufacturing industry). (Source: Financial Statements Statistics of Corporations by Industry, Quarterly Surveys by the Ministry of Finance)

from the first quarter of 2000 to the second quarter of 2022, and discuss future research issues.

The Imani, Uesugi, and Yasuda paper focuses on the zombie firm criteria (FN criteria) by Fukuda and Nakamura (2011). In the FN criteria, EBIT (Earnings Before Interests and Taxes) is used as a major indicator. If EBIT decreases, more firms will be judged as zombie firms. Figure 10.5 shows the transition of EBIT in the manufacturing industry in the 2000s by capital scale. EBIT is standardized by total assets and shows the total for the most recent fourth quarter. The EBIT of the manufacturing industry dropped significantly due to the impact of the 2008 global financial crisis. In particular, the EBIT of large firms with a capital of 1 billion yen or more and small- and medium-sized firms with 20–50 million yen became negative, and many firms are believed to have met the profitability criteria in the FN criteria. In fact, according to Fig. 10.4 in the Imani, Uesugi, and Yasuda paper, the ratio of zombie firms increased for both listed and unlisted firms towards 2009. After that, although the EBIT of the manufacturing industry recovered for all firm sizes, it decreased significantly due to the COVID-19 pandemic in 2020. However, the decrease is smaller compared to the global financial crisis in 2008, and it is improving towards the level before the COVID-19 pandemic from 2021 onwards.

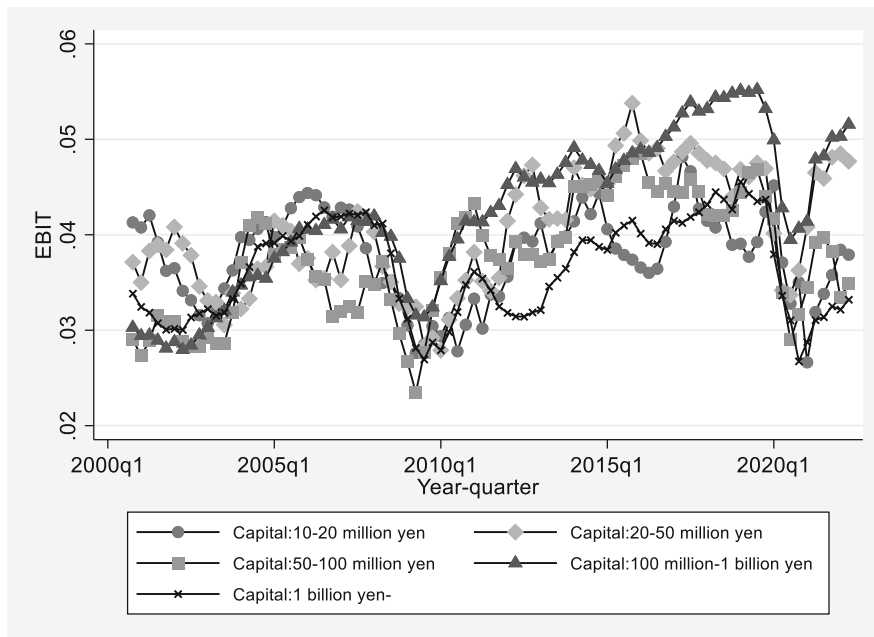


Fig. 10.6 EBIT trend by capital stock (non-manufacturing). (Source: Financial Statements Statistics of Corporations by Industry, Quarterly Surveys by the Ministry of Finance)

From the above, it can be considered that the increase in zombie firms in the manufacturing industry due to the COVID-19 pandemic is not so serious.

Figure 10.6 shows the trend of EBIT in non-manufacturing industries by capital stock. In the non-manufacturing sector as well, EBIT significantly decreased during the global financial crisis in 2008. Afterwards, EBIT recovered, and although there was an upward trend in the 2010s, it has significantly decreased due to the COVID-19 pandemic in 2020. The decrease is larger than in the manufacturing industry, and it is expected that many firms have become zombie firms. Furthermore, while some firms are recovering to pre-COVID-19 pandemic levels after 2021, recovery is lagging in large corporations with capital of 1 billion yen or more, and in small- and medium-sized enterprises with capital of 10 million to 20 million yen and 50 million to 100 million yen.

The background to this includes a significant decrease in profitability in the accommodation, food and beverage, and entertainment industries due to requests for self-restraint and business suspension associated with the declaration of a state of emergency. Figure 10.7 shows the trend of EBIT in the accommodation, food and beverage service, life-related service, and entertainment industries since 2009. EBIT significantly decreased after the COVID-19 pandemic in 2020, and is negative in all firm groups. The decrease is very large compared to the time of the global financial

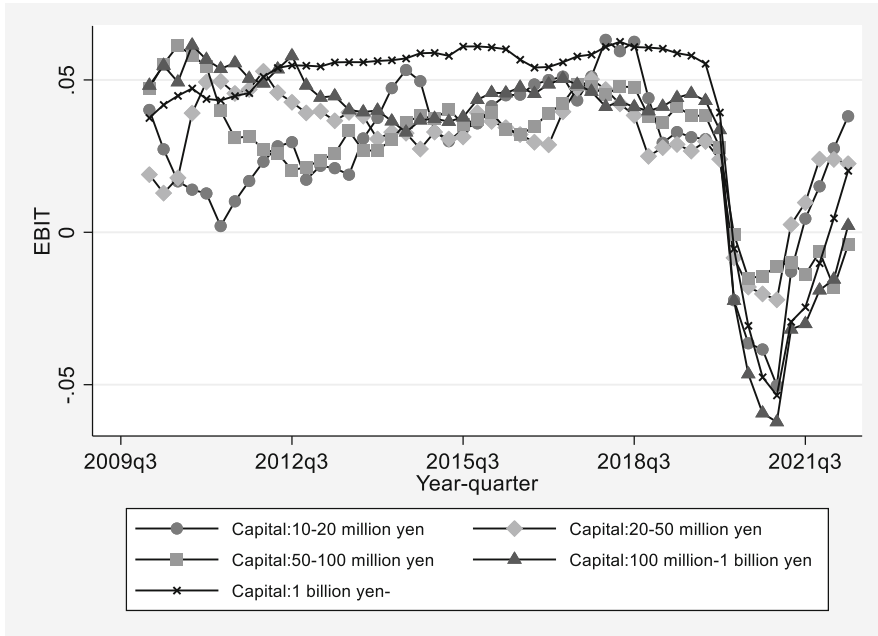


Fig. 10.7 EBIT trend by capital stock (accommodation, food and beverage services, life-related services, entertainment). (Source: Financial Statements Statistics of Corporations by Industry, Quarterly Surveys by the Ministry of Finance)

crisis. Although recovery can be seen in small- and medium-sized enterprises with capital of 10 million to 20 million yen, it is still significantly below the EBIT before the COVID-19 pandemic. In the accommodation, food and beverage, and entertainment industries, the number of zombie firms has increased after the COVID-19 pandemic, and the possibility of zombification becoming permanent is high due to the delay in profitability improvement.

10.8.4 Research Issues in Light of the Imani-Uesugi-Yasuda Paper and the Situation of the COVID-19 Pandemic

Considering the above situation, I will discuss the direction of future research. Firstly, this is an evaluation of financial support considering the externalities of zombie firms. After the COVID-19 pandemic, many firms' profitability and cash flow deteriorated, and the government has been providing various cash flow support through loans from government financial institutions, expansion of public credit guarantee systems, several grants and subsidies, etc. Among them, zero-interest, unsecured loans, or "zero-zero loans", have effectively exempted interest payments

for a certain period, and financial support has been provided to small- and medium-sized enterprises. Using these systems, many firms have increased their borrowings to cope with the deterioration of cash flow, despite their poor profitability. However, the interest-free period is three years, and the repayment of the principal has gradually started, making it difficult for many firms to survive without additional financial support. Additional financial support prevents firms from exiting the market, but it also has the effect of keeping zombie firms alive. According to the Imani, Uesugi, and Yasuda paper, the survival of zombie firms affects non-zombie firms and generates negative externalities in the market. The appropriateness of financial support should be evaluated not only in terms of inhibiting market turnover but also considering such negative externalities. It is also very important to measure how much negative externalities have occurred after the COVID-19 pandemic.

Secondly, it is about the occurrence of zombie firms among small- and medium-sized enterprises due to the COVID-19 pandemic and the measurement of their externalities. In the Imani, Uesugi, and Yasuda paper, the occurrence of zombie firms among listed firms (large firms) and the impact on non-zombie firms, both listed and unlisted, is measured, which is a significant contribution. During the COVID-19 pandemic, financial support was particularly focused on small- and medium-sized enterprises, so it is highly likely that many zombie firms will emerge among them in the future. Therefore, it will be important to measure the impact of the emergence of zombie firms among small- and medium-sized enterprises on non-zombie firms.

Thirdly, continuous research is needed on zero-leverage firms, which were not touched on much in this section. Behind the increase in zero-leverage firms is the corporate savings surplus shown in the Imani, Uesugi, and Yasuda paper, and the decrease in investment opportunities in the Japanese economy as a whole is considered to be the fundamental factor. Managers who have seen firms greatly affected by the COVID-19 pandemic or becoming zombie firms may avoid excessive risk-taking, and the trend towards zero-leverage may further progress.

10.8.5 Conclusion

In this section, while reviewing the Imani, Uesugi, and Yasuda paper, I discussed the direction of research after the COVID-19 pandemic. Regarding the occurrence of zombie firms in Japan after the COVID-19 pandemic, Hoshi, Kawaguchi, and Ueda (2023), Uesugi et al. (2022b), Hong et al. (2022) and others have conducted analyses, but the business activities of zombie firms and their impact on the overall economy have not been sufficiently analyzed. In the future, it will become more important to clarify about zombie firms and zero-leverage firms, taking into account the results and analysis methods obtained in the Imani, Uesugi, and Yasuda paper.

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Chapter 11

Financial System and Crisis Response: Theoretical Background and Policy Issues on Public Bailouts of Private Firms



Kenichi Ueda

Abstract This chapter discusses the merits and demerits of government bailouts of firms facing bankruptcy risk during crises. As in the discussion in Chap. 10, Ueda points out that a significant proportion of the firms that received government financial support in Japan and other countries in the early 2020s may have been zombie firms.

Ueda emphasizes that the financial system is vulnerable due to the inherent functions of banks, and thus the financial institutions require public intervention. However, Ueda argues that there is a limited theoretical basis for bailing out non-financial businesses and that public intervention for them should only be justified in the context of institutional reforms, such as the reform of insolvency legislation and procedures, which would lead to a reduction in bankruptcy costs in general. Ueda also presents an analysis of the importance of banks' corporate screening function and shows that this function has been declining in Japan in recent years, using indicators that simultaneously capture the existence of zombie firms and the financial constraints faced by healthy firms in real need of funds. In this chapter comment, "The Pros and Cons of Corporate Bailouts as a Crisis Response," Hirofumi Uchida agrees with the importance of the issues raised by Ueda. Uchida then points out the need to distinguish whether Ueda's arguments are based solely on theoretical models or are supported by both theory and evidence, and points to keep it in mind when understanding the contents of this chapter.

11.1 Introduction

In response to the economic turmoil caused by the global COVID-19 pandemic that began around March 2020, Japan adopted several policies to support financing of private businesses. This chapter discusses the theoretical background and recent empirical analyses of how much government intervention in economic and financial

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crises can be justified based on economics of bankruptcy, especially by many private companies and financial institutions.

The remainder of this chapter is organized as follows: The book by Ueda (2022) explains the current status of analyses of the financial system and its policies until the first half of 2020. Section 11.2 summarizes the book's part explaining theoretical background, particularly the circumstances under which government intervention is justified. I then include additional materials from Sect. 11.3. Section 11.3 points out the theoretical problems of corporate bailouts during crises. Section 11.4 highlights the existing corporate bailout mechanism. The expectation that such a mechanism will be created or strengthened in an emergency can cause problems, even in normal times. I present the related theoretical discussions and empirical results. Section 11.5 presents an international comparison of the factors determining the scale and size of corporate bailouts and economic recovery after bailouts. I conclude with discussion on a path toward future reform on the financial system.

Please note that the discussions in this chapter, especially from Sect. 11.3 onwards, rely primarily on my past and ongoing research (including many co-authored ones), and they are not comprehensive summary of the literature.

11.2 Discussion Before the COVID-19 Pandemic

11.2.1 *Optimality of Competitive Market's Outcome*

In a market with perfect information, if various future risks can be fully hedged ("a complete market"), the general equilibrium of a competitive market is socially optimal (in the Pareto sense), and there is no role for the government. This is the essence of the well-known fundamental theorems of welfare economics.

Consider a simple example of an apple as a commodity. We can easily tell how many apples there by looking at them (and their quality by looking at them or tapping them); therefore, information about the commodity should be considered perfect. Shutting down the freely competitive market for apples would help the communist government determine the price of apples and allocate quantities among people. However, this kind of planned economy does not work.

It is not the government's role in protecting apple farmers from risks such as price fluctuations through price guarantees. Instead, the government has no further role other than creating an environment where firms and households can hedge risks (e.g., via futures and insurance markets), grow, and flourish. The fundamental theorems of welfare economics prove that a socially optimal allocation can be achieved if the information on the commodity (the subject of the contract) is well-known in quantity and quality and if the market is left to its own devices.

11.2.2 Imperfect Information

The information is considered perfect when the quantity and quality of transactions are readily observable as apples. However, transactions of unobservable items, such as the effort level of labor, or items whose quality is concealed, such as used cars, have long been considered by economists not to work well in market transactions. In economics, imperfect information which creates an incomplete market, is divided into two major categories: one is hidden behavior, such as the effort level of labor, causing moral hazard. The other is hidden types, such as quality (good or bad), causing adverse selection (bad quality or a wrong type is chosen or gets more benefits).

However, years of theoretical work have shown that competitive equilibrium is generally socially optimal even with imperfect information, and that the government has no role. Regarding hidden behavior, it has been shown that moral hazard can be minimized by the parties involved entering into incentive contracts and that the government can do nothing more (Prescott and Townsend 1984a, b). It has also been shown that even for hidden types, type-specific equilibria (separating equilibria) based on nonlinear pricing can always be achieved and that by opening the market for futures market based on predictions of such equilibria, the general equilibrium of those markets will be socially optimal, and the government has no role (Bisin and Gottardi 2006).¹

11.2.3 Debt Contract

Sometimes, information can be obtained or verified at a cost. This is something between perfect and imperfect information. It leads to the well-known debt contract theory. If you cannot repay a loan, you must prove so by paying accountants or lawyers, and then you do not have to repay the promised amount. This situation is referred to as “bankruptcy.” Here, bankruptcy is a broad concept that includes

¹These papers do not imply that information becomes perfectly known in the market. In this sense, the social welfare that would be obtained in the equilibrium if information was perfect would never be achieved, and thus the equilibrium is not the first-best. However, a government facing the same asymmetric information problem cannot provide a better allocation than the market. In this sense, the equilibrium allocation is called a constrained social optimum, that is, the second-best. In case of a separating equilibrium in an adverse selection model, for example, in an insurance market, the bad type, which frequently has accidents, obtains the same allocation (perfect insurance) as in the perfect information case, so that his consumption becomes equal between the case with and without accidents. However, the good type who encounters fewer accidents cannot obtain such an allocation through the equilibrium insurance contract. Here, if there is a futures market for future consumption (which could be substituted by stock futures or bond futures, etc.), only the good type would need to hedge her risk and use it. If such a market is open, government intervention is not required. The theoretical consequences of this general equilibrium analysis remain the same, even for small firms and start-ups that face more complex information imperfections.

liquidation (i.e., asset seizure) and reorganization (i.e., corporate restructuring, civil rehabilitation, or Alternative Dispute Resolution (ADR)).

However, if money is repaid as scheduled, there is no need to go bankrupt and no need to explain the financial situation of the firm or the household at significant cost to the creditors. Then, the financial condition of a borrower remains imperfect information. Since there is no information on corporate profits or household income, it is impossible to set repayments based on these factors, so that the same constant amount is repaid. This is a typical debt contract because such constant repayment can be regarded as a predetermined principal and interests.

Suppose all agents in the economy can obtain information about the borrower's condition, but at a cost. Then the economy is not equipped with a complete market with securities that can hedge risks for all situations (i.e., Arrow-Debreu securities), but with an incomplete market. Nevertheless, the debt contract can be regarded as a contract with insurance in which the debtor and creditor mutually understand each other in advance, and repayment will be reduced in the event of bankruptcy. Based on this contract, a general equilibrium in a competitive market is socially optimal (with constraints). In other words, the government (bureaucrats) is not considered to be better than the private sector (e.g., bankers) in obtaining information on each debtor. As such, government intervention is unnecessary concerning contracts determined in the market. The same is true even if a lender, such as a bank, proves the condition at a cost. This theory of debt contracts and the social optimality of the market equilibrium with such debt contracts is known as the theory of costly state verification (CSV) (Townsend 1979).

Without paying a cost, CSV assumes that a firm's financial information is unknown except to the firm owners. There is a similar theory, called the theory of incomplete contracts (Grossman and Hart 1986; Hart 1995). In this theory, the profit situation is completely unknown and thus, the repayment amount cannot be set contingent on the profit. Therefore, a debt contract ask the same repayment amount no matter what happens. Then, asset ownership must be transferred to the creditor if the borrowed amount cannot be repaid. This is also a type of bankruptcy, especially liquidation with asset seizure. Handing over the remaining assets to creditors can be considered as a cost that ensures the creditors to become owners who are informed of the financial situation. Therefore, the incomplete contract theory can be regarded as a variant of CSV theory (Tirole 2006). However, in the original CSV theory, which does not involve the transfer of ownership, the distribution of remaining assets is not biased towards creditors in bankruptcy, instead involves debt reduction or forgiveness. Thus, bankruptcy of CSV is more like debt restructuring, based on the Civil Rehabilitation Law or the Corporate Reorganization Law in Japan.

Notably, the presence or absence of these ownership transfers does not lead to different conclusions in a static context but may do so somewhat in a dynamic context. This is because the costs of accountants and lawyers, which are costs when there is no transfer of ownership, do not depend much on the business cycle. However, the costs of asset seizure (especially land) when there is a transfer of ownership, depend on the business cycle. For example, when the economy worsens due to exogenous shocks (e.g., rising international oil prices), land prices would

fall, thereby lowering the maximum amount that can be borrowed from banks. This leads to a negative spiral in which capital investments cannot be made as planned, thereby further worsening the economy (Kiyotaki and Moore 1997).

Here, a price deviates from the fundamental value (in this case, the corporate profits earned in the future, that is, the creditor's share of the corporate value to be repaid for borrowing) and affect another value (the maximum borrowing amount). Moreover, this other value (the collateral value) cannot be changed by a single company or household and are determined by the price in the market. In this case, it is said to have a pecuniary externality. Markets generally do not work well with an externality, and Keynesian policies to stimulate the economy can be effective.

However, theoretically, developing a market for contingent securities on land prices, in general, is possible (e.g., a market for Case-Shiller housing price index futures in the U.S.A.) because information is widely available for land prices and other assets used as collateral. When such market is set up, the general equilibrium of a competitive market was found to be optimal (Kilenthong and Townsend 2021).

11.2.4 Reputational Damage to Banks

There is a caveat: Not all issues can be left to the free market, and the most critical one stems from the nature of the banking industry, which has inherent vulnerabilities. A bailout of a collapsing bank is a bailout of its creditors (if we take for granted that shareholders will suffer losses) since a bank (and any business corporation) is nothing more than a box. Depositors are the bank's significant creditors. Therefore, emerges a question why depositors must be bailed out. The answer lies in peculiarities of the banking industry.

The key function of banking is maturity transformation, whereby short-term demand deposits are received and lent as long-term industrial or housing loans. Simultaneously, various financial transactions are settled using demand deposits; thus, the banking business has an aspect of the payment service. However, without being a bank, it is possible to be a payment service provider (e.g., prepaid cards, electronic payment services, or a part of credit card functions).²

Since demand deposits are expected to face a certain amount of withdrawal in each period, holding the same amount of short-term and highly liquid government bonds in assets is necessary to meet such deposit withdrawals. In normal times, most

²The transactions using the payment services discussed here is a broad sense of settlement known as "payment," which refers to an agreement to pay for something at stores. In a strict sense, payment involves three stages if not cash based. After many people pay at stores (by e.g., debit cards), various payment messages will gather at banks, and then these claim messages will be netted out across banks. This is "clearance" by the Zen-Gin system provided by Japanese Bankers Association in Japan. Afterward, according to the remained claims, banks raise or lower the accounts each other at the Bank of Japan. This is "settlement" done through by Nichigin-Net at the Bank of Japan in Japan. A narrow sense of settlement refers to "clearance" and "settlement," or only "settlement."

portion of deposits can be used for long-term illiquid loans to firms and households as these loans are profitable. Without the long-term illiquid loans, firms could not engage in business and households would achieve lower utility. In other words, the banking industry's maturity transformation function generates significant value to the economy, although accurately capturing it as a fraction of GDP is difficult.

However, if, for some reason, many depositors feel insecure about the bank's business and withdraw their deposits, the bank may become short of funds because long-term loans cannot be converted into cash immediately, and the bank may be unable to pay back the deposits. In such a case, banks desperately try to collect their long-term loans, by terminating forcibly outstanding loans or curbing new loans. Here, the maturity transformation function is suppressed. This situation is called a bank run or liquidity crisis. Obviously, if depositors feel safe and do not withdraw their deposits, the bank will not collapse. Conversely, even if a bank's balance sheet is sound, a bank run may occur just due to rumors (Diamond and Dybvig 1983)³.

It is sufficient to prevent depositors from feeling insecure in order to prevent banks from a run due to rumors. For example, in case that a bank collapses, an insurance can be arranged to pay the principal and interest as promised, including for depositors who do not withdraw their deposits. This deposit insurance ensures that the principal and interest on deposits are always repaid. Therefore, deposit insurance removes each depositor's incentive to withdraw deposits that are not urgently needed. Theoretically, this makes it possible to prevent bank runs.

A financially sound bank may have little liquid funds to pay to many depositors now but will have enough funds to do so in the future by collecting long-term loans at the end. In this case, the central bank, as a "lender of last resort," can lend short-term funds (liquidity) to a bank in distress to enable it to pay principal and interests on its deposits. The central bank will not lose money because a solvent bank can return these funds in the future. This "lender of last resort" function of the central bank works like deposit insurance.

However, in many actual cases, banks that had been subject to bank runs were often not financially sound due to mismanagement. So, liquidity is not the only issue. In such cases, the bank (shareholders) must still be punished by liquidation or capital injection. In this case, the deposit insurance mechanism provides a better response as it helps only depositors after a bank went bankrupt. By the way, central banks and deposit insurance systems have taken their current shape step by step through the long history of devastating financial crises.

The existence of deposit insurance and a central bank may conversely foster profligacy in bank management, as depositors no longer pay sufficient attention to bank soundness. In other words, insurance inversely contributes to moral hazard. This argument is supported empirically based on historical data (Demirguc-Kunt and Detragiache 2002; Calomiris and Jaremski 2019). Hence, it is necessary to increase the proportion of capital (equity) that is not be bailed out and to have equity holders

³Their contribution to this issue is why Douglas Diamond and Philip Dybvig (along with Ben Bernanke) won the 2022 Nobel Prize in Economics.

monitor bank management to prevent moral hazard due to deposit insurance. This means that, while deposit insurance makes banks safer, it requires higher capital (Kareken and Wallace 1978). Therefore, since 1989, the Basel Committee on Banking Supervision has set a minimum level of bank capital internationally, and this Capital Adequacy Ratio Requirements have been introduced in major countries. Since then, significant reforms have been made (Basel II). The Global Financial Crisis led to further reforms in the 2010s, known as Basel III.

11.2.5 Discussion After the Global Financial Crisis: The Too Big to Fail Problem

For the decade following the Global Financial Crisis started in 2008, how to combat with the too-big-to-fail (TBTf) problem was the key policy agenda. Reinforcement of international financial regulations were carried out and almost completed by the time of the COVID-19 pandemic. Chari and Kehoe (2016) presented a basic theory behind the TBTf problem. This theory assumes that bankruptcy is costly, based on the theory of costly state verification (CSV). Although there is no need to avoid the cost ex-ante (Townsend 1979), the government will try to avoid the cost ex-post (politically), creating a time inconsistency problem. The essence of the TBTf problem is the moral hazard, that is, the distorted behaviors of banks, firms, creditors, and depositors in anticipation of an ex-post bailouts of big financial institutions by the government, even without an explicit mechanism such as deposit insurance.

The Global Financial Crisis was a complex event. The collapse of Lehman Brothers in 2008 wreaked havoc on the world's financial markets, even though it was not a deposit-taking bank. The bankruptcy of a multinational investment bank (group), which plays a central role in capital markets, is challenging to resolve because of the complex relationships among the group companies and conflicting laws and regulations in different countries. Therefore, bankruptcy costs were much higher than expected, and stock prices and credit ratings of similar large financial institutions were significantly declined. American International Group (AIG), a big insurance company, was bailed out by the U.S. authority at the same time because it was the top underwriter of bankruptcy insurance (CDS) for other large financial institutions and corporations. AIG's bankruptcy would have rendered the insurance policies of many of its counterparties worthless and undermined the assumptions on which many financial transactions were based.

Here, it was recognized that the financial system is fragile. In the manufacturing industry, even if a company goes bankrupt financially, the goods it has made and sold will not disappear. However, if the financial system collapses and promised financial contracts are not fulfilled, it is like the sudden disappearance of goods that have already been purchased. Sometimes, the bankruptcy of a single financial institution can significantly impact the entire financial system. In this case, it is

understood that such a financial institution is too important for the financial system to fail (i.e., it is too systemic to fail). In fact, after the Lehman Brothers bankruptcy, these important financial institutions were all bailed out by the governments⁴. It has also been empirically shown that bailouts of such important financial institutions were anticipated, which induced actions by market participants that were considered moral hazard, already in the years before the Global Financial Crisis (Ueda and Weder di Mauro 2013; Lambert et al. 2014).

Various institutional reforms were considered necessary. In the 2010s, international financial regulations were strengthened, mainly for the world's largest financial institutions (G-SIBs: Global Systemically Important Banks), to prevent the TBTF problem. These efforts primarily focused on capital regulation. However, the main requirement was not simply capital per se but rather the issuance of bonds that would be converted into something like equity (capital) in times of crisis to increase the overall ability to absorb losses individually (without relying on the government). It is called the Total Loss-Absorbing Capacity (TLAC) regulation.

In addition, there were many reflections on the preparation of the market for a potential crisis. In particular, the high bankruptcy cost of Lehman Brothers was recognized as a systemic problem. Therefore, as a reform, systemically important banks were required to have a prescribed procedure, called "living will," in case of bankruptcy. In addition, the regulators ensured that in the case of a multinational institutions, insolvency resolution could be successfully carried out with only a single point of entry, that is, the intervention by the authority of the country where the parent company is located.

A bailout helps creditors who were not depositors, and rarely helps shareholders. This is strange considering the original agreement on the debt contract. Therefore, an additional reform aims that, when a bailout is (or is likely to be) provided, the debt value should be forcibly reduced (or converted to equity). So, this new reform requires banks to issue a certain number of bonds that would not be bailed out. This meant that the creditors would share the losses ("bail-in") when the government intervened (bailout). In addition to capital regulation, this type of financing was required to absorb losses together, resulting in the TLAC regulations described above⁵. TLAC bonds have been issued under this regulation. This regulation was

⁴ Although the payment service is not the key function of the banking business, banks dominate the payment service; therefore, banks are considered important to the payment system. It would not be strange to see major dedicated payment service providers in the same way. With the advancement of digitalization of finance, recently in 2022, a Japanese related law was revised to require a banking license to issue safe stable coins. This strand of research is rapidly evolving.

⁵ In some countries, the option of raising or lowering the regulatory level of capital requirement conditional on the state of the economy has been added (i.e., counter-cyclical buffers). However, many consider that such a regulatory framework is difficult to implement. There are conflicting theories: In the recession, loosening the capital requirement is good to increase the bank lending (a Keynesian policy); but, it is bad to raise the probability of a banking crisis (financial crisis theory). These two views have never been converged. Such a regulation conditional on the state of the economy is called a macro-prudential regulation. The original regulations (represented by the fixed capital requirement so far) have been called prudential regulations, but now, they are also called micro-prudential regulations to distinguish them from macro-prudential regulations.

scheduled to start in 2019, with a minimum of 16% of assets for the time being and 18% (including capital) by 2022. However, the implementation of the new regulation was delayed due to the COVID-19 pandemic.

11.3 Crises and Corporate Bailouts

Redesigning the financial regulations, and the financial system more broadly, as a response to a crisis has historically been the norm. In early twentieth century, the Great Depression and other financial crises triggered the establishment of central banks and deposit insurance schemes. The COVID-19 pandemic started in 2020, just after the financial system's restructuring following the Global Financial Crisis. However, the economic condition in 2022–23 may not seem like a financial crisis yet. Private and national debts have increased in many countries, including Japan. Then Russia invaded Ukraine, and interest rates rose worldwide along with inflation due to soaring energy and food prices. The exchange rates were also significantly affected. However, simply put, the situation is ripe for a financial crisis.⁶ What kinds of institutional reforms should be made at this time? The reform process should be conducted along with an evaluation of tightening the regulations after the Global Financial Crisis. A particular concern is the extensive government bailouts for private businesses. In the following section, this issue is discussed from a theoretical perspective.

11.3.1 Corporate Bailouts

Any economist, including myself, failed to provide a sufficiently persuasive rationale to the general public about the need to bail out banks during the Global Financial Crisis and the Japanese banking crisis in the late 1990s. The rationale should have emphasized the peculiarities of the financial institutions described above. The lack of such explanations may have led the public to demand that, as large banks were bailed out, ordinary (small and medium) non-financial businesses should also be bailed out by the government during an economic crisis.

According to the theory of debt contracts, once the institutional arrangements for corporate insolvency and related markets (including the markets for credit default

Other types of macro-prudential regulations include a capital control to prevent a significant increase in capital inflows denominated in foreign currencies as well as mortgage loan limits to prevent a sudden rise in domestic real estate prices. These regulations are not so rare now in the world. Many models that extend Kiyotaki and Moore (1997) have been written as the theoretical backgrounds for those regulations.

⁶At the time of writing, in April 2023, Silicon Valley Bank in the U.S.A. and Credit Swiss in Switzerland had already failed.

swaps and land price futures) are present, there is no need to bail out each private business, even if there is a need for macroeconomic policies for the entire economy in response to a large negative aggregate shock such as the COVID-19 pandemic or a severe earthquake⁷. If a company is expected to produce profits in the future and improve its financial condition, it should be allowed to continue its business activities (along with better management) by reducing its debt through a bankruptcy procedure or an out-of-court workout. This also means that banks (creditors) must be selective in their judgments to allow a company to continue or not and instead liquidate it.⁸ Either way, debt contracts split the loss between the debtor and creditors when repayment cannot be made as promised. If the debtor and creditors cannot decide how to split in advance, the issue should be resolved through negotiations with an institutional arrangement for corporate bankruptcy. There is no room for government intervention in the allocation of loss or remaining assets as explained already.

If there is any necessity for direct government intervention in the bankruptcy of a private sector company, this should be the case when externalities exist (i.e., when there is a significant negative impact on the general public outside of the related businesses). A typical example is the collapse of the financial system, in which large financial institutions are important, creating a room for a government to intervene. Other bailout possibilities for non-financial firms exist in specific industries such as electricity and telecommunications. Large power and telecommunications companies provide the social infrastructure, and the sudden shutdown of their operations is highly disruptive. In such cases, government intervention is justified. However, as the discussion above suggests, there is no need for government bailouts for small solar power companies.

In some cases, the current institutional arrangement for corporate bankruptcy may be inadequate. If so, it is better to avoid bankruptcy because high bankruptcy costs are expected to reduce the combined share of debtors and creditors, even if they do not affect the whole economy. This argument could also be extended to SMEs. In the U.S.A., the inadequacy of the bankruptcy practices has been highlighted as making it more difficult for small- and medium-sized firms to undergo debt restructuring, and so some researchers justify direct government intervention from this perspective (Brunnermeier and Krishnamurthy 2020). In addition, regarding a large aggregate shock as the COVID-19 pandemic (or the Great East Japan Earthquake), many companies may go bankrupt simultaneously, and the bankruptcy process, which is normally smooth, may not be smooth due to “congestion,” for example, occurred in

⁷Negative shocks to the overall macro-economy should be addressed primarily through monetary policies. In addition, depending on the situation, fiscal policies to stimulate macroeconomic demand may also be considered, though with mixed evidences for the effectiveness. However, there is no need to bail out individual companies.

⁸This involves judging whether the firm has solid and profitable sales. In this sense, the firm's customers perform the ultimate screening. In business-to-business transactions, firms often lend funds each other to some extent through increases and decreases in accounts receivable and payable if there are temporary liquidity shortages in important business partners (Petersen and Rajan 1997; Love et al. 2007).

court administrative procedures. This can be called as the case of “too many to fail.” Some argue that, in this case, the bailout may be justified for all firms (Brunnermeier and Krishnamurthy 2020).

However, regarding the theoretical perspective of bankruptcy, government bailouts in this situation should be avoided. Rather, it is necessary to improve the bankruptcy procedure, to eliminate the possibility of bailouts of ordinary business firms. Recently, worldwide efforts have been made to improve bankruptcy processes. For example, the Financial Stability Board (FSB) (2022) and Díez et al. (2021) of the International Monetary Fund (IMF), suggests various reforms. In Japan, a study group with the Japanese Bankers Association as its secretariat proposed the “Guidelines for Business Revitalization of Small and Medium Enterprises” in 2022. The Japanese government has intended to end COVID-19-related business subsidies as part of its package to revitalize small and medium enterprises while establishing an improved procedure for a faster bankruptcy procedure emphasizing business revitalization.

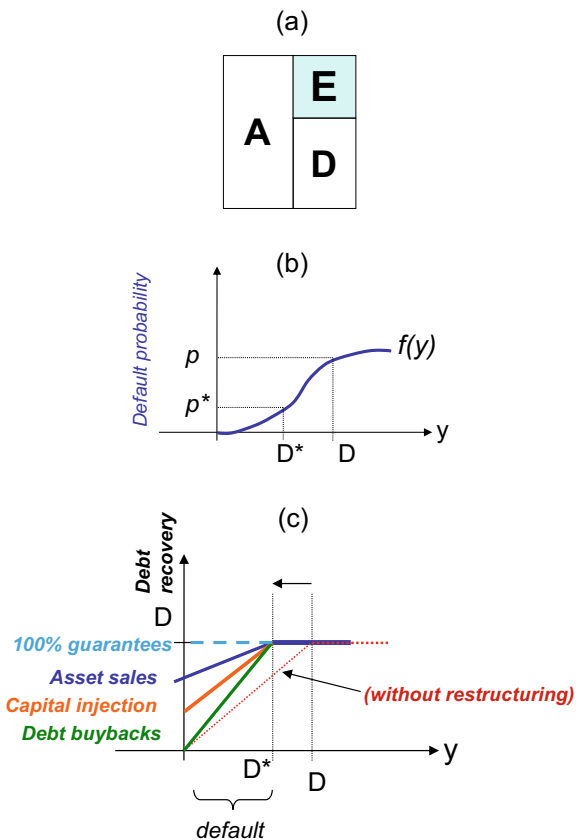
Thus, while the government should not intervene directly in the bankruptcy of private businesses in principle, it should design institutions that improve and assist bankruptcy procedures as a whole. In other words, the government has a role to write a good market rule as a law, if necessary. Note, however, that it is not always necessary for the government to set all market rules legally. For example, financial disclosure rules can be established by stock exchanges. There are also many cases in which industry associations may set rules voluntarily, not the government.

11.3.2 Corporate Bailouts as Bank Bailouts

Theoretically, if the bailouts of large banks could be justified, then reduction of non-performing loans (NPLs) by corporate bailouts could also be justified. This is because the high NPL ratio (to total loans) often triggers the bank bailouts. Recent reports by the Financial Stability Board (FSB 2020) and the Basel Committee on Banking Supervision (2021) stated that bank management remained sound (at the time of their reports) despite the COVID-19 pandemic. The reasons for this judgment are cited as enhanced capital adequacy ratios due to tightened regulations after the Global Financial Crisis and the prevention of corporate failures through various policies in each country. Indeed, also during the Global Financial Crisis, several countries, including Japan and the U.K., adopted policies to prevent or alleviate banking crises by reducing the NPL ratio through, for example, strengthening public credit guarantees for bank loans. Note that strengthening credit guarantees can be regarded as bailouts as it lowers corporate funding rates.

Theoretically, Landier and Ueda (2009) found that bailing out banks by providing credit guarantees is not a good strategy. Their study analyzes which policy action is the best to reduce the probability of bankruptcy of a large bank when the bankruptcy has a social cost. They compare four actions and show that the costs of those actions

Fig. 11.1 Various effects of bank bailout. (Source: Landier and Ueda 2009)



are different each other. The discussion is somewhat complex, but I summarize it below.

We denote a bank’s current assets as A , liabilities as D , and capital as E (Fig. 11.1a). If nothing changes, asset A increases or decreases in the next period and becomes y ; this increase or decrease is assumed to follow a cumulative distribution $f(y)$ (Fig. 11.1b). If the assets in the next period y fall below the debt level $y \leq D$, this bank is considered to be in a state of bankruptcy due to insolvency, so $p = f(D)$ is the probability of bankruptcy in the current period. If the bankruptcy probability is too high, the policy goal is to reduce it to $p^* = f(D^*)$, and we consider which action should be taken.

As the bank has not yet gone bankrupt, the value of bank assets in the current period remains unchanged even if the debt structure changes due to a public fund injection. Thus, the government (taxpayer) will lose as much as creditors gain. It is challenging to figure out this fiscal cost directly. Therefore, we compare the increases in bond prices with a decline in bankruptcy probability. There are differences in the rise in bond prices because, even for the same bankruptcy probability, the recovery rates in bankruptcy are different.

First, consider public capital injection, that is, the government gives cash and hold new shares for the same amount. In this case, compared to before the capital injection, the bank can repay the principal and interest for the amount of new cash and would go bankrupt at a lower level of the next period's assets $y \leq D^*$. However, the composition of the bank's original assets is unchanged (excluding new cash). Therefore, the recovery rate at a lower value will be a parallel shift of the original recovery rate (the line of "Capital injection" in Fig. 11.1c). When the next period's assets are $y=0$, only cash remains (y -intercept), indicating a parallel shift. This capital injection increases the current value of debt claim $V(D)$.

Similar effects can be achieved by providing a minimum loan guarantee that covers a small portion of loans, for example, 10% of loans, which is almost equivalent for the bank asset value as if the bankruptcy probability is reduced by 10%.⁹ However, the Japanese government guarantees 80% or 100% of bank loans to SMEs. With a 100% guarantee, the recovery rate becomes 100%, and the bank does not lose at all (nor do its creditors). The line of "100% guarantees" in Fig. 11.1c represents this. This is too high (invisible) subsidy and fiscal costs.

Another common measure is the (high-priced) purchase of bad assets. If the price is not high, there is no transfer from the government to the bank's creditors, and reducing bankruptcy probability is not achieved. Therefore, purchasing bad assets involves high prices if intended to rescue a bank. In a high-priced purchase of bad assets, the content of the bank's original asset A changes. That is, some bad debt disappears and is replaced by (high-priced) cash, making the bank's assets safer overall and increasing the recovery rate in the case of bankruptcy (line of "Asset sales" in Fig. 11.1c). Therefore, high-priced purchases of bad assets would raise the current value of claim $V(D)$. Importantly, the increase will be more significant than the capital injection because the recovery rate is higher, given the same target bankruptcy probability. This means the fiscal costs are also higher.

There is a scheme that can further reduce fiscal costs in case of capital injection. At the same time as injecting capital, the government should make the bank to use cash to buy the bank's own debt (bonds) at the (increased) market price. This further improves the debt-to-capital ratio. The bank's assets A remain the same, but debt D decreases. In addition, the required amount cash injections can be reduced by taking advantage of an increase in the debt price. The next period's asset value, if bankrupt, is $y=0$. That is, there is no cash left, so the recovery rate for the original creditors is relatively low, as it is back to the original point (the line of "Debt buybacks" in Fig. 11.1c). This in turn reduces the fiscal costs.

⁹The cost of such a loan guarantee can be calculated as the value of a put option, as Merton (1977) shows.

11.4 The Importance of Screening of Borrower Firms by Banks

From a theoretical perspective at the time of (near) bankruptcy, I have explained that bailing out individual companies should be avoided as it is costly for taxpayers without economy-wide benefits. Moreover, there is a further problem: such a bailout distorts the incentives of the parties involved and causes significant problems in the medium to long run. Consider a situation in which bank loan guarantees are publicly provided to banks at zero or low guarantee fees. In particular, if bank loan guarantees are substantial (e.g., 100%), banks will not scrutinize firms' business conditions before lending to them, and they may waste their funds.

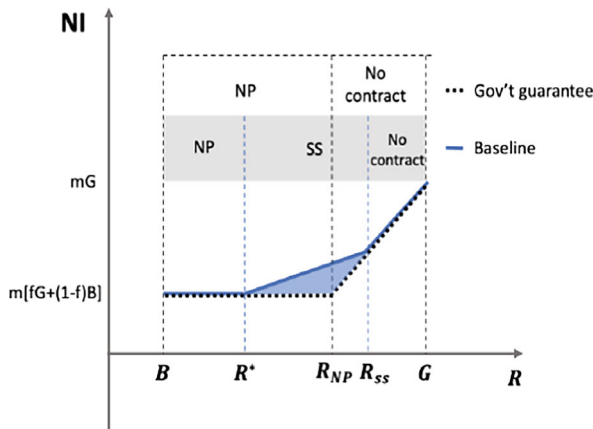
However, the impact of public guarantees on the bank screening of borrower firms is not apparent in existing theories. For example, even with a 100% loan guarantee, banks would screen firms under the assumption of perfect information if there were a small cost due to the bankruptcy of borrower firms, such as a negative performance review for the bank employee responsible for making the loan.

The theory of asymmetric information usually considers a case in which firms (or managers) know whether they are good (i.e., profitable and unlikely to go bankrupt) or bad (i.e., highly likely to go bankrupt), but banks do not know. This is the setup of the adverse selection theory. This theory is applied in some papers in the way that firms are not screened when the economy is booming or when the bank's interest rate costs are low, resulting in a significant social cost (Dell'Ariccia and Marquez 2006; Figueroa and Leukhina 2015). Using this adverse selection framework, we could write a model in which firms are not screened when their credit guarantees are too generous. However, as explained in Sect. 11.2, a more sophisticated general equilibrium theory shows that firms can always be screened (i.e., only the separating equilibrium becomes an equilibrium) by designing loan contracts carefully considering for adverse selection (Bisin and Gottardi 2006). In other words, the theory that firms cannot be screened due to adverse selection does not hold unless ad hoc assumptions are made. Therefore, modifying the basis of incomplete information about the type of firm and creating a new canonical model is necessary to develop a theory of firm screening. This is our intention in Gao and Ueda (2022).

11.4.1 *Bank's Screening with Cost for Bank Lending Examination*

Gao and Ueda (2022) argue that it is uncommon for a small firm to apply for a loan if knowing that it will not make money, and instead assume that the firm does not know whether it is in a profitable business (a good firm) or a loss-making one (a bad firm). In other words, they all think they are profitable and understand the risks of failure in a same way. A theoretical model is then built in which a bank can know the

Fig. 11.2 Firm screening and credit guarantee.
(Source: Gao and Ueda 2022)



borrower’s type by examining the loan application at some cost and decides whether it should lend to it¹⁰. The assumption is that the probability of a company’s success (or bankruptcy) cannot be determined entirely at any cost; but that the accuracy of the screening increases as cost increases.

The theoretical results show that, for realistic parameter values, banks will examine and screen firms and lend to them at some cost. For simplicity, we assume a small open economy, that is, a country cannot influence the international interest rate. Under this assumption, we consider the economy where banks raise external funds at the gross interest rate R . The level of interest rate R relative to the profit G of good firms and profit B of bad firms is an important parameter. A separating equilibrium is established when R is within a realistic range.

In Fig. 11.2, the market equilibrium in the absence of government intervention is indicated by the solid line titled “Baseline.” A separating equilibrium is obtained if funding rate R is in the SS region. In region SS , firms are screened and separated by type based on information obtained by banks. In region NP , firms are not screened; thus, good and bad firms are pooled. However, in the NP region, where the funding rate is too high (at the right end of the x-axis), no loan contract is made, shown as *No Contract*.

If 100% loan guarantee is publicly provided, banks have no incentive to pay the costs of screening firms.¹¹ In this case, since the total loan amount is capped by

¹⁰In a situation of adverse selection where only the borrowers know the risks and returns of the business, Bernanke (1983) posited that banks bear the cost of screening firms, bringing about a separating equilibrium, and speculates that the collapse of many banks during the Great Depression in the United States may have been one of the causes of the stagnation of fund flows from households to firms.

¹¹Theoretically, this argument would go through in the same way, even if such loan guarantees do not currently exist, but if people (in this case, banks) predict that such policies are likely to be implemented in an emergency. Please refer to Gao and Ueda (2022) for several variables appearing in Fig. 11.2.

deposits, compared to the separating equilibrium, firms identified as good ones will receive less loans. On the other hand, some funds are lent to firms that are identified as bad ones. Consequently, the national income (NI) declines at the macroeconomic level. This is indicated by the dashed line titled “Government guarantee” in Fig. 11.2, where the separating equilibrium disappears in region SS, and the no-contract region becomes wider. The shadowed area between the solid line (“Baseline”) and the dotted line shows the decline in NI.

While Gao and Ueda (2022) focused on loan screening and firm selection as a particular role of banks, Diamond and Rajan (2001) focused on the debt collection role of banks. Although their study does not discuss loan guarantees, the bank acts as a specialist in debt collection. Apparently, if the loan guarantee is sufficiently large (e.g., 100% or 80%), efforts to collect loans are not needed. In possible variants of either models, if efforts were not required for loan screening or collection, bank employees’ abilities (or human capital) could decline significantly. In this case, even if banks try to return to their original roles in the future, they may not have appropriate persons in charge of lending decisions. By the way, the screening of firms in the stock and bond markets by institutional investors could be analyzed in a similar framework.

11.4.2 Empirical Evidence on Screening of Firms

In economic theory, the equation “marginal product of capital = market interest rate” holds in the competitive market equilibrium when firms are examined and screened appropriately. Of course, there may be differences between industries (due to risks, monopolistic profits, etc.) and from year to year (due to booms or busts, natural disasters, etc.). However, after removing such differences within the same industry in the same year, we can assess how close (or uneven) are the marginal products of capital, which is represented by return on assets, across firms. This theoretical prediction can be used to evaluate the degree of firm screening. In an econometric analysis using panel data, Abiad, Oomes, and Ueda (2008) showed that inequality in returns, measured by the Gini coefficient of the return on assets (ROA), decreased after financial liberalization in several emerging market economies. In other words, we empirically demonstrate that firms are better screened after financial liberalization.

Ueda and Dovchinsuren (2020) measured the inequality in Japanese firms’ profitability over 1983–2017 using *Surveys for the Financial Statements Statistics of Corporations by Industry*. The sampling rate of *Surveys for the Financial Statements Statistics of Corporations by Industry* differs depending on the size of the firm. From time to time, the way firms were sorted by size as well as the sampling rate for each category of firms changed. We correct for these sampling rate variations by taking a random sample (i.e., resampling or bootstrapping) from the original sample to maintain the same sampling rate relative to the population (based on the Economic Census) in any year. We then measure the Gini coefficient of firm profitability (ROA) in the same year controlling for the industry. The resampling was random but not

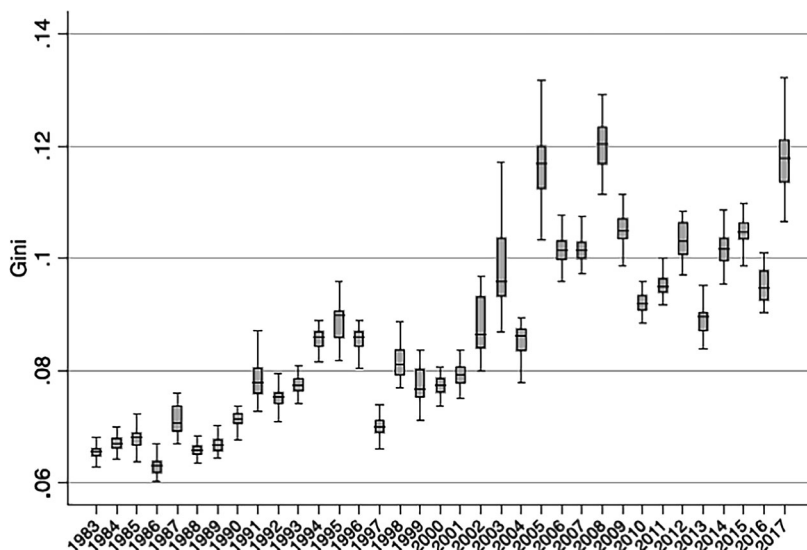


Fig. 11.3 Gini coefficient of corporate profitability. (Note: Gini coefficient per year for each of 30 resamples. The solid line in the box indicates the median of the Gini coefficient of 30, the top of the box is the third quartile point, the bottom is the first quartile point, and the tip values of the upper and lower whiskers represent the maximum and minimum values, respectively. Source: Ueda and Dovchinsuren (2020))

identical each time. Hence, we resampled 30 times. Figure 11.3 shows a candlestick graph. The upper and lower edges of the box show the first and third quartiles of the Gini coefficient, respectively, based on 30 resamples obtained every year. The middle bars indicate the median. The upper and lower ends of the whiskers indicate maximum and minimum values, respectively. The results show that the degree of firm selection in Japan worsened over time.

Regarding firms with low profitability, literature indicates that too many have been surviving in Japan, leading to a debate on Zombie Firms. (For a detailed discussion on this subject, please refer to Chap. 10.) There are also many theories and empirical analyses (see the survey by Uchida (2021)) on the extent to which low-profit companies are naturally eliminated and intertwined with business cycles.

11.4.3 Corporate Bailouts and Financing Supports During the COVID-19 Crisis

The COVID-19 pandemic has brought corporate bailouts and loan assistance to countries worldwide, but on the largest world-leading level in Japan. Regarding bank loans, the Japanese government provided loan guarantees and measures to

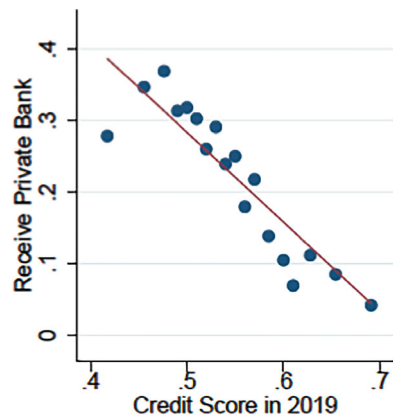
lower loan interest payments. Together, the policy is called zero-zero loans, with which private sector banks can provide loans without risk.

The loan guarantee scheme, originally 80%, expanded to 100% in 2009 during the Global Financial Crisis and was extended in response to the Great East Japan Earthquake in 2011. This scheme has been extended sequentially without much intermission. In response to the COVID-19 pandemic, a new scheme of 100% guarantees was launched for small- and medium-sized enterprises (SMEs) in early 2020 (for those with a sales decline of 15% or more). The government also covers the interest rates paid by such firms. Government-affiliated banks also provided a similar loan program (started earlier than private sector banks). Additional subsidies and tax exemptions were also provided.

Hoshi, Kawaguchi, and Ueda (2023) surveyed firms regarding various governmental support to SMEs in collaboration with Tokyo Shoko Research (TSR), a leading credit rating agency in Japan. They showed that firms that received the government support had a high probability of bankruptcy at the end of 2019, before COVID-19 pandemic started. Figure 11.4 shows zero-zero loans from private sector banks, with the percentage of firms receiving such loans on the y-axis and the credit score at the end of 2019, that is, the degree of the lower probability of bankruptcy on the x-axis (the closer to the origin, the higher the probability of bankruptcy). From this figure, we see clearly that the policy creates zombie firms in the future.

By the way, Uesugi et al. (2021) also showed that more loans were given to zombie firms defined in 2019. Miyakawa, Oikawa, and Ueda (2021) provided an analysis of Japanese firms' exits during the COVID-19 pandemic.

Fig. 11.4 The ratio of zero-zero loans received from private sector banks and the Tokyo Shoko Research (TSR) rating (original scores divided by 100) at the end of 2019. (Source: Hoshi et al. 2023)



11.5 International Comparison of Corporate Bailouts

Differences in public support for the corporate sector existed during the COVID-19 pandemic, the same way as during the Global Financial Crisis of the late 2000s. Does excessive support negatively impact the macroeconomy? Japanese government provided generous support, but why is it always overprotective toward private businesses? Are there institutional reasons compared to other countries? Understanding this will help us to see a clearer path for future institutional reforms.

11.5.1 *Corporate Bailouts and Recovery from the Global Financial Crisis*

During the Global Financial Crisis, the Japanese government provided some of the world's largest public funds to the private sector, especially by expanding the coverage of guarantees for SME loans from 80% to 100%.¹² Other countries, such as Italy, have similar policies. Such policies have been implemented in several countries, albeit to varying degrees. Theoretically, this would cause problems such as a reduction in screening intensity for borrowing firms and distortion in the goods market created by the survival of zombie firms. However, if these policies had contributed to mitigating the banking crisis, one could argue that those countries resolved the situation relatively quickly.

Ueda and Uzui (2022) conducted a regression analysis using cross-country data, covering mainly OECD countries. Specifically, they examined how the recovery of GDP and its growth rate relative to pre-crisis trends seven years after the Global Financial Crisis relate to policies, such as corporate bailouts and public support for bank loans. Policy indicators were obtained from the IMF (2013). We also evaluate the effects of fiscal and monetary policies.

Our analysis revealed the negative effects of corporate bailout policies and public support for bank loans. In other words, such policies delayed macroeconomic recovery. Monetary policy shows positive impacts, but its statistical significance is weak and not solid in the robustness checks. The effect of the fiscal policy was either positive or negative, with no robustness and generally ineffective. These results are consistent with the conventional view of Keynesian policies, which are known to be ineffective in the medium to long run.

¹²Uesugi (2022) summarized various empirical analyses on public support for SMEs in Japan. There is also a strong argument that the government's response to the Great East Japan Earthquake was excessive (Saito et al. 2015, etc.). For empirical evidence on the relationship between bank and corporate exits during the Great Earthquake and the impact of public support, see Uchida et al. (2015).

11.5.2 Corporate Bailout and Bankruptcy System in the COVID-19 Crisis

Fu and Ueda (2022) examined the relationship between the bankruptcy system and the government support for SMEs during COVID-19 pandemic in OECD countries. The legal system is the foundation of a country's financial system, especially represented by creditor rights, the efficiency of bankruptcy procedures, the degree of corporate governance, and the origin of the legal system (the British vs. the German v.s. the French legal systems). We investigate how these institutional factors determine the government interventions, controlling for the financial and fiscal policies.

Our analysis shows that countries with stronger creditor rights (those often with the German legal system) provide more corporate bailouts and loan assistance. These countries include Japan and Germany, where bankruptcy means mainly liquidation rather than rehabilitation, and US chapter 11-like reorganization laws were not introduced until the early 2000s. In Japan, the Civil Rehabilitation Law was enacted in the early 2000s, and the Corporate Reorganization Law was revised dramatically around the same time. However, these laws have hardly been utilized.

According to Kawata and Yamashita (2013), who used loan data on from several banks, the average recovery rate of loans by creditors in the event of bankruptcy is approximately 90% in Japan, unusually high compared to the average recovery rates of half to two-thirds in Europe and the U.S.A., respectively. Therefore, when facing bankruptcy, creditors suffer fewer losses and receive larger shares through repayments from debtors than on average in Europe and the U.S.A. Hence, the assets available to debtors are considerably smaller in Japan. Furthermore, in Japanese SME, managers often provide personal guarantees, and the corporate bankruptcy often lead to personal bankruptcy. Thus, the debtor's life is fragile in Japan in light of the legal system and its implementations, and therefore, there is a room for intervention by politicians.

Political intervention in banks and corporate bailouts during crises occurs in many countries. For example, Igan, Mishra, and Tressel (2011) showed that the donations from bank managers to lawmakers are the only variable in a regression analysis that explains the receipt of government bailout funds by local banks during the Global Financial Crisis in the U.S.A. Although I am unaware of any such empirical analysis for Japan, cases of the illegal receipt of subsidies for the COVID-19 disaster (including METI officials) continue to emerge, along with politicians' meddling in the SME loans from the Japan Finance Corporation (JFC), a state-owned bank. These distortions are additional costs to the economy, which can be easily explained by an economic theory.

The resource allocation in bankruptcy is an intrinsic characteristic in any debt contract. They do not require government intervention, provided that the contracting parties accept it, regardless of how creditor-friendly it may be. However, if, as a practical matter, unnecessary political interventions are common in countries where

the debtor is weakly protected, then making the legal system and its implementation more debtor-friendly could stop such wasteful political interventions.

The immediate challenges in institutional reforms in Japan are to make the Civil Rehabilitation Law and the Corporate Reorganization Law easier to use, and further improve the Alternative Dispute Resolution (ADR) procedure for bankruptcy, which was indeed recently improved (in 2022). These are mostly efficiency enhancements in the insolvency procedures. In addition, it seems necessary to have procedures that decide how to increase the debtor's share in advance. Thus, eliminating managers' personal guarantees when companies take out loans and decreasing collateralized loans are important. Related efforts have already started in Japan. Moreover, reducing the overall time and cost of bankruptcy procedures mitigates the debt overhang problem, benefiting both debtors and creditors. Note that the debt overhang issue is also important here but omitted due to the page constraint (see Ueda (2022) for further discussion).

Of course, if debtors are more protected in the event of bankruptcy, the share of creditors, such as banks, would become proportionally smaller, and the quality of non-performing loans (NPLs) would worsen. However, banks are special, protected by a central bank and deposit insurance, and regulated and supervised to prevent moral hazard from the public insurance. Therefore, an efficient response to a crisis is to gather the bankruptcy costs to banks and narrow the room of government interventions.

11.5.3 Supplementary Argument: Labor Market Issues

It is often argued that corporate bailouts are not necessarily intended to benefit creditors but to save jobs for workers. Among the various subsidies provided in response to the COVID-19 pandemic, a main one in Japan was the Employment Adjustment Subsidy, with which the government subsidizes a portion (or all if specific requirements are met) of the absence allowance paid to employees by employers who are forced to downsize their business activities for economic reasons and temporarily suspend job positions but want to maintain the employment of their workers (Hoshi, Kawaguchi, and Ueda 2023). The US government similarly responded to COVID-19 by providing low-interest loans to small businesses to continue to pay their wages for their workers (the Paycheck Protection Program).

However, this is a labor market issue and is not the focus of this chapter, which deals with the financial system. If the labor market is functioning well, workers should find the next suitable job. Hence, the government should not adopt policies that prevent workers from losing their jobs in their current companies. However, the Japanese labor market does not seem function perfectly. But, these problems should be resolved through an analysis based on labor economics. Bailing out individual

companies would create another distortion interacting with the unemployment insurance system (e.g., incentive problems) and macroeconomic policies.

If institutional factors related to finance also prevent the labor market from functioning perfectly, it can be viewed as a problem of the financial system. A theoretical possibility was analyzed by Claessens and Ueda (2020). The premise is that the labor market is functioning well, with workers moving from one job to the next, but society loses money when workers move. This is a case in which workers must work hard to acquire (invest in) skills specific to individual firms, which is often the case in industries dependent on advanced knowledge and information.

The following results were obtained by Claessens and Ueda (2020): Firms want workers to hone their firm-specific skills, and an optimal labor contract should promise high wages in the future. However, a bankruptcy system does not always allow to implement optimal labor contracts. In other words, workers are aware that the economic situation may change suddenly, the firm may go bankrupt, and the promise of future payback may not be fulfilled. Therefore, the parties involved cannot enter an optimal long-term contract in a company with an unstable future and uncertain economic conditions. In response, our theory suggests that policy measures to secure employment could effectively prevent such a low level of their specific skills.

However, the same theory also shows excessive job security is not good. Since bankruptcy cannot be eliminated, the probability of bankruptcy increases if firing workers is too difficult. Therefore, long-term contracts become even more difficult to emerge.

Based on U.S. data, our empirical analysis demonstrates that the assurance of basic labor standards helps the growth of industries where many college graduates work. However, a survey of the relevant literature reveals that most existing empirical studies find that job security that exceeds such basic labor standards, as seen in Japan, Western Europe, and elsewhere, is detrimental to the economy. Heimberger (2021) reviewed many studies and obtained similar results.

11.6 Conclusion

Bankruptcy is an insurance contract between a debtor and creditors that reduces repayment if the debtor cannot repay its promised amount. If the ownership of corporate assets is transferred to creditors, liquidation occurs; otherwise, debt

restructuring occurs. In either bankruptcy procedure, there is no room for the government to intervene in a contract that is mutually agreed upon.¹³

Additionally, government interventions are theoretically detrimental to the national income. This is because corporate bailouts expectation make it impossible to distinguish firms that are not profitable from those that are, leading to inefficient capital allocations. Indeed, during the Global Financial Crisis, countries that bailed out many firms experienced weaker recoveries.

There are two exceptions. One is the banking industry. A bank is fragile because of its nature, that is, it may go bankrupt due to rumors. Such rumor-based bankruptcy must be eliminated by deposit insurance and the central bank. Here, capital requirements are necessary to prevent the moral hazard caused by such public insurance. The second is entities whose social costs of bankruptcy are substantial, for example, big financial institutions important to the financial system and large infrastructure companies, such as electric power companies. However, such government interventions should be avoided as much as possible, and various institutional designs should be considered. Basel III was designed to reduce the likelihood of government interventions in the systemically important financial institutions.

Problems arise with generous government support and bailouts of individual companies. Theoretically and empirically, such a policy negatively impacts the economy. However, in Japan, there are loud calls for the government to keep its current course. Consequently, there has been much greater government interventions in individual companies than in other countries during the Global Financial Crisis and the COVID-19 pandemic. Such policies have been in place since the banking crisis at the end of the 1990s and have gradually strengthened after the collapse of Lehman Brothers and the Great East Japan Earthquake. Consequently, the dispersion of corporate profitability among Japanese firms has increased since the 2000s. In other words, the effectiveness of screening firms in allocating funds has weakened over the past two decades.

Regarding COVID-19, some Western countries adopted corporate rescue measures similar to those in Japan. This is understandable as a political decision in a situation where many banks and firms are simultaneously on the brink of bankruptcy, congesting bankruptcy procedures and raising the social costs of bankruptcy. However, this is due to institutional inadequacies. Not all developed countries have adopted such policies. Even if they do, the scale and types of such policies are smaller than in Japan. Government interventions were more significant in countries

¹³This chapter does not touch on it much, but Ueda (2022) explain that liberalization is necessary for financial markets to function well. This is clear from the history: For example, under a controlled price system, the futures market for rice, which had existed even in the Edo period, disappeared in Japan. However, at the same time, Ueda (2022) also explain that it is necessary to properly establish financial and economic systems, such as bankruptcy procedures and corporate governance, that allow the market to function well. In other words, public involvement is necessary to create and implement such market rules. By strengthening such institutions, markets work well. However, hard laws are not always necessary, instead soft laws, i.e., rules such as those established by stock exchanges may be sufficient.

where bankruptcy is more detrimental to debtors. Conversely, improving the asset allocations in bankruptcy to make it more debtor-friendly should reduce political pressure for government interventions on distressed SMEs.

International regulations on corporate bailout policies, similar to the Basel rules for financial institutions, should also be introduced. In the EU and the (original) Trans-Pacific Partnership Agreement (TPP), there are mechanisms that do not allow member countries' governments to support companies that harm healthy competition. Although the EU relaxed its regulation after COVID-19, efforts should be made to prevent the governmental corporate support (e.g., subsidies) more strictly globally.¹⁴

11.7 Comment by Hirofumi Uchida: The Pros and Cons of Corporate Bailouts as a Crisis Response¹⁵

11.7.1 Summary and Overall Comments on the Paper

Ueda's paper, "Financial System and Crisis Response—Theoretical Background and Policy Issues on Public Bailouts of Private Firms," focuses on the policies that took the form of corporate rescue in response to the economic turmoil associated with the global spread of COVID-19 in Japan, and examines their pros and cons. First, in Sect. 11.2, the author introduces a part of Ueda (2022), which explains the current state and institutions of the financial system and policies up to the first half of 2020. Starting from the basic theorems of welfare economics, which are the basis of normative analysis in standard economics, the author examines whether, in the presence of incomplete information, government intervention to corporate default can be justified in financial transactions using bonds. He then explains the merit of bailing out banks, touching on the maturity transformation as one of the important functions of banks, the problems of moral hazard and "too big to fail," and the trends in international bank regulation.

Section 11.3 theoretically examines government policies to rescue companies in the COVID-19 crisis. Based on the theory of debt, the author points out that unless there is market failure, corporate rescue by the government cannot be justified, that there is room for the intervention in the case of externalities, but that if the cause of the externalities is deficiency in the bankruptcy system, what is needed is not rescuing individual firms, but the development and improvement of the bankruptcy

¹⁴Relatedly, in June 2022, the EU decided on a policy to regulate subsidies from governments within and also outside the EU for companies operating within the EU.

¹⁵This paper is financially supported by JSPS KAKENHI Grant Numbers 20H01517, 22H00860.

system itself. He also examines corporate rescue based on the objective of preventing an increase in non-performing loans and bailing out banks, and explains that such a rescue cannot be theoretically justified.

Despite its thin theoretical basis, however, corporate rescue is widely practiced in reality. On such rescue, Sect. 11.4 further theoretically demonstrates that when it is conducted in the form of corporate debt guarantees, it causes another problem of making banks' selection of firms inefficient. Based on data, the author also discusses that the likelihood of these problems actually occurring is high, where he compares the distribution of profit rates of Japanese companies over time, and points out that the selection of firms is not being properly conducted. He also shows that the corporate support in the COVID-19 crisis, which is supposed to be provided based on firms' sales in 2020, is actually being provided to companies with a high probability of bankruptcy.

In Sect. 11.5, the author introduces empirical analysis of international comparison. The first analysis is an analysis that tests the hypothesis that, to the extent that corporate rescue packages in different countries are distorting the real economies, there should be a delay in recovery from the crisis among them. The author reports the result that countries with generous corporate rescue packages and policies to support corporate borrowing have lower levels of GDP and growth rates. The second analysis examines the relation between financial legislation, particularly the degree of efficiency of debtor protection and bankruptcy systems, and how ample corporate rescue and lending support are. The result is that countries with stronger creditor rights tend to provide more generous rescue and support. The author also discusses the idea of rescuing firms to protect employees' jobs, and points out that problems on jobs should be resolved in the labor market, not in the financial market.

As the above summary indicates, the Ueda paper can be evaluated as an important paper that makes and considers many important points regarding the pros and cons of government intervention to firms and banks during the COVID-19 crisis. In particular, the introduction of different empirical analyses in this paper is important, through which the author points out from a calm and objective standpoint the problems in the government's policies, which may be excessive in the face of the COVID-19 crisis. In recent years in Japan, public support has become more and more generous as enormous economic shocks occur, and the support has been taken for granted, resulting in seemingly excessive support. Saito, Nakagawa, and Gu (2015) pointed out the problem that the government excessively estimated the amount of budget needed for reconstruction from the Great East Japan Earthquake. The recipients seem to have taken such generous support for granted, and the support was expanded to meet these expectations. The Ueda paper points out that such a situation can be observed also in the COVID-19 crisis, and sounds an alarm to it from an academic perspective.

11.7.2 Commentary on the Ueda Paper

However, the Ueda paper may not necessarily be easy to understand for readers. I have been commenting on the paper from its draft stage, receiving explanations from the author himself, and writing this comment on the revised draft that incorporated my comments. Compared to the first draft, the final manuscript has been significantly improved, but there still remain parts with the lack of sufficient explanations. It may be difficult for first-time readers who are not familiar with academic papers to understand the author's intentions unless the author fills in the space between the lines. My first comment on the Ueda paper is related to this point: in this book, which targets a wide range of readers, I would have liked to see a more plain descriptions with taking into account such readership.

This comment, however, does not mean that Ueda's paper is worthless. Rather, in sections such as the introduction of the empirical results, the paper provides important implications (criticisms) for the government's policies during the COVID-19 crisis. Although there are some reservations that will be pointed out below, this paper contains enough contents that a wide range of readers should read.

Let me provide some supplementary explanation to understand the importance of the Ueda paper. First, to correctly understand this paper, we need to check its style. Ueda's paper is not an academic paper that reports newly discovered academic achievements, but a paper that summarizes already publicized or ongoing academic achievements. Also, it is not a review paper that summarizes the results in various papers from an academic perspective, but a practical paper with social significance that presents implications for urgent economic issues on corporate rescue and bank bailouts during the COVID-19 crisis.

On the other hand, in making such a summary, Ueda's paper only focuses on the research that the author himself has conducted. Because his research is based on a common awareness of the issues, this paper provides a big-picture implication that individual papers cannot, but because it is based only on the author's own research, it touches on neither the vast academic achievements nor various important practical issues. In this sense, we need to understand that some of the author's arguments here do not necessarily reflect the consensus of the academic researchers.

11.7.3 How to Read Policy Implications in Ueda's Paper

In relation to the above points, I would like to touch on the policy implications provided in Ueda's paper as my next comment. Not only in economics but also in other fields, following academic or scientific approaches, we first theoretically propose a mechanism behind various natural, social, or economic phenomena (theoretical analysis), and then test the real validity of the theory by statistical

analysis using actual data (empirical analysis). If the empirical analysis supports the validity of a theory, policy implications derived as a consequence of the theory becomes plausible implications with a secure theoretical foundation. This procedure to establish the theoretical basis of a policy is also backing the concept of EBPM (Evidence-Based Policy Making), which has been attracting attention in recent years.

While the above procedure seems to be widely understood, however, the opposite statement that “policy implications based on theories that have *not* passed the test of real validity do not have a theoretical foundation” does not seem to be well-understood. It is often the case that we cannot obtain sufficient data for economic phenomena, and it is often difficult to test a specific theory. Therefore, there are many theories that have not been tested by empirical analysis, and the policy implications derived from such theories may not be sufficiently founded.

Taking into account these points, when examining the policy implications of the Ueda paper, some of the implications presented there, especially many of those presented in the latter half of the paper, are based on the results of empirical research conducted by the author himself, and therefore these implications have sufficient foundation backed by real data. However, other implications are mere speculations not based on empirical evidence. For example, the implication presented in the first half of Ueda’s paper that “corporate rescue is unnecessary” is an implication derived from a rigorous theoretical model of financial contracts, but this theory cannot be easily tested by empirical analysis, and so the derived implications are founded only “within the scope of that theory” or “if real financial contracts are conducted according to that theory.” Unless the assumptions underlying the theory are met, the implications are unfounded.¹⁶

It is true that the theory of financial contracts (for example, the CSV model) is a model that focuses on the forms of financial contracts that are actually used, and is developed to explain why such forms are used. However, there is a possibility that the same forms of contracts are being used for other reasons. Many economic theories are difficult to test, and it is often the case that there are multiple theories that can explain the same phenomenon. In such a case, it is difficult to determine which of them has the highest real validity by following a rigorous scientific approach, and so we cannot help but judge the validity based on our experiences as experts, related data, corroborative evidence, and so on. However, some of the implications in the Ueda paper have not gone through such a process, and are thus merely based on the author’s personal beliefs.

As the author himself admits, the Ueda paper is not a comprehensive summary of the related literature. Therefore, there is a possibility that a claim different from the author’s may be more plausible. In particular, as mentioned below, some of his

¹⁶For example, the author provides a policy implication that, to the extent that bankruptcy systems and related markets (such as derivative markets) are well developed, there is no need to rescue individual firms even at the time of a major economic shock. However, this implication is valid only when the actual bankruptcy system and related markets are sufficiently developed as the underlying theory assumes. I believe that such presumptions are not a good description of reality.

policy implications include claims that could cause social friction, and so I would have liked that the author also presented alternative theories, and proposed policy implications from a more comprehensive perspective.

11.7.4 The Purpose of Corporate Rescue

In relation to the above comment, I would like to sort out the parts of the author's evaluation of corporate rescue and bank bailout that I agree with and that I do not. First of all, let me emphasize again that I generally agree with the derived implications related to the pros and cons of the rescue that are based on empirical analysis (evidence). In particular, I agree with the judgment that there is excessive rescue by the government in recent Japan. However, as mentioned above, we must carefully judge the validity of implications that are only presented as theoretical possibilities.

Second, in his paper, the author discusses "corporate rescue as a means of bank rescue," and suggests that there be no need for such a policy. However, I feel somewhat uncomfortable with the logical development behind this argument. If a firm is rescued and the loan to the firm does not become a non-performing loan, then the lending bank does not suffer a shock. In this sense, corporate rescue could indeed be a means of bank bailout. However, in reality, corporate rescue is primarily under the jurisdiction of the Small and Medium Enterprise Agency as part of its small and medium enterprise policy, and is not carried out by the Financial Services Agency, which is concerned about bank bailout. Therefore, even if one criticizes "corporate rescue that is carried out for the purpose of bank bailout," the policy authorities would consider the criticism as off-target, because they have not considered such a purpose from the beginning.

Note that I do not criticize the consideration of corporate rescue as a means of bank bailout per se. Even if the policy authorities are not aware of it, there is a high possibility that generous corporate rescue actually prevents an increase in non-performing loans and contributes to the stability of banking system. In this sense, corporate rescue produces an external economy in the form of bank bailout. Based on this theoretical possibility, we could consider corporate rescue as bank bailout, and could produce a policy implication that the policy authorities should (or should not) rescue firms by taking into account its impact outside their jurisdiction. Rather, such an implication is sufficiently meaningful. However, Ueda's paper also suggests that if the aim of the corporate rescue is bank bailout, we should use more direct means other than corporate rescue. If, in this manner, the author after all does not theoretically support the idea of rescuing firms to bail out banks, there was little need to mention this very issue of corporate rescue for the purpose of bank rescue from the first place.

Third, regarding the purpose of corporate rescue, there are important points that are not addressed in Ueda's paper. Among measures for the corporate rescue in the event of a major economic shock, there is provision of funds to firms that would otherwise go bankrupt due to the shortage of working capital. Such a measure can

theoretically be justified to the extent that it is provided to firms that are in financial difficulty due to the temporary shock, but can generate sufficient economic value (net present value) once they obtain funds. As a matter of fact, if the financial market is perfect as the author assumes, such firms could obtain funds from private financial institutions. However, especially for small and medium-sized enterprises (SMEs) on which the problem of information asymmetry is significant, there is a high possibility that they face difficulty in raising funds even in normal times, and that public financial support to them actually improve the situation. In the event of a major economic shock, it is difficult to distinguish whether a firm that faces the scarcity of working capital is a good SME or a firm with low business viability that should not survive. In such a case, private financial institutions may not provide funds to the former, and so public support can be justified.

Of course, this claim is also a theoretical possibility that needs to be empirically tested. And, it is difficult in reality for the government to identify good firms that are in financial trouble only temporarily and support only them, so such a support could result in the formation of a breeding ground for excessive support as mentioned above. However, we should at least consider this (theoretical) possibility that we need the public support to provide funds to firms for this reason, and evaluate these (and other) policies based on a more comprehensive viewpoint.

Fourth, Ueda's paper also discusses the possibility of corporate rescue to secure employees' jobs, arguing that job security is a labor market issue and should not be resolved by corporate rescue. This policy implication is theoretically correct under the assumption that the labor market is efficient. And, as the author points out, from the viewpoint of economics, this is the issue to be handled in the field of labor economics. However, as the author also mentions, it is unlikely that the Japanese labor market is efficiently functioning. And, given that the availability of funds as an economic resource actually plays an important role in the survival of firms and job security, it seems too strong to argue that financial analysis does not need to handle this issue at all.

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