Corporate Financial Surpluses and Allocation of Internal Cash Flow in Japan: Microdata Analysis by Enterprise Size Based on Financial Statements Statistics of Corporations by Industry[*]

Jun-ichi Nakamura

General Manager, Research Institute of Capital Formation, Development Bank of Japan

Abstract

This paper uses annual survey slips data in the Ministry of Finance's Financial Statements Statistics of Corporations by Industry (FSSCI) to analyze the stylized facts and determinants of financial surpluses (excess savings), cash holdings, and allocation of internal cash flow in enterprises with a wide range of capital sizes for the 20 years between 1996 and 2015 when the corporate sector continued to record financial surpluses or excess savings. The estimation results of the excess savings function and the cash holdings function identified the influence of financial constraints in small and micro enterprises and in preparation for lumpy investment as one of the factors behind excess savings and cash holdings. While no behavior of expanding savings to accumulate cash or repay debt was identified, the results indicated the possible excessive accumulation of cash caused by corporate governance problems in firms featuring business diversification and larger boards. The estimation results of the cash flow usage function confirmed that the propensity to spend changed in the direction of giving priority to securing liquidity after the Global Financial Crisis around 2008, and that smaller firms had a higher propensity to spend on cash accumulation. Meanwhile, firms featuring business diversification and larger boards tend to restrict the outflow of cash. This tendency is strong particularly among major firms. Even if major firms accumulate cash in preparation for future investment, M&A and FDI are in mind rather than domestic plant and equipment investments.

　　Key words: financial surpluses, excess savings, cash holdings, cash flow sensitivity, corporate governance

　　JEL Classification: D22, E22, G31, G32

I.　Introduction

During Japan's "lost decade" until the early 2000s, the existence of so-called "zombie firms" was considered to have impeded the metabolism of industry and caused long-term stagnation in Japan (e.g., Caballero, Hoshi, and Kashyap, 2008). However, as Fukuda and Nakamura (2011) indicated, the majority of "zombie firms" recovered mainly because of so-

---

called "restructuring," such as reduction of employees and fixed assets, by the early 2000s.

As Nakamura and Fukuda (2013) pointed out, the recovery of "zombie firms," which rely on cutting costs, had a deflationary effect on the macro economy to some extent. At the same time, supposing that the existence of the zombie firms became the main cause of long-term stagnation by preventing the metabolism of the industry, as was commonly asserted in the past, production factors released by zombie firms would have been rapidly absorbed by healthy firms or new entrants, and profitability of the corporate sector would have greatly improved with a substantial increase in capital investment for innovation. In reality, however, an improvement in profitability and increase in capital investment was only temporary and limited, even taking into account adverse shocks such as the Global Financial Crisis and the Great East Japan Earthquake.

Since the end of 2012 under so-called Abenomics, the package of economic policy introduced by the second Abe administration, corporate earnings have reached a record high thanks to the depreciation of the yen brought about by drastic monetary easing. However, the expected virtuous cycle of corporate earnings and capital investment has been realized insufficiently. Meanwhile, further enhancing of corporate profitability, which has been much lower than in other economies, is still a big issue. Moreover, financial surpluses or excess savings (internal capital minus capital investment)[1] of the corporate sector has further expanded, much of which has been used to repay debt or to accumulate cash reserves. As a result, "zero-leverage firms," which have no debt or enough cash reserves to repay all their debt, have been not uncommon in recent years. These situations invite the criticism that "they should use their excess cash to invest more actively." The fact that Abenomics set corporate governance reforms as the main axis of growth strategy reflects the view that the business attitudes of listed firms has been too conservative in terms of corporate value maximization due to the weakness in disciplinary pressure from shareholders.

However, the empirical analysis by Nakamura (2017) on the investment behavior of listed firms in Japan did not find any solid evidence regarding the influence of corporate governance on investment behavior after the Global Financial Crisis, even though the data before the crisis indicated that the risk averse tendency of top managers could lead to restrained investment, as assumed by the corporate governance reforms under Abenomics. At the same time, as Brufman, Martinez, and Artica (2013) pointed out, financial surpluses of the corporate sector have become common among major developed economies at least since the 2000s. It is abnormal in theory but not a unique problem of Japanese firms, although there are differences in degree. In addition, Goto (2014), who analyzed aggregate data of Financial Statements Statistics of Corporations by Industry through 2012, showed that the main contributor to financial surpluses of the corporate sector in recent years is actually SMEs, particularly those belonging to the service, wholesale/retail, and real estate industries. Even though the aim of current corporate governance reforms under Abenomics to encourage dia-

---

[1] According to the accounting identity, financial surpluses and excess savings are no more than two sides of the same coin and must always satisfy an equality.

logue between investors and top managers of listed firms is meaningful in itself, we cannot simply expect it will resolve the trend of financial surpluses and sluggish investment in the corporate sector without examining various possible causes behind these phenomena.

This paper explores the stylized facts and determinants of financial surpluses and sluggish investment across a wide range of enterprise size based on both descriptive statistics and regression analyses of the survey slips data of the Ministry of Finance's Financial Statements Statistics of Corporations by Industry (hereafter referred to as FSSCI). We have to accept some data constraints in the following such that the survey form includes only non-consolidated and fewer items than the securities reports of listed firms and it is difficult to perform panel analyses due to the replacement of sampled firms, etc. However, in spite of these constraints, it is pretty informative to see how the main features of the recent Japanese corporate sector, such as financial surpluses, cash holdings, and sluggish investments, differ depending on the enterprise size based on micro data.

Below, the structure of this paper is as follows. In the next section, we clarify the definition of financial surpluses or excess savings used in this paper and give an overview of aggregate data of the FSSCI annual report based on our definition. In Section III, we describe the stylized facts and determinants of excess savings by descriptive statistical analyses using survey slips data from the FSSCI annual survey and by estimating the excess savings and cash holdings functions. In Section IV, we explore the allocation of internal cash flow by estimating the cash flow usage function and discuss the relevance to investment restraint. Section V concludes the paper and discusses future research issues.

II. Definition of Financial Surpluses and Overview of Aggregate Data

Discussions on financial surpluses or excess savings in the corporate sector tend to cause confusion due to differences in definitions or terminology. Therefore, we will first clarify the definition of financial surpluses or excess savings used in the following discussion.

Figure 1 is a simplified balance sheet of a company that eliminates items not important for the following analysis. We assume non-consolidated settlement in accordance with the survey scope of FSSCI. The left side (asset side) of the balance sheet represents the assets owned by the company and is roughly divided into financial assets and real assets. Financial assets are represented by cash in Figure 1 for simplification[2]. Real assets include tangible fixed assets such as factories and shops, intangible fixed assets such as software and patent rights, outstanding investments in other companies[3], and net working capital, which is categorized as current assets. Net working capital is considered a kind of real capital, which is necessary for business operations and consists of net trade receivable (gross receivable mi-

---

[2] Additionally, temporary holding securities are also applicable.
[3] Outstanding investments in other companies include assets that are not aimed at the control on management, such as the case of cross-holding, but in general they are mainly shares of affiliated companies acquired through M&A or FDI. Therefore, it is categorized as a real asset in a broad sense (in the consolidated settlement, the real assets held by affiliated companies are recorded as tangible fixed assets).

nus gross payable) and inventory stocks. The right side (liability side) of the balance sheet represents the source of funds to hold these assets, and it is divided into three major categories: liabilities, paid-in stocks, and accumulated retained earnings. Liabilities consist of corporate bonds payable and loans from financial institutions payable[4]. Paid-in stocks are funds paid by shareholders at the time of issuance of new shares, such as capital and capital surplus, deducting the treasury stocks outstanding. Accumulated retained earnings are the sum of retained earnings from each period. Naturally, the sum of each item on the asset side and the sum of items on the liability side should be always consistent.

Figure 1. Simplified Corporate Balance Sheet (unconsolidated basis)

Usage of Fund		Source of Fund	
Current Assets	Cash Reserves	Corporate Bonds Payable	Liabilities
		Loans from Financial Institutions Payable	
	Net Working Capital (*)	Paid-in Stocks	Net Assets
		（－）Treasury Stocks Outstanding	
Non-current Assets	Tangible Fixed Assets		
	Intangible Fixed Assets	Accumulated Retained Earnings	
Real Assets in a broad sense	Outstanding Investments in Other Companies		

（＊）Net Working Capital ＝ Gross Trade Receivable － Gross Trade Payable + Inventory Stocks

Figure 2 shows the amount of change in each item caused by the business activities of the current term from the balance sheet at the end of the previous term. Obviously, the sum of each item should be consistent for the left and right also in terms of the amount of change. Retained earnings are the net income(+)/loss(-) after tax minus the number of outflows as dividends[5], which will be newly added to the accumulated retained earnings on the balance sheet at the end of the term. On the asset side, an increase in tangible fixed assets and softwares (an item of intangible fixed assets) corresponds to capital investment[6], an increase in outstanding investments in other companies corresponds to M&A and FDI, and an increase in net working capital corresponds to inventory investment.

In reality, the final amount of change in each item is decided simultaneously. However, at the stage of capital budgeting, the tiered framework depicted in Figure 3 is generally used to make decisions. The starting point is current cash flow, or internal funds, which comes from the net income(+)/loss(-) plus depreciation expenses after removing the influence of extraordinary items[7]. According to the "pecking order hypothesis" in corporate finance, the most preferable source of funds for corporate managers is internal funds, and its level works as a benchmark to decide the level of gross capital investments[8]. To make gross capital investments in excess of internal funds, they need to withdraw cash reserves or issue new

---

[4] In addition to such externally procured financial liabilities, accounting liabilities preparing for future expenses are also recorded on the actual balance sheet, such as provisions or allowances.

[5] Bonuses for executives were also treated as profit appropriations before 2006.

[6] In this case, capital investment means "net investment" after depreciation, but what we analyze below is the concept of "gross investment" before depreciation.

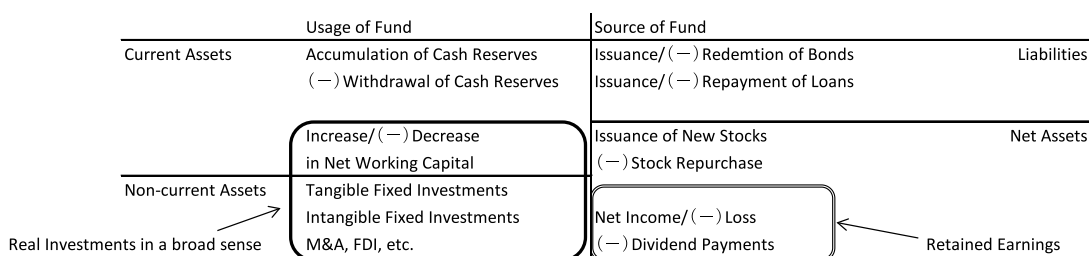## Figure 2. Change in Simplified Corporate Balance Sheet (unconsolidated basis)

	Usage of Fund	Source of Fund	
Current Assets	Accumulation of Cash Reserves （－）Withdrawal of Cash Reserves	Issuance/（－）Redemtion of Bonds Issuance/（－）Repayment of Loans	Liabilities
	Increase/（－）Decrease in Net Working Capital	Issuance of New Stocks （－）Stock Repurchase	Net Assets
Non-current Assets	Tangible Fixed Investments Intangible Fixed Investments		
Real Investments in a broad sense	M&A, FDI, etc.	Net Income/（－）Loss （－）Dividend Payments	Retained Earnings

Figure 3. Typical Framework of Capital Budgeting Process

	Net Income/（－）Loss after removing the influence of extraordinary items
＋）	Depreciation Expenses
	Internal Funds (Cash Flow)
－）	Increase/（－）Decrease in Net Working Capital
	Adjusted Internal Funds（Operating Cash Flow）

Adjusted Internal Funds < Real Investments in terms of Gross Investments, i.e., Excess Investments
⇒ Withdrawal of Cash Reserves or New External Fund (Issuance of Liabilities or Stocks) is needed

Adjusted Internal Funds > Real Investments in terms of Gross Investments, i.e., Excess Savings
⇒ Accumulation of Cash Reserves or Reduction of External Fund (Repayment of Liabilities or Stock Repurchase) is considered

debts (corporate bonds, bank loans) or new shares[9]. On the contrary, if the gross capital investments are carried out within the level of current internal funds, financial surpluses are generated and spent on accumulating cash reserves, repaying debts, and returning money to shareholders (dividend payments or stock repurchases).

Although the above definition of cash flow has been widely accepted, the cash flow calculated by this definition includes the amount of change in net working capital, which is in fact one element of real investments. It has been a well-known puzzle in the literature of empirical studies on investment functions that cash flow shows stronger explanatory power on capital investments than Tobin's q, which should in theory be the sufficient statistic of capital investments. However, it is pointed out in recent studies that the puzzle is caused by the widely accepted definition of cash flow, which partly includes real investments and therefore generates an unintended correlation with capital investments. For this reason, we adopt a definition of cash flow that eliminates the amount of change in net working capital[10].

---

[7] The accounting profit includes non-cash revenues and expenses, such as depreciation. To compute cash flow from the profit loss statement, we should adjust these non-cash items. In this regard, the impact of extraordinary profit and loss cannot be ignored when analyzing Japanese firms in recent years. Extraordinary profit and loss include both cash and non-cash items. However, it is difficult to distinguish them in data, and it is obvious that the proportion accounted for by non-cash items has increased substantially in recent years due to the introduction of market value accounting, retirement benefit accounting, etc. Therefore, it would be better to exclude the influence of extraordinary profit and loss to get better estimates of cash flow.

[8] For an explanation on the pecking order hypothesis, see Hanazaki (2008) and its reference.

[9] The withdrawal of cash reserves can be regarded as a source of funds equivalent to internal funds as long as maintaining a sufficient level of cash reserves. On the contrary, if the cash holding amount has been reduced to a level below or close to the necessary minimum level then it cannot be considered a source of funds.

There is no room for discussion to define financial surpluses or excess savings as the difference between gross savings and gross investments. However, both the definition of gross savings and gross investments are controversial. For gross savings, if we take into account the consistency with macro statistics such as National Accounts or Flow of Funds, it should be defined as cash flow after deducting outflows such as dividend payments[11]. However, in this case, it becomes difficult to explicitly discuss the trends of dividend payments and its relevance on investment. Therefore, in this paper, with the tiered framework of capital budgeting from Figure 3 in mind, the definition of gross savings is equivalent to the whole cash flow defined above. This implies that we regard dividend payments as one of the uses of financial surpluses or excess savings. For gross investments, we should pay attention to the fact that the figures and interpretations can change depending on the definition. If we take into account the consistency with macro statistics, gross investments consist of tangible fixed asset investments excluding land, software investments, and inventory investments. However, inventory investments have already been deducted from cash flow as a part of the change in net working capital, as described above. Also, when focusing on investment behavior at the corporate level, the literature of empirical study on investment functions robustly shows that it is better to include land acquisition in capital investments[12]. Therefore, in this paper, we adopt acquisition of tangible fixed assets including land and intangible fixed assets as a definition of gross investments[13] for analyzing financial surpluses or excess savings, while the increase in outstanding investments in other companies is handled as one of the uses of financial surpluses or excess savings.

In the following, based on the above definitions, we overview the development of investment and financial behavior of the Japanese corporate sector as a whole using aggregate data[14]. Figure 4 shows the trend of IS balance with gross savings (i.e. cash flow) and gross investments as the ratio of total assets. We can see that the IS balance started to record surpluses (i.e. excess savings) at a significant level in 1997, and that gross investments continued to be sluggish since then even though gross savings were steadily increasing. As a result, the magnitude of excess savings continued to expand until around 2002 and has plateaued since then, although a temporary decline in excess savings was seen in 2006-07 when capital investment expanded largely at the end of the economic expansion and in 2011 when cash flow dropped sharply due to the appreciation of the yen after the Great East Japan Earthquake.

Figure 5 shows the trend of IS balance with gross savings and gross investments by corporate size. Since the late 1990s when the excess savings trend was established, the surplus

---

[10] See Chang, Dasgupta, Wang, and Yan (2014), for example. The cash flow in this case corresponds to the concept of operating cash flow in the cash flow statement.
[11] Brufman, Martinez, and Artica (2013), or Goto (2014), for example.
[12] Recent research examples include Nakamura, Tonogi, and Asako (2017).
[13] We use the difference between the beginning and the end of the fiscal term book value plus depreciation expenses deducted during the term to estimate acquired value.
[14] FSSCI is designed to perform statistical population estimation (inflammation) to obtain the aggregate value for smaller enterprises. Therefore, the simple summation of all the survey slips data does not provide an appropriate aggregate value. The aggregate values discussed in this chapter are based on population estimates.

Figure 4. Trend of Aggregate IS Balance with Breakdown in Gross Terms
(Total of All Sizes, as the Ratio of Total Assets)
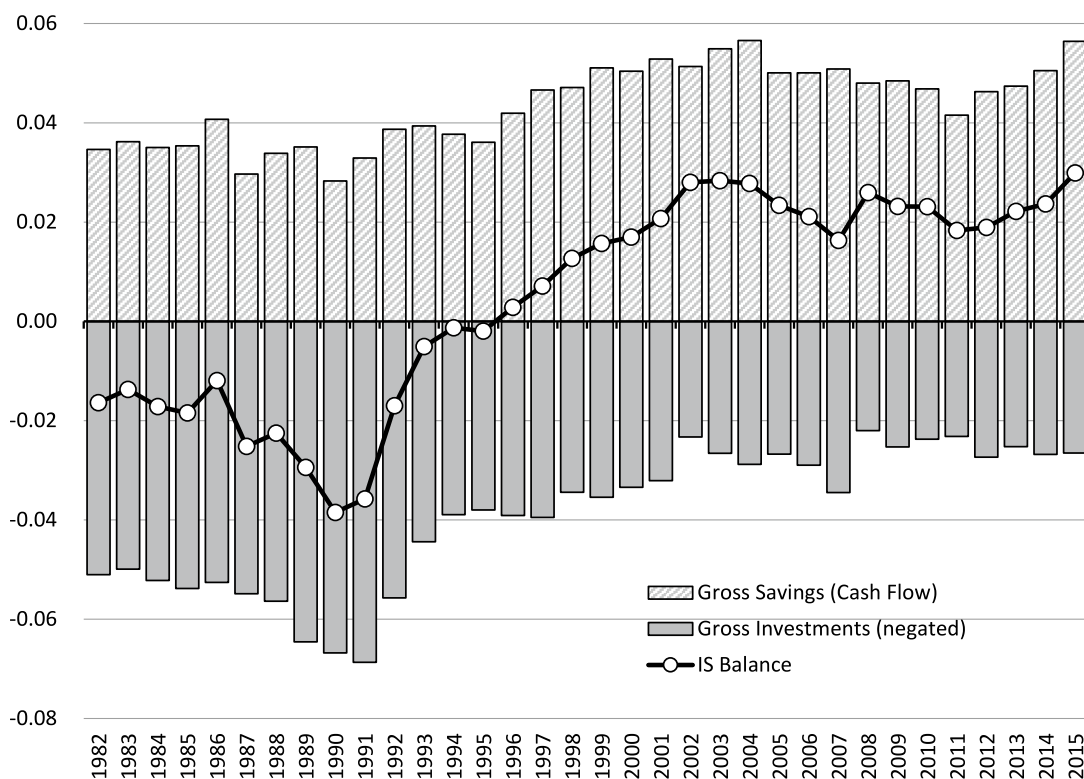
of major enterprises with capital of 1 billion yen or more has always exceeded that of smaller enterprises with capital less than 1 billion yen in terms of the ratio of total assets. Moreover, the recent surpluses of major enterprises have fluctuated greatly and are increasing remarkably, while the surpluses of smaller enterprises are relatively stable. These observations may sound contradictory to Goto (2014), who emphasized the contribution of SMEs to corporate excess savings in Japan. However, the difference mostly comes from the definition of gross savings, for which Goto (2014) excludes the outflow of dividend payments from gross savings. In other words, this difference just reflects the fact that the dividend payments of major enterprises account for a substantial portion of cash flow uses in our definition[15].

Figure 6 shows how excess savings were used since the latter half of the 1990s by comparing four major categories of usage in terms of the ratio of total assets, accumulation of cash reserves (negative values mean withdrawal), net repayment of interest-bearing debt (negative values mean net issuance), increases in outstanding investments in other companies like M&A or FDI (negative values mean decrease)[16], and dividend payments. We find

---

[15] However, after 2013, which is outside the sampled period of Goto (2014), the excess savings of large enterprises exceeds those of SMEs even after deducting the outflows such as dividends.

Figure 5. Trend of Aggregate IS Balance with Breakdown in Gross Terms by Enterprise Size

Total of Major Enterprises (in Trillion Yen)


Total of SMEs (in Trillion Yen)
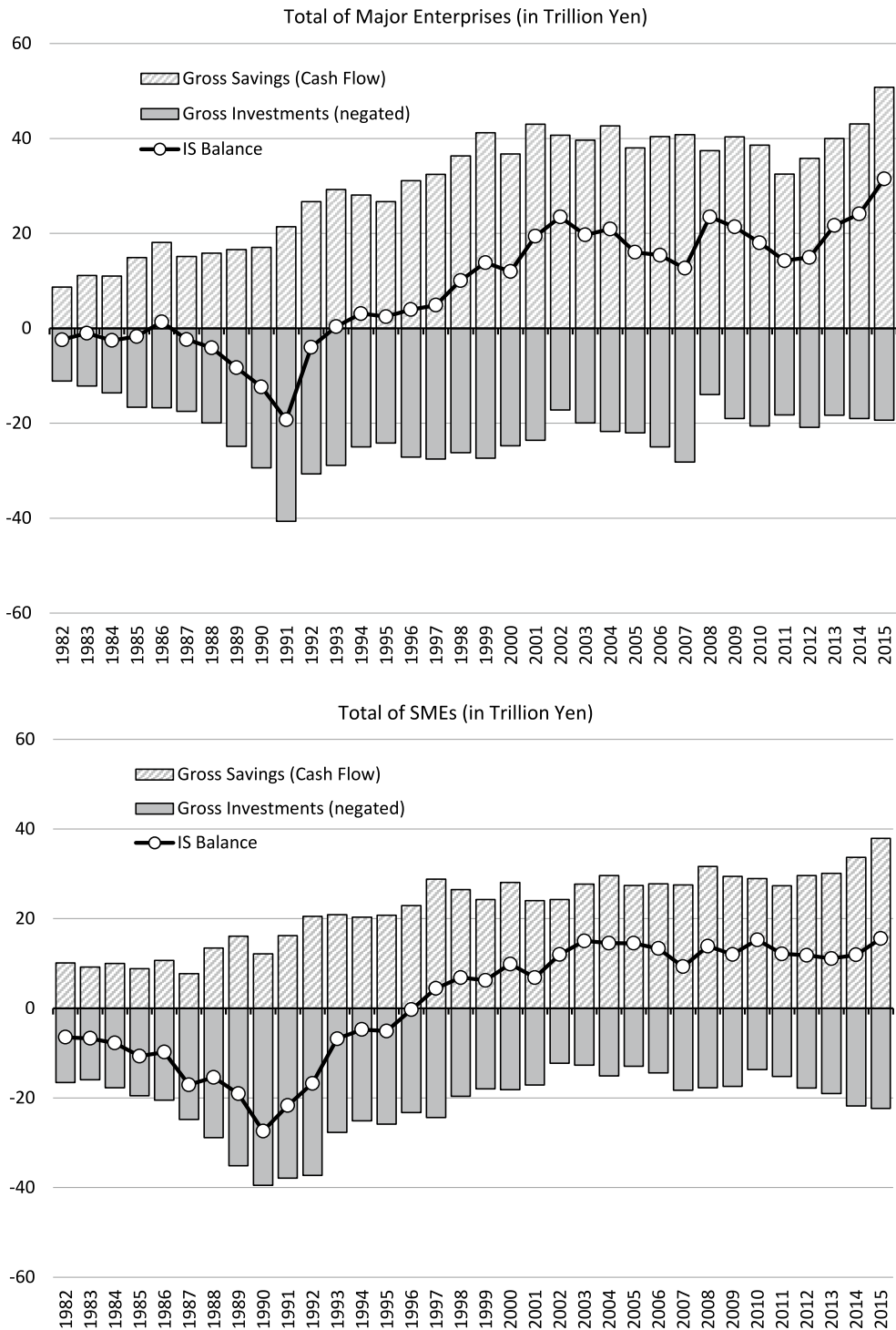
the relationship between excess savings and cash accumulation, which has been emphasized as symbolically indicating the inefficient conservativeness of Japanese firms, seems tenuous at least at the aggregate level. However, since the Global Financial Crisis, major enterprises are persistently accumulating non-negligible amounts of cash reserves each year except for 2011. Furthermore, smaller enterprises recently accelerated their pace of accumulating cash reserves. Meanwhile, from the banking crisis at the end of the 1990s until the mid-2000s, the reduction of interest-bearing debt was the largest use for smaller enterprises and one of the largest uses for major enterprises. In those days, it was common even for profitable firms to declare a "debt reduction before investment" policy due to increased concern over the liquidity risk against the backdrop of impaired bank health. However, after the mid-2000s, major enterprises basically turned to net issuance, while smaller enterprises have continued net repayment up until very recently. The change in outstanding investments in other companies, such as M&A and overseas direct investment, has shown positive values in most of these twenty years, reflecting the trend of overseas transfer of production and global expansion, including non-manufacturing. Especially for major enterprises, following a few spikes of big deals in the early 2000s, an increase in outstanding investments in other companies explains a greater portion of excess savings usage driven by the appreciation of the yen due to the Global Financial Crisis and the Great East Japan Earthquake. This trend is consistent with remarks made by managers of large corporations in recent years–"M&A and overseas investment rather than domestic investment"–while it somewhat slowed down very recently. Regarding dividend payments, the gradual increasing trend has continued for the last 20 years since excess savings of the corporate sector was established, and as a result, it explains the greatest portion of annual excess savings usage frequently after-2000s, mainly for major enterprises. Looking at the relationship between dividend payments and the increase in cash reserves for major enterprises, it is worth noting that dividend payments have grown in line with the accelerated cash accumulation after 2012, while two items are negatively correlated before that.

Based on the above observation, from the next section onwards, we analyze the stylized facts and determinants of excess savings, cash holdings, and investment behaviors of Japanese companies using survey slips data from the FSSCI annual survey while taking account firm heterogeneity.

---

[16] Below, including the analysis of microdata, we regard the difference between the beginning and the end of the all items classified as "investment and other assets" in the FSSCI annual survey as the value of outstanding investments in other companies in this study. Among these items, there is a miscellaneous item which includes both applicable and non-applicable contents, though we confirmed the main results reported below unchanged even if this item is excluded from calculations.

Figure 6. Major Usage of Excess Savings (as the Ratio of Total Assets)

Total of All Sizes

Total of Major Enterprises

Total of SMEs
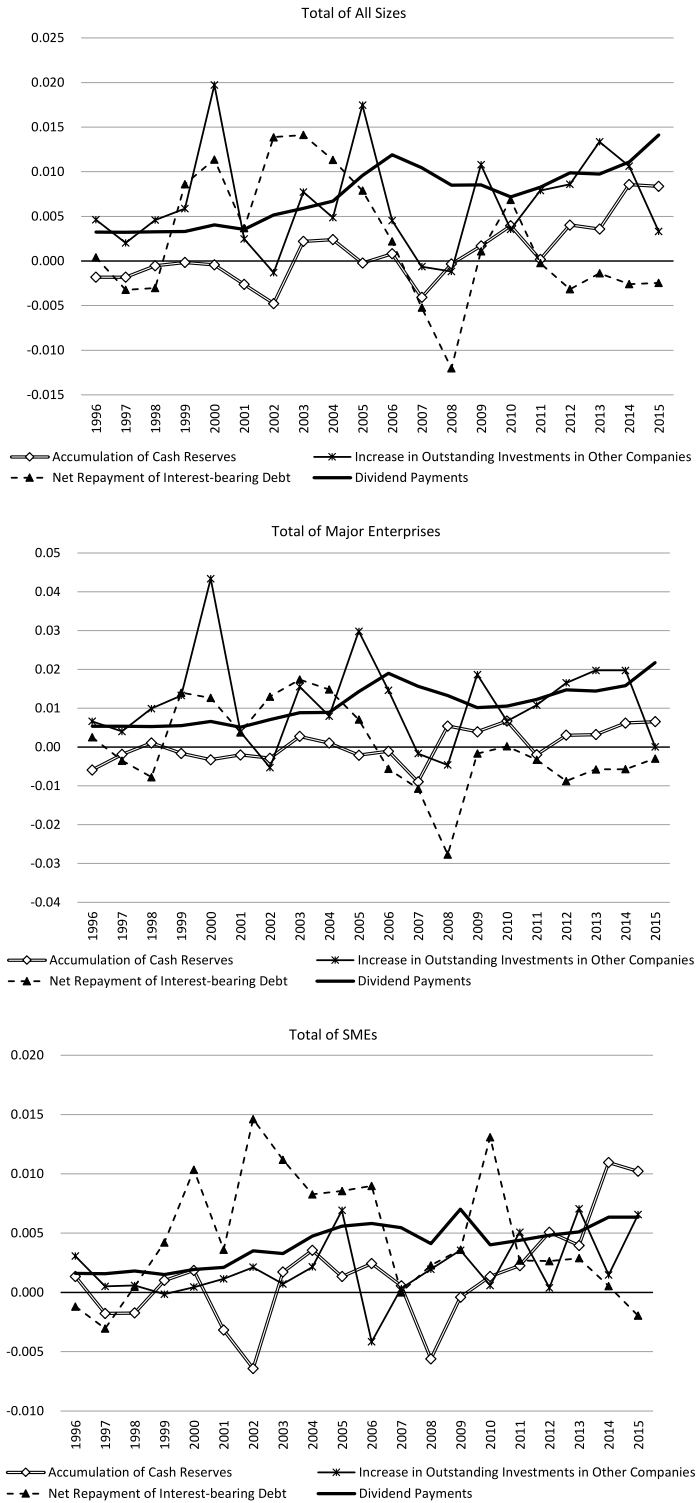
III. Stylized Facts and Determinants of Excess Savings

III-1. *Descriptive Statistics Analysis*

Even though the trend of excess savings is persistent and expanding in the corporate sector as a whole, we find a substantial number of firms with excess investments or with reduced excess savings at the individual level. As a first step, it is important to see such microstructures behind the macro trend through descriptive statistics analysis.

Figure 7 shows the proportion of the number of excess saving firms in each fiscal term, along with the trend of aggregate excess savings (as the ratio of total assets). In the economic expansion period around 2002-07, the proportion of excess saving firms has declined consistently with the reduction of aggregate excess savings, reflecting widespread increase in capital investments. However, the correlation between them clearly weakened after the two huge negative shocks (i.e. the Global Financial Crisis and the Great East Japan Earthquake), and sometimes they even moved in the opposite direction, as in 2008-09 and 2013. This is presumably because a substantial number of firms faced an unintended level of excess savings due to the huge shock and tried to recover it in the following years. Since 2014, despite the economic expansion period, the proportion of firms with excess savings has risen again, suggesting a widespread increase in capital investments, which Abenomics is aiming for by reducing the corporate income tax and conducting corporate governance reform, has not yet been realized.

Next, we carry out a gross flow decomposition that explicitly shows movements in the positive direction by firms with excess savings and movements in the negative direction by firms with excess investments. This type of analysis is possible only with microdata, though it should be noted when aggregating microdata that we cannot add the figures of major enterprises assuming a complete survey with those of smaller enterprises assuming a sample survey. In other words, we can only compare the composition and the changes—not the level—of excess savings in Figure 8, which shows the results of gross flow decomposition for major enterprises with capital of 1 billion yen or more (complete survey) as well as for small enterprises with capital of 10 million yen or more and less than 100 million yen (sample survey). Focusing on the characteristics of the economic expansion period of 2002-07, we find that major enterprises shrunk their excess savings in the expansion period, with both decreasing contribution in the positive direction and increasing contribution in the negative direction. In contrast, small enterprises widened their excess savings in this period, with remarkably increasing contribution in the positive direction despite increasing contribution in the negative direction until 2005. In the expansion period after 2013, we find that the contribution in the negative direction is smaller than in 2002-07 for major enterprises, whereas it is larger than in 2002-07 for small enterprises. This reflects the reality that the shift toward M&A and FDI away from domestic investment after the Global Financial Crisis is less prominent in small enterprises than in major enterprises.
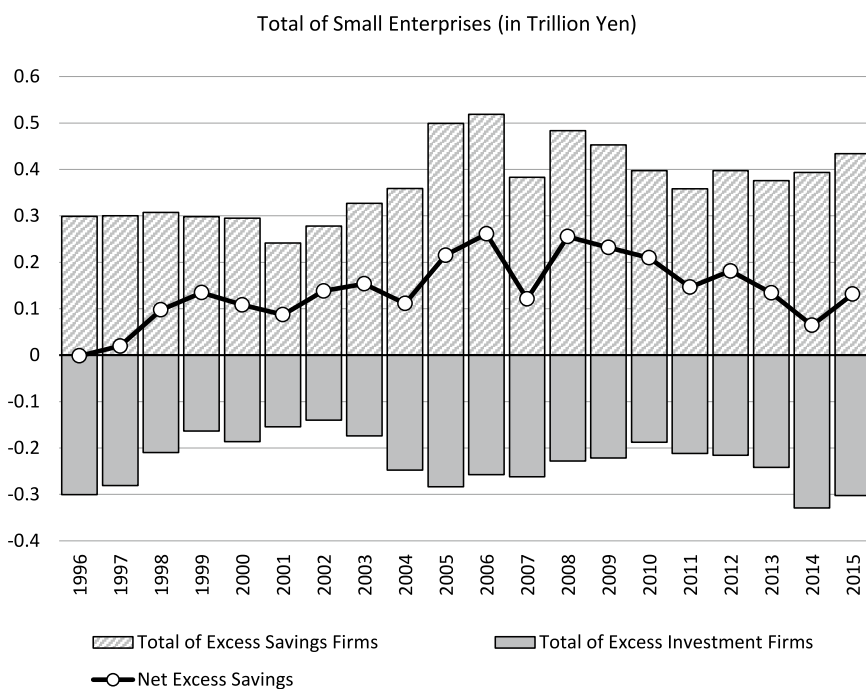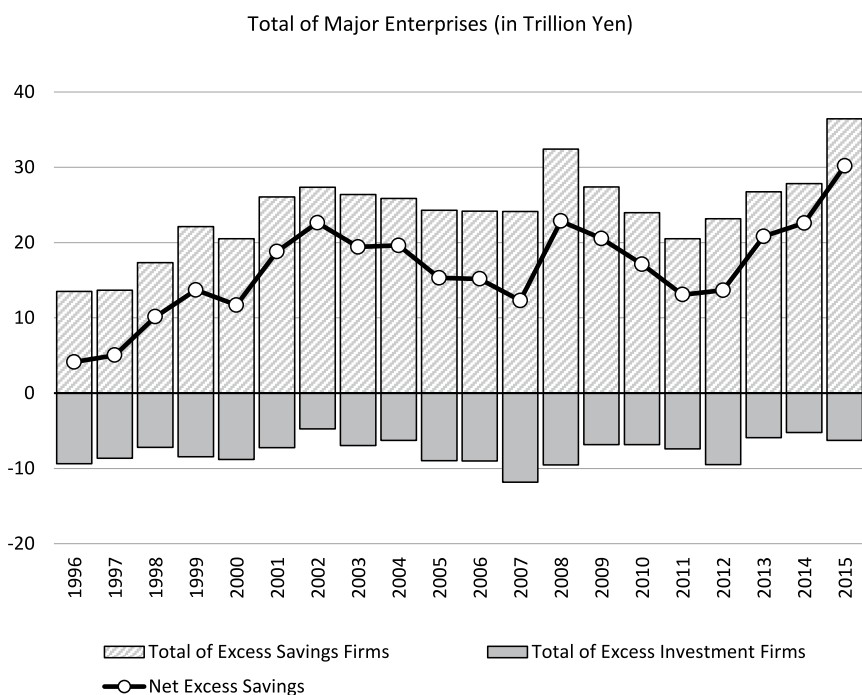
Finally, for excess savings, gross savings and gross investments of individual firms (as

Figure 7. The Proportion of Excess Saving Firms and Aggregate Excess Savings

Proportion of the Number of Excess Saving Firms (left axis)
Aggregate Excess Savings as the Ratio of Total Assets (right axis)
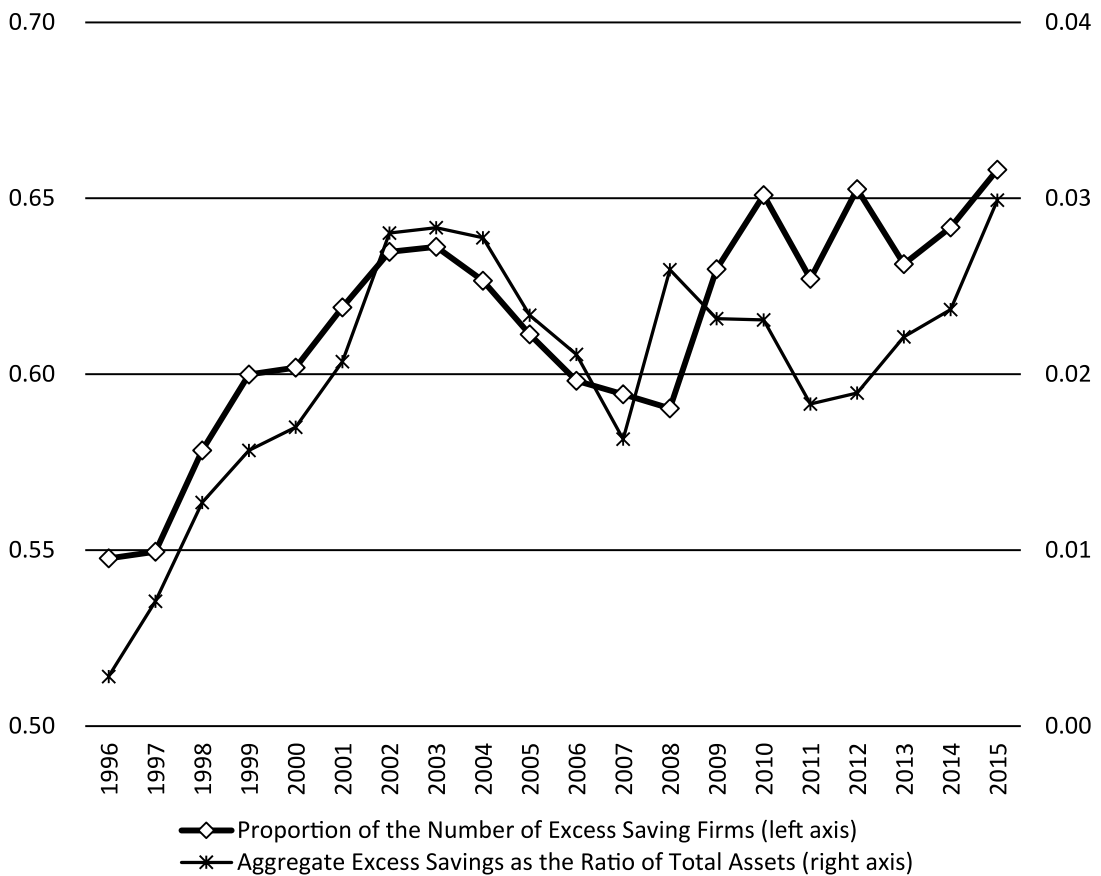
the ratio of total assets), we show the changes in representative values (75th percentile, median, 25th percentile value) of the distribution by size of capital. As for the excess savings ratio shown in Figure 9, we find in major enterprises with capital of 1 billion yen or more that a moderate upward trend is basically common among the 75th percentile value, median, and 25th percentile value. Naturally, the differences among these representative values has not expanded or shrunk either. The 25th percentile value has increased from negative to nearly zero since the beginning of the 2000s, except for in 2006-07 when capital investments surged and in 2008 when cash flows dropped due to the Global Financial Crisis. This increase to nearly zero reflects the prevalence of an excess savings tendency. In medium-sized enterprises with capital 100 million yen or more and less than 1 billion yen, although the disparity among representative values is slightly larger, the overall trend is quite similar to major enterprises. In small enterprises with capital 10 million yen or more and less than 100 million yen and micro enterprises with capital less than 10 million yen, the differences among representative values further expands and 75th percentile values are higher than those of major and medium-sized enterprises. Changes in 25th percentile values are

Figure 8. Gross Flow Decomposition of IS Balance

Total of Major Enterprises (in Trillion Yen)

- Total of Excess Savings Firms
- Total of Excess Investment Firms
- Net Excess Savings

Total of Small Enterprises (in Trillion Yen)

- Total of Excess Savings Firms
- Total of Excess Investment Firms
- Net Excess Savings

different from the moderate upward trend in median values and 75th percentile values. The 25th percentile value has a rapid upward trend compared to the median and 75th percentile value in small enterprises, while it almost levels off in micro enterprises except for the several years before and after the Global Financial Crisis.

Figure 9. Representative Values of the Distribution of Excess Savings Rate by Size of Capital
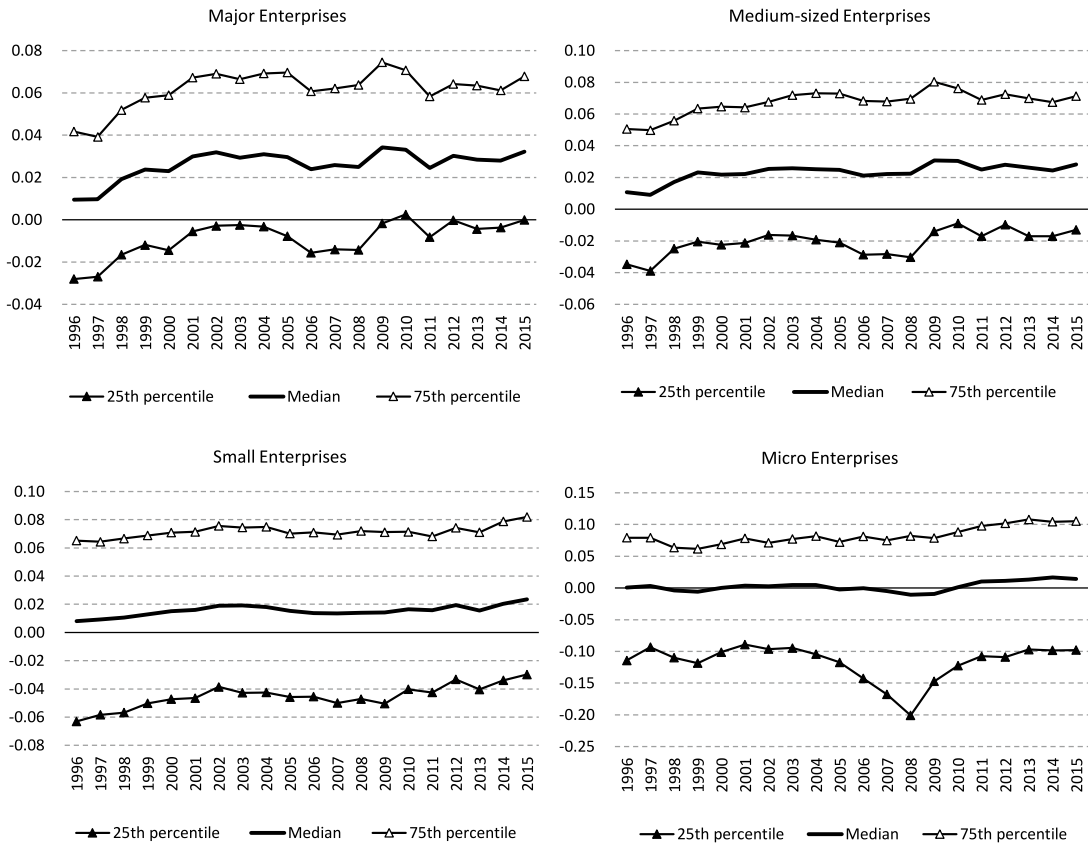
The transition of the excess savings rate described above is decomposed into gross savings rate and gross investments rate, shown in Figure 10. We find the graphs for gross savings rates have basically a similar appearance to their counterparts for excess savings rates in every tier of capital size, while the graphs for gross investments rates look quite different. Among representative values in gross investments rate, the 75th percentile value shows a clear cyclical pattern while the 25th percentile value almost levels off around zero. The median value basically represents an intermediate feature between the 75th percentile and 25th percentile except for micro enterprises, whose median value almost levels off around zero. It is worth noting that the 75th percentile value in small and micro enterprises has a few spikes and the one in the latest economic expansion period is more conspicuous than in major and medium-sized enterprises. One reason for this is naturally that smaller enterprises tend to

put much weight on domestic operations; however, the aspect of lumpy behavior of investment first emphasized by Doms and Dunne (1998) is also important because zero gross investment firms make up 25% or more of small enterprises and more than half of micro enterprises. Doms and Dunne (1998) argued that when capital investment incurs some kind of fixed costs irrespective of the scale of investment, such as opportunity costs of sustained operation to install a new capital, it is inefficient for such firms to adjust its capital stock little by little to the optimal level. Instead, they should invest in a lumpy manner when a discrepancy from the optimum level exceeds a certain threshold. Doms and Dunne (1998), showing the clear evidence that such behavior was actually general based on the microdata of U.S. manufacturing establishments, pointed out that such lumpy behaviors at the micro level were diluted with the degree of aggregation getting higher from an individual establishment level to a line of business and further to an enterprise level, but at the same time, a certain lumpiness could be still observed even at the enterprise level. Therefore, it is rather natural we find much more lumpiness in capital investments in smaller enterprises, which have fewer and smaller establishments per enterprise.

## III-2.   Framework of the Excess Savings Function

Brufman, Martinez, and Artica (2013) used the panel data of 5000 listed manufacturers in the major five economies, namely Germany, France, Italy, Japan and the UK, from between 1997-2011 and estimated an excess savings function, where the excess savings to total assets ratio was the dependent variable, to test three potential mutually non-exclusive drivers of excess savings: (i) financial constraints, (ii) volatility of the business environment, and (iii) poor investment opportunities. Their study found a significantly positive effect of (ii) and (iii) on the level of excess savings ratio and an effect of (i) on the rising trend of the excess savings ratio. In the following, we estimate an original excess savings function using the survey slips data from the FSSCI annual survey for the 20 years from 1996 to 2015, a period during which the excess savings of the corporate sector was at a new normal. As is clear from the above observations of aggregate data, it is an indispensable task to analyze microdata including non-listed small and micro enterprises such as FSSCI, in order to elucidate the overall picture of excess savings in Japan. This study focuses not only on the issue of financial constraints and investment opportunities, which was also discussed in Brufman *et al*. (2013), but also on the corporate governance issue, which draws special attention regarding corporate excess savings and cash holdings in Japan. We also incorporate variables related to lumpy investment, which Nakamura, Tonogi, and Asako (2017) reconfirmed the significance of in investment function estimation using the survey slips from the FSSCI annual survey, into our model. At the same time, we put aside the issue of business environment volatility because it requires longitudinal data, which we cannot construct from sample survey slips for the analysis.

The dependent variable is the ratio of excess savings to total assets (ESTA), where excess savings (ES) are computed as "gross savings (GS) – gross investments (GI)." As al-

Figure 10. Representative Values of the Distribution of Gross Savings Rate by Size of Capital
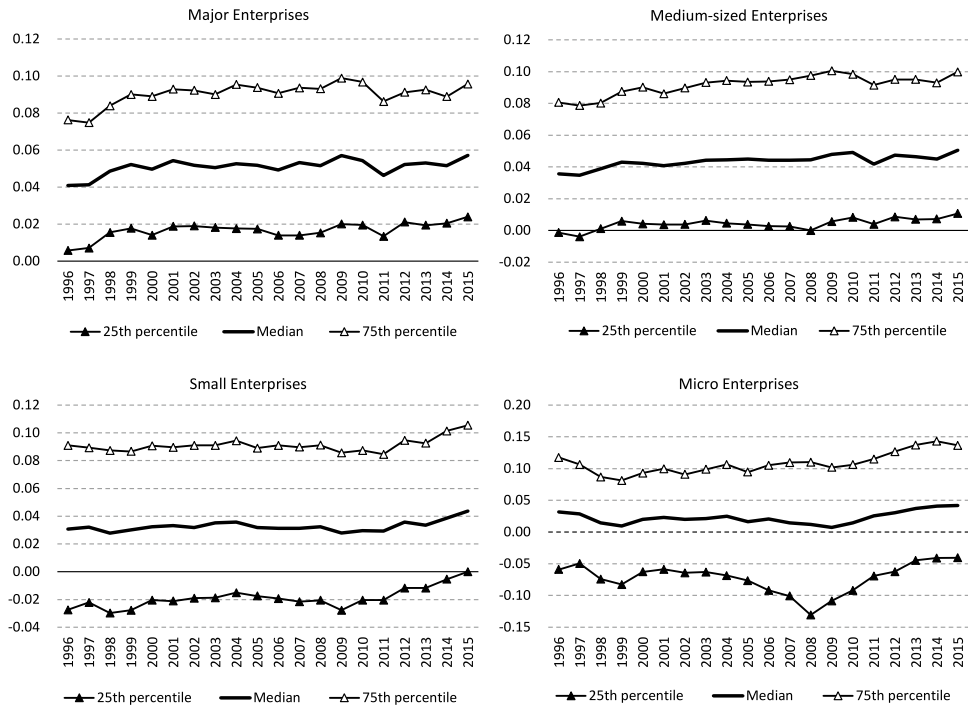
Representative Values of the Distribution of Gross Investments Rate by Size of Capital
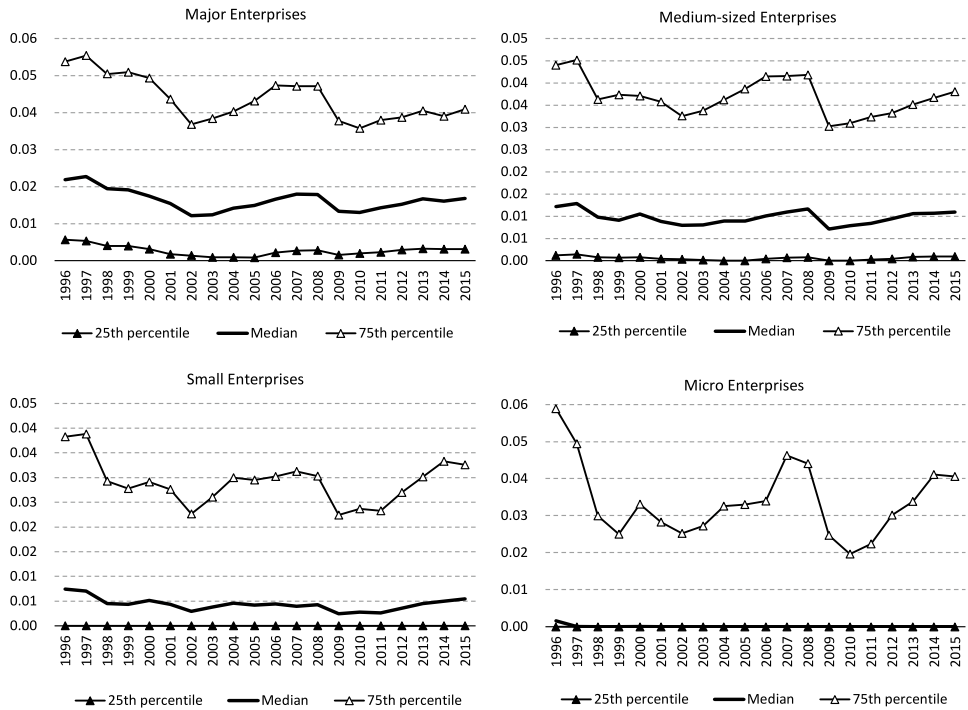
ready discussed in detail in Chapter II, gross savings are defined as "net income + depreciation expenses + special depreciation expenses – (extraordinary profit – extraordinary loss) – the difference of net working capital between the beginning and the end of the fiscal term." That is, our definition of gross savings departs from Brufman *et al*. (2013) in two ways: firstly we do not subtract dividends and other outflows from gross savings, and secondly we remove the effect of changes in net working capital from gross savings. The gross investments are obtained by "the difference in the sum of tangible assets including land and intangible fixed assets between the beginning and the end of the fiscal term plus depreciation expenses."

The explanatory variables are as follows: the natural logged value of total assets at the end of the previous term (LNTA), the squared value of LNTA (LNTASQ), a dummy variable equal to 1 if the company pays out positive dividends and equal to 0 otherwise (DIVDUM), a dummy variable equal to 1 if the company has a positive borrowings outstanding from financial institutions and equal to 0 otherwise (FIBDUM), the cross term of FIBFUM and a dummy variable equal to 1 if the company's capital is less than 100 million yen and equal to 0 otherwise (SMEFIBDUM), the ratio of accumulated retained earnings on the balance sheet to the total assets at the end of the previous term (ESPLTA), the ratio of tangible fixed assets, including land to the total assets at the end of the previous term (TANGIBILITY), Tobin's *q*, the ratio of outstanding investments in other companies to total assets at the end of the previous term (OTINVTA)[17], a dummy variable equal to 1 if the company operates in multiple industries and equal to 0 otherwise (MULTIDUM), the natural logged average number of employees during the term (LNEMPL), the natural logged average number of executives during the term (LNEXEC), the ratio of cash reserves to the total assets at the end of the previous term (CASHTA), the ratio of outstanding interest bearing debt to the total assets at the end of the previous term (DEBTTA), a dummy variable equal to 1 if the company makes zero or gross negative investments and equal to 0 otherwise (NPFIXINV), fiscal year dummies, and industry dummies[18].

LNTA and LNTASQ are variables adopted by Brufman *et al*. (2013) as proxies of financial constraints. In the corporate finance literature, the firm size has been used as a variable that inversely correlates with financial constraints based on the assumption that information asymmetry is larger for smaller firms. However, since Hadlock and Pierce (2010) pointed out that the effect of firm size hits a ceiling if it exceeds a certain level, it became a more common practice to add a squared term into the model. If it is the case that a company with more severe financial constraints tends to suppress investments and save liquidity, a nega-

[17] The numerator of OTINVTA is the sum of all items classified as "investment and other assets" in the FSSCI annual survey. See also footnote 16.

[18] Based on the industry classification table of FSSCI, we classified the sample into 14 industries; agriculture, forestry and fisheries (01, 08), mining, coal and petroleum (10, 27), construction (15), material industries (20, 24, 26, 30, 31, 32, 33), machinery industries (29, 34, 35, 36, 37, 38, 51), other manufacturing (18, 22, 25, 39), wholesale, retail and food & drink services (40, 49, 50), real estate (59), transportation (60, 61, 64), information processing and telecommunication (60), electricity, gas and water (70, 71), business services (73, 74), personal services (75, 76, 79), and others (80, 85, 86, 89). The numbers in parentheses correspond to the industry classification code of FSSCI in FY 2008.

tive sign is expected for the coefficient of LNTA, while a positive sign is expected for LN-TASQ. However, it should be noted that we cannot control the firm age due to data constraints[19] and therefore firm size may also represent the maturity of the company.

In addition to the above, DIVDUM, FIBDUM, SMEFIBDUM, ESPLTA, and TANGIBILITY are also added as variables related to financial constraints in this paper. DIVDUM is a commonly used variable[20] when analyzing the relationship between financial constraints and capital investments (or cash holdings) as it is not reasonable to let cash out as a dividend under financial constraints. As long as companies that pay dividends are less likely to face financial constraints and therefore the need for saving liquidity is not so vital, the coefficient of DIVDUM is expected to have a negative sign. As for FIBDUM, if the record of borrowing from financial institutions reflects some kind of creditworthiness that leads to relaxation of financial constraints, the coefficient is expected to have a negative sign as well. However, since the impact of this effect is considered to decrease as the company size increases, the cross term SMEFIBDUM, with the dummy taking the value of 1 in the case of small and micro enterprises, is added[21]. ESPLTA is interpreted as an indicator of long-term profitability as well as financial capacity. As long as companies with a large ESPLTA are less likely to face financial constraints and therefore the need for saving liquidity is not so vital, the coefficient is expected to have a negative sign. TANGIBILITY is also a popular variable in the corporate finance literature used as a variable that is inversely correlated with financial constraints based on the assumption that tangible fixed assets are a kind of asset with smaller information asymmetry and can be easily pledged as collateral. Therefore, the coefficient is expected to have a negative sign.

As variables related to investment opportunities, Tobin's q and OTINVTA are used. Tobin's q is not controversial as a proxy of investment opportunities in theory, though there are substantial difficulties in obtaining an appropriate estimate of q from the data set of this paper since it does not contain stock price information and cannot be panelized. In the following, as in Nakamura *et al*. (2017), assuming a steady state where static expectation formation becomes equivalent to rational expectation, "(profit rate + capital depreciation rate) / (discount rate + capital depreciation rate)" is used as an estimate of the marginal q. However, we depart from Nakamura *et al*. (2017) in the definition of profit rate, capital depreciation rate and discount rate because intangibles are included in the capital investments and capital stocks analyzed in this paper. Specifically, the profit rate is defined as "(ordinary profit before depreciation – tax paid) / tangible and intangible fixed assets at the end of the previous fiscal term excluding construction in progress," the capital depreciation rate is defined as "depreciation expenses / tangible and intangible fixed assets at the end of the previous fiscal term excluding construction in progress," and the discount rate is defined as "in-

---

[19] The year of establishment is not included in survey items of FSSCI.

[20] In Brufman *et al*. (2013), variables related to dividend payments are not adopted because excess savings are defined as the after dividend payments basis.

[21] For companies with excess debt, we should also consider the possibility that savings would be rather promoted due to repayment burden and pressure from financial institutions, though this effect is absorbed by DEBTTA.

terest expense / average outstanding interest-bearing debt at the beginning and the end of the fiscal term.[22]" As long as companies with abundant investment opportunities actively invest and are less likely to save, the coefficient of Tobin's q is expected to have a negative sign. However, since the profit rate in the numerator of Tobin's q defined above naturally has a high correlation with the gross savings rate, the sign of coefficient of Tobin's q could be positive if the impact of this correlation is strong. Moreover, even if q is effective as a proxy variable for investment opportunities, it would not lead to a reduction in excess savings rate in the case that the main targets of investment have already moved away from domestic operations toward M&A or FDI. To control this possibility, OTINVTA is added to the list of explanatory variables, and its coefficient is expected to have a positive sign.

MULTIDUM, LNEMPL, LNEXEC, CASHTA, DEBTTA, and NPFIXINV are variables that control corporate governance and various other factors that could affect the excess savings rate. MULTIDUM is apparently a proxy for business diversification. From the viewpoint of financial constraints, the coefficient of MULTIDUM is expected to have a negative sign because the extent of financial constraints or the need for liquidity is mitigated if the risk diversification effect works among multiple industries in which the company operates. At the same time, most of the literature on diversification shows that it tends to be a bleeding ground of inefficient investment due to the problem of corporate governance and lead to a conglomerate's discount in stock price. Therefore, from the viewpoint of corporate governance, the coefficient of MULTIDUM is also expected to have a negative sign because low profitability and inefficient excess investment due to the lack of discipline reduce the excess savings. Which viewpoint is more plausible can be judged based on the results for other variables with regard to financial constraints and corporate governance. We include LNEMPL and LNEXEC as control variables for corporate governance issues because we already consider the size effects on financial constraints with LNTA and LNTASQ. In Japan, where the lifetime employment system for regular workers has been established for many years and the labor market has been quite illiquid (except for new graduates), an employee's influence on corporate governance is stronger in a company with a larger number of regular workers. The number of executives is used as a proxy for managerial entrenchment in the literature of company's cash holding behavior. For either variable, if it appears as the preference for business expansion, the coefficient is expected to have a negative sign. On the contrary, if it appears as the preference for financial soundness and stability, the coefficient is expected to have a positive sign. For CASHTA and DEBTTA, the coefficient is expected to have a negative sign for the former and a positive sign for the latter under the assumption that each company must always adjust its cash reserves and interest-bearing debts towards an optimum level in response to the divergence caused by external shocks. On the other hand, if CASHTA and DEBTTA reflect a kind of corporate fixed effects in investment behavior or profitability, the sign is reversed for each variable. NPFIXINV controls the lumpy

---

[22] Since outliers frequently appear in the discount rate, a winsorizing treatment is performed with an upper limit of 20% and a lower limit of 0.1%. In addition, the discount rate of zero levered firms is uniformly set at 0.1%.

nature of investment behavior, centering on small and micro enterprises discussed at the end of the previous section. In such enterprises with lumpy investment behavior, we typically observe the state of zero investment for a while, followed by huge investment in a burst; therefore, the excess savings rate, which is usually large, shows a sudden decrease or even becomes negative (i.e. the state of excess investment) at the time of lumpy adjustment. Hence, the coefficient of NPFIXINV is expected to have a positive sign if it captures a kind of slack in excess savings in normal times, when such companies are preparing for lumpy investment in the future[23].

III-3. *Estimation Results of the Excess Savings Function*

According to the aforementioned framework, we estimated the excess savings function by enterprise size. We included all samples whose Tobin's *q* is positive and less than 10 in the estimation. However, samples whose total asset book value is more than double or less than half of the previous period are excluded because those samples are likely to lose data continuity as a consequence of a substantial reorganization such as merger, spin-off or becoming a holding company. For a similar reason, samples with gross investments or gross savings equal to or exceeding total assets are also excluded as outliers[24]. Based on the above observation of aggregate data and descriptive statistics of the individual data, we set the sample period for 20 years from FY 1996 to FY 2015, a period during which the excess savings trend in the corporate sector persistently continued. To explore the possibility of structural changes triggered by the Global Financial Crisis, we also performed the estimation dividing the sample period into two segments: one from FY 1996 to 2007 (before the GFC) and one from FY 2010 to 2015 (after the GFC)[25]. The number of samples after eliminating outliers are nearly 300 thousands in total over 20 years. Of these, major enterprises with capital of 1 billion yen or more make up 26%, medium-sized enterprises with capital of 100 million yen or more and less than 1 billion yen make up 36%, small enterprises with capital of 10 million yen or more and less than 100 million yen make up 29%, and micro enterprises with capital less than 10 million yen make up 8% of all enterprises. The basic statistics of each variable used for estimation are reported in Table 1.

Table 2 shows the estimation results for the entire 20-year period studied as well as those for the time periods before and after the Global Financial Crisis. We mainly look at the results for the whole 20 years. For financial constraints related variables, the coefficients of LNTA and LNTASQ are both significantly estimated with the expected sign, which is consistent with previous research. On the other hand, the coefficient of DIVDUM is significantly positive, contrary to the expectations of financial constraints. This should be inter-

---

[23] Bearing in mind the retirement of aging facilities, we regard not only zero but also negative values as the state of inaction, which is represented by NPFIXINV.

[24] Besides this, a sample with one item of the total assets breakdown taking a larger value than the total assets, or other cases considered an erroneous answer are eliminated.

[25] We excluded FY 2008-09 when the direct impact of the Global Financial Crisis is significant, although we confirmed the main results are unchanged even when including FY 2008-09 in the latter half of sub-sample period.

Table 1. Descriptive Statistics of Variables for Excess Savings Function

	ESTA	LNTA	LNTASQ	DIVDUM	FIBDUM	SMEFIBDUM
Number of Obs.	297723	297723	297723	297723	297723	297723
Mean	0.021	7.931	68.690	0.432	0.765	0.304
Median	0.026	8.150	66.416	0.000	1.000	0.000
S.D.	0.112	2.405	38.161	0.495	0.424	0.460
Minimum	-1.375	-4.200	0.001	0.000	0.000	0.000
Maximum	1.415	16.533	273.355	1.000	1.000	1.000

	ESPLTA	TANGIBILITY	Tobin's q	OTINVTA	MULTIDUM	LNEMPL
Number of Obs.	297723	297723	297723	297723	297723	297723
Mean	0.178	0.361	2.929	0.108	0.269	4.380
Median	0.144	0.318	2.417	0.067	0.000	4.511
S.D.	0.263	0.243	1.735	0.124	0.444	2.064
Minimum	-0.999	0.000	0.001	0.000	0.000	0.000
Maximum	0.999	1.000	10.000	0.993	1.000	12.885

	LNEXEC	CASHTA	DEBTTA	NPFIXINV
Number of Obs.	297723	297723	297723	297723
Mean	1.536	0.146	0.338	0.183
Median	1.609	0.101	0.309	0.000
S.D.	0.823	0.146	0.271	0.387
Minimum	0.000	0.000	0.000	0.000
Maximum	8.137	0.994	1.000	1.000

preted as reflecting the reverse causality that dividends are being paid out as a result of financial surpluses (or limited investment opportunities compared to profitability). Regarding the variables to capture credit enhancement effect of outstanding borrowings, the coefficient of SMEFIBDUM is negative and significant while that of FIBDUM is insignificant, consistent with the expectation that this effect mainly works for smaller enterprises. However, the coefficients of ESPLTA and TANGIBILITY are both significantly positive, contrary to the assumption of mitigating effect on financial constraints. For ESPLTA, it may capture a kind of corporate fixed effect on profitability rather than financial constraints mitigation as the numerator of ESPLTA is strongly correlated with retained earnings in the past. For TANGIBILITY, the result can be interpreted along with the lumpy investment view; TANGIBILITY surges at the moment of lumpy investment and declines slowly afterwards due to its stock variable nature while the excess savings, which is a flow variable, is expected to in-

crease just after lumpy investment to prepare for the next opportunity[26]. As above, we can summarize the estimation results of financial constraints related variables by stating that financial constraints has a certain influence on the direction of increasing excess savings mainly in small and micro enterprises.

For variables related to investment opportunities, the coefficient of Tobin's q is positive and significant while the coefficient of OTINVTA is negative and significant; both of these estimations are contrary to the expected sign in the original sense. For Tobin's q, it may capture the positive correlation with the gross savings rate stronger than with the gross investment rates as is the case in ESPLTA because it uses the current profit rate to obtain the estimates due to data constraints. For OTINVTA, it should be noted that it has a negative correlation with both gross savings rate and gross investments rate, and that it has a negative correlation with excess savings as a result of the smaller negative influence on gross investments rate than on gross savings rate. In other words, these results suggest that M&A or FDI basically has a substitution effect on conventional domestic investments, though a part of the effect is cancelled out by new domestic investments induced by M&A or FDI.

For variables related to corporate governance and other factors, the coefficient of MULTIDUM is negative and significant as is expected, suggesting that business diversification suppresses excess savings through mitigation of financial constraints or inefficiency in corporate governance. However, the latter seems more plausible given that the negative correlation between MULTIDUM and the gross savings rate indicates low profitability due to inefficiency in corporate governance. The coefficient of LNEMPL is significantly positive, which is consistent with the preference for financial soundness and stability, while the coefficient of LNEXEC is significantly negative, which is consistent with the preference for business expansion. However, it should be noted that LNEXEC has a negative correlation with both gross savings rate and gross investments rate, whereas LNEMPL has a positive correlation with both of them. In other words, for LNEXEC, like MULTIDUM, the negative effect on excess savings should be interpreted as the consequence of low profitability due to managerial inefficiency rather than the preference for business expansion. The coefficients of CASHTA and DEBTTA are both significantly negative. The result of CASHTA suggests that adjustment to the optimal level of cash reserves rather than a kind of corporate fixed effects in investment behavior or profitability drives excess savings, while the result of DEBTTA suggests a kind of corporate fixed effects in investment behavior or profitability rather than adjustment to the optimal level of outstanding interest-bearing debt drives excess savings. In either case, the view that companies with excess savings save in order to increase cash reserves or to repay outstanding debt is not supported. The coefficient of NPFIXINV is significantly positive as expected, suggesting it captures a part of the effect that the inactive phase of lumpy investment boosts excess savings.

Estimated results for divided sample periods before and after the Global Financial Crisis

---

[26] Although we intend to control the influence of lumpy investment by NPFIXINV, it is conceivable that a part of the influence is left unabsorbed.

are basically the same as those for the entire sample period. The only noticeable difference is that the coefficient of OTINVTA is not significant before the GFC, although it is significantly positive after the GFC as in the full period estimate. One could argue that the GFC did not cause any essential changes in the investments and savings behavior of Japanese firms in the long run[27].

Are these features of investments and savings behavior common among various enterprise sizes? Table 3 shows the estimation results for the sample divided into four capital size categories (major enterprises, medium-sized enterprises, small enterprises, and micro enterprises) before and after the Global Financial Crisis. For financial constraint related variables, the significance of estimates for LNTA and LNTASQ declines compared to the whole sample estimates, especially in the period before the GFC, because disparity beyond capital size categories are eliminated. However, small enterprises robustly show non-linear scale effects on excess savings through financial constraints even within the category. The coefficient of DIVDUM is significantly positive as is the case in the entire sample, except for major enterprises after the GFC. For FIBDUM, it is difficult to directly compare the results with those

Table 2. Baseline Estimation Results of Excess Savings Function

	Entire Period	FY 1996-2007	FY 2010-15
LNTA	-0.0045 ***	-0.0039 ***	-0.0086 ***
LNTASQ	0.0003 ***	0.0002 ***	0.0004 ***
DIVDUM	0.0071 ***	0.0074 ***	0.0067 ***
FIBDUM	-0.0001	-0.0006	0.0013
SMEFIBDUM	-0.0053 ***	-0.0045 ***	-0.0062 ***
ESPLTA	0.0121 ***	0.0145 ***	0.0053 ***
TANGIBILITY	0.0598 ***	0.0627 ***	0.0598 ***
Tobin's q	0.0131 ***	0.0133 ***	0.0126 ***
OTINVTA	-0.0057 ***	-0.0028	-0.0066 **
MULTIDUM	-0.0013 ***	-0.0010 *	-0.0016 **
LNEMPL	0.0010 ***	0.0008 **	0.0017 ***
LNEXEC	-0.0029 ***	-0.0028 ***	-0.0038 ***
CASHTA	-0.0359 ***	-0.0407 ***	-0.0264 ***
DEBTTA	-0.0091 ***	-0.0091 ***	-0.0131 ***
NPFIXINV	0.0539 ***	0.0558 ***	0.0469 ***

Note 1. Standard errors are heteroscedastically robust (Huber–White estimator), with ***, **, and * denoting significance at the 1%, 5% and 10% levels, respectively.
2. The results of the year dummies, industry dummies, and constant term are omitted from the table.

---

[27] However, in the sense of the magnitude (i.e., absolute value) of the coefficient, we find some changes after the GFC; the influence of MULTIDUM, LNEMPL, LNEXEC, and DEBTTA gets larger than before the GFC while that of CASHTA gets smaller.

of the entire sample because we should omit SMEFIBDUM in the estimation by capital size due to collinearity. Nevertheless, the coefficient is significantly negative in medium-sized and small enterprises before the GFC, which is qualitatively consistent with what we find in the baseline estimation. Similarly, there are no noteworthy differences with the baseline results with regard to ESPLTA, TANGIBILITY, Tobin's q, and OTINVTA[28]. The effects of LNEMPL and LNEXEC are roughly the same as the entire sample estimation in large and medium-sized enterprises, though they are not significant or take the opposite sign in small and micro enterprises, suggesting that the influence of corporate governance differs depending on enterprise size. For CASHTA and DEBTTA, we find no systematic difference from the baseline, although estimates are insignificant in some combination of capital size category and period. However, the absolute value of the coefficient of CASHTA tends to become larger as the capital size becomes smaller both before and after the GFC, suggesting that the trend of returning to the optimum level is more pronounced in small and micro enterprises. NPFIXINV is robustly significantly positive for all capital size categories, which shows us that we should not ignore the influence of lumpy investment behavior when analyzing excess savings in large enterprises.

III-4.   *Estimation Results of the Cash Holdings Function*

Even in a company with excess savings, the surplus is used for repaying outstanding loans, returning profits to shareholders through dividend payments or stock repurchases, and investing in other companies, including M&A and FDI. Which is to say, only a part of the surplus goes to accumulation of cash reserves. However, it is also true that there are many commonalities between the trend of excess savings and the accumulation of cash reserves, such as risk aversion and preliminary motives. Hence, it is worth trying to estimate a cash holdings function using a similar variable list as that used for estimating an excess savings function; at the same time, once estimates are made, the results can be compared to each other for the sake of confirming the robustness of the excess savings function[29]. Interpretation and expected signs of explanatory variables will not be repeated here, since they are basically the same as the excess savings function, even though those of the investment opportunity variables are somewhat different from the excess savings function. Tobin's q was expected to have a negative coefficient for excess savings as the flip side of having a positive coefficient for investment, but it is generally known that a positive coefficient is expected for cash holdings driven by the incentive to avoid opportunity loss due to future financial constraints[30]. In addition, OTINVTA is expected to have a positive coefficient for cash holdings contrary to the case of excess savings for the similar reason to Tobin's q because out-

---

[28] The coefficient of OTINVTA in major enterprises is significantly positive before the crisis, which is the only difference worth noting from the entire sample estimation.

[29] In the cash holdings function, ESTA, the dependent variable in excess savings function is added to the explanatory variable list instead of CASHTA, which goes to left-hand side.

[30] See Opler, Pinkowitz, Stulz, and Williamson (1999), for example.

Table 3. Estimation Results of Excess Savings Function by Size of Capital

FY 1996-2007

	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
LNTA	0.0037	0.0069 *	-0.0076 **	0.0008
LNTASQ	-0.0001	-0.0004 *	0.0006 **	-0.0004
DIVDUM	0.0052 ***	0.0044 ***	0.0135 ***	0.0127 **
FIBDUM	0.0010	-0.0029 **	-0.0035 *	-0.0035
SMEFIBDUM				
ESPLTA	0.0133 ***	0.0178 ***	0.0246 ***	0.0119 **
TANGIBILITY	0.0669 ***	0.0644 ***	0.0475 ***	0.0728 ***
Tobin's q	0.0106 ***	0.0118 ***	0.0137 ***	0.0219 ***
OTINVTA	0.0075 **	-0.0007	-0.0235 ***	0.0017
MULTIDUM	-0.0013	-0.0015 *	-0.0008	-0.0025
LNEMPL	0.0008	0.0016 ***	0.0004	-0.0039 ***
LNEXEC	-0.0051 ***	-0.0035 ***	-0.0010	0.0039 *
CASHTA	-0.0040	-0.0305 ***	-0.0656 ***	-0.0492 ***
DEBTTA	-0.0159 ***	-0.0062 **	-0.0035	-0.0075
NPFIXINV	0.0681 ***	0.0573 ***	0.0484 ***	0.0577 ***

FY 2010-15

	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
LNTA	-0.0083 **	0.0038	-0.0160 ***	-0.0298 ***
LNTASQ	0.0004 **	-0.0003	0.0010 ***	0.0028 **
DIVDUM	0.0010	0.0050 ***	0.0117 ***	0.0231 *
FIBDUM	0.0019	-0.0020	0.0007	-0.0075
SMEFIBDUM				
ESPLTA	0.0187 ***	0.0155 ***	0.0018	-0.0111
TANGIBILITY	0.0589 ***	0.0597 ***	0.0517 ***	0.0632 ***
Tobin's q	0.0095 ***	0.0107 ***	0.0142 ***	0.0282 ***
OTINVTA	-0.0008	-0.0027	-0.0098	-0.0526 **
MULTIDUM	-0.0001	-0.0019	-0.0021	-0.0078
LNEMPL	0.0026 ***	0.0019 ***	0.0012	-0.0036
LNEXEC	-0.0069 ***	-0.0058 ***	0.0000	-0.0006
CASHTA	-0.0138 **	-0.0168 ***	-0.0347 ***	-0.0749 ***
DEBTTA	-0.0130 ***	-0.0046	-0.0121 ***	-0.0283 **
NPFIXINV	0.0488 ***	0.0471 ***	0.0457 ***	0.0553 ***

Note 1. Standard errors are heteroscedastically robust (Huber–White estimator), with ***, **, and * denoting significance at the 1%, 5% and 10% levels, respectively.

    2. The results of the year dummies, industry dummies, and constant term are omitted from the table.

standing investments in other companies highly correlate with investment opportunities in M&A and overseas operations.

Table 4 shows the estimation results of the cash holdings function for the entire time period as well as for before and after the Global Financial Crisis. Since most of the variables naturally indicate similar results to the excess savings function, we only mention below the variables showing different results. The coefficient of DIVDUM is significantly negative, contrary to the excess savings function; this is consistent with the financial constraints view. As with excess savings, there could be a reverse causality in cash reserves from cash to dividend payments, yet the result suggests the effect of reverse causality is not so strong in the case of the cash holdings function. Regarding the coefficients of FIBDUM and SMEFIB-DUM, both are estimated to be significantly negative, suggesting that in larger enterprises persistent excess savings after debt repayment are leading to the accumulation of cash reserves, rather than financial constraints[31]. The coefficient of TANGIBILITY is also significantly negative, contrary to the excess savings function but consistent with the financial constraints view. However, taking into consideration that it takes time to recover after cash reserves sharply decrease due to huge investments, this finding is not contradictory to the interpretation based on lumpy investment behavior. For variables related to investment op-

Table 4. Baseline Estimation Results of Cash Holdings Function

	Entire Period	FY 1996-2007	FY 2010-15
LNTA	-0.0435 ***	-0.0391 ***	-0.0557 ***
LNTASQ	0.0010 ***	0.0009 ***	0.0015 ***
DIVDUM	-0.0057 ***	-0.0021 ***	-0.0109 ***
FIBDUM	-0.0040 ***	-0.0179 ***	0.0163 ***
SMEFIBDUM	-0.0180 ***	-0.0121 ***	-0.0246 ***
ESPLTA	0.1189 ***	0.1163 ***	0.1251 ***
TANGIBILITY	-0.2030 ***	-0.1910 ***	-0.2323 ***
Tobin's *q*	0.0019 ***	0.0021 ***	0.0012 ***
OTINVTA	-0.1533 ***	-0.1454 ***	-0.1753 ***
MULTIDUM	0.0060 ***	0.0040 ***	0.0115 ***
LNEMPL	-0.0002	0.0008 ***	-0.0016 ***
LNEXEC	0.0179 ***	0.0143 ***	0.0238 ***
ESTA	0.1802 ***	0.1733 ***	0.2056 ***
DEBTTA	-0.0341 ***	-0.0254 ***	-0.0542 ***
NPFIXINV	-0.0031 ***	-0.0031 ***	-0.0037 ***

Note 1. Standard errors are heteroscedastically robust (Huber–White estimator), with ***, **, and * denoting significance at the 1%, 5% and 10% levels, respectively.
  2. The results of the year dummies, industry dummies, and constant term are omitted from the table.

---

[31] In the case of after the GFC, the coefficient of FIBDUM is *positive* and significant.

portunities, the coefficient of Tobin's q is estimated to be significantly positive, which is consistent with preliminary motive of cash holding, though the magnitude is extremely small. On the other hand, the coefficient of OTINVTA is estimated to be significantly negative with a relatively large magnitude. The result for OTINVTA may reflect the fact that M&A or FDI has been financed with the withdrawal of cash reserves. The coefficient of MULTIDUM is significantly positive, which is inconsistent with the assumption that MULTIDUM captures the mitigating effect on financial constraints through risk diversification. Hence, an interpretation related to corporate governance expecting diversified firms to accumulate excess cash reserves with low profitability due to the lack of discipline seems to fit well with the above results. The coefficient of LNEXEC is also significantly positive, which is inconsistent with the assumption that LNEXEC captures the preference for business expansion. Therefore, an interpretation related to the preference for financial soundness expecting managerial entrenchment represented by LNEXEC lead to excess cash reserves seems to fit well, as in the case of MULTIDUM.

Subsequently, Table 5 shows the estimation results of the cash holdings function when dividing our sample into four capital size categories before and after the Global Financial Crisis. We find some interesting differences among capital size categories as well as changes in cash holding behavior before and after the crisis, which we did not find in the pooled estimation. Contrary to the pooled case, the coefficient of DIVDUM before the GFC is significantly positive for every tier of capital size. This is because the difference within each tier of capital size comes up to the surface, with sample division removing the global difference across tiers of capital size that smaller enterprises pay less dividends and accumulate more cash reserves. However, after the GFC the sign of the coefficient is significantly negative or insignificant. Regarding FIBDUM, the sign of the coefficient, which is significantly negative before the GFC for every tier of capital size, changes in major and medium-sized enterprises to positively significant, capturing their movement toward giving more priority to ensuring liquidity in the wake of malfunctioning of the capital market. In addition to the above, we find no variable that changes its coefficient sign before and after the GFC. However, when comparing the magnitude (i.e., absolute value) of the coefficient, it is worth noting that a larger magnitude for ESPLTA, OTINVTA, and ESTA is observed as the capital size gets smaller. This reflects, among small and micro enterprises, the reality that more profitable enterprises tend to accumulate more cash reserves to use for M&A and overseas investment.

Regarding the influence of corporate governance, the significantly positive coefficient of MULTIDUM estimated in the pooled case is found to be mainly due to major and medium-sized enterprises. Meanwhile, the coefficient of LNEXEC is robustly significantly positive for every tier of capital size, consistent with the pooled estimation. Therefore, we can conclude that among the causes of excess accumulation of cash reserves regarding the problem of corporate governance, the influence of business diversification is a remarkable feature seen in major and medium-sized enterprises, but that the influence of the board size is common regardless of the capital size.

IV.   Allocation of Internal Cash Flow

The major reason why excess savings and cash holdings attract a lot of attention today is the possibility that such phenomena may lead to restrained capital investments, stagnation of innovation, and sluggish economic growth. From this point of view, we need to explore the relevancy of results from the excess savings function and the cash holdings function to investment behavior more directly. Moreover, in order to clarify the interpretation of corporate governance variables such as MULTIDUM and LNEXEC, whose coefficients show different signs in the excess savings function and the cash holdings function, it is important to know the allocation of internal cash flow (= gross savings defined above) to various usages, including capital investments[32].

Therefore, in this chapter, we examine the stylized facts and determinants of cash flow allocation focusing five major usages of cash flow normalized by the total assets: capital investments (FIXINV, equal to the gross investments rate defined above), investments in other companies such as M&A and FDI (OTHERINV, equal to the change in OTINVTA defined above), accumulation of cash reserves (CASHACC, equal to the change in CASHTA defined above), reduction of interest-bearing debt (DEBTRED), and dividend payments (DIVIDEND). These usages are regressed on the same list of explanatory variables as the excess savings function, excluding the DIVDUM and NPFIXINV variables, which overlap with the left-hand side variables[33]. Of the five usages, negative values are allowed for each item except for DIVIDEND. Since we use exactly the same sample as the previous chapter, we only report the basic statistics of each dependent variable in Table 6.

Table 7 shows the estimation results for the entire time period and for the periods before and after the Global Financial Crisis. First looking at the coefficient of CFTA (propensity to spend), we find the largest usage over 20 years is DEBTRED (0.275) followed by FIXINV (0.221) and CASHACC (0.213). On the other hand, the propensity to spend for DIVIDEND (0.014) and for OTHERINV (0.012) are surprisingly low. There is no remarkable change in this situation, even in the estimations before and after the GFC. However, the propensity to spend for DEBTRED dropped considerably after the GFC, whereas coefficients for the other four usages increased. In addition to the completion of repayment of excess debt in early 2000s, preliminary motives of giving more priority to secure liquidity in the wake of the malfunctioning of the capital market in the crisis are thought to have played an important role in the decline in the propensity to spend for DEBTRED and the rise in that for CASHACC after the GFC.

Next, we focus on MULTIDUM and LNEXEC, whose coefficients show different signs in the excess savings function and the cash holdings function, and examine the effect of

---

[32] The following analysis of what we call the "cash flow usage function," particularly with respect to capital investments, has a lot in common with the long history of "cash flow sensitivity" literature, although the latter is interested more in determinants of capital investments than the allocation of cash flow.

[33] Needless to say, cash flow and expenditure on each usage are decided simultaneously. However, as shown in Chang, Dasgupta, Wang, and Yan (2014), the cash flow usage function (in terminology of this paper) should be estimated in a single equation, not a simultaneous equation, as long as accounting identity is satisfied.

Table 5. Estimation Results of Cash Holdings Function by Size of Capital

FY 1996-2007

	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
LNTA	-0.1172 ***	-0.1446 ***	-0.0731 ***	-0.0495 ***
LNTASQ	0.0045 ***	0.0064 ***	0.0034 ***	0.0024 ***
DIVDUM	0.0041 ***	0.0064 ***	0.0061 ***	0.0405 ***
FIBDUM	-0.0199 ***	-0.0152 ***	-0.0347 ***	-0.0514 ***
SMEFIBDUM				
ESPLTA	0.0654 ***	0.1063 ***	0.1779 ***	0.1424 ***
TANGIBILITY	-0.1288 ***	-0.1520 ***	-0.2522 ***	-0.2849 ***
Tobin's q	0.0020 ***	0.0025 ***	0.0035 ***	0.0007
OTINVTA	-0.0799 ***	-0.1043 ***	-0.2369 ***	-0.2873 ***
MULTIDUM	0.0032 ***	0.0067 ***	-0.0008	-0.0021
LNEMPL	-0.0005	0.0024 ***	0.0054 ***	0.0118 ***
LNEXEC	0.0138 ***	0.0202 ***	0.0145 ***	0.0117 ***
ESTA	0.1265 ***	0.1387 ***	0.1929 ***	0.2406 ***
DEBTTA	-0.0311 ***	0.0013	0.0087 ***	-0.0230 ***
NPFIXINV	0.0028 **	-0.0008	-0.0056 ***	-0.0046 *

FY 2010-15

	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
LNTA	-0.1654 ***	-0.1596 ***	-0.0754 ***	-0.0697 ***
LNTASQ	0.0064 ***	0.0071 ***	0.0035 ***	0.0044 **
DIVDUM	-0.0014	-0.0046 **	-0.0029	0.0098
FIBDUM	0.0064 ***	0.0235 ***	-0.0265 ***	-0.0504 ***
SMEFIBDUM				
ESPLTA	0.0912 ***	0.1189 ***	0.1710 ***	0.1753 ***
TANGIBILITY	-0.1478 ***	-0.2116 ***	-0.2952 ***	-0.3514 ***
Tobin's q	0.0021 ***	0.0003	0.0036 ***	0.0009
OTINVTA	-0.1125 ***	-0.1498 ***	-0.2786 ***	-0.3480 ***
MULTIDUM	0.0081 ***	0.0167 ***	0.0015	-0.0003
LNEMPL	0.0020 **	-0.0023 ***	0.0031 ***	0.0021
LNEXEC	0.0207 ***	0.0300 ***	0.0190 ***	0.0198 ***
ESTA	0.1349 ***	0.1863 ***	0.2399 ***	0.2371 ***
DEBTTA	-0.0414 ***	-0.0428 ***	-0.0165 ***	-0.0028
NPFIXINV	0.0070 ***	-0.0059 **	-0.0052 **	0.0064

Note 1. Standard errors are heteroscedastically robust (Huber–White estimator), with ***, **, and * denoting significance at the 1%, 5% and 10% levels, respectively.
2. The results of the year dummies, industry dummies, and constant term are omitted from the table.

Table 6. Descriptive Statistics of Dependent Variables for Cash Flow Usage Function

	FIXINV	OTHERINV	CASHACC	DEBTRED	DIVIDEND
Number of Obs.	297723	297723	297723	297723	297723
Mean	0.037	0.003	0.005	0.004	0.005
Median	0.015	0.000	0.000	0.003	0.000
S.D.	0.086	0.043	0.075	0.098	0.019
Minimum	-0.952	-0.947	-0.890	-0.997	0.000
Maximum	0.999	0.994	0.980	0.991	0.997

these factors on each usage[34]. The coefficients of MULTIDUM are significantly negative with respect to FIXINV, DEBTRED, and DIVIDEND, significantly positive for CASHACC, and insignificant for OTHERINV, indicating a strong tendency to suppress cash outflow in general. This is apparently inconsistent with the assumption that risk diversification reduces the need for cash reserves through relaxation of financial constraints, indicating that business diversification is closely linked to loosened discipline in corporate governance and excess cash reserves. The coefficients of LNEXEC are significantly negative with respect to FIXINV, DEBTRED, and DIVIDEND, but they are significantly positive for OTHERINV and CASHACC. Except for the result with regard to OTHERINV, this also reflects a strong preference to retain cash internally.

The coefficients of CASHTA are significantly positive with respect to FIXINV and OTHERINV but significantly negative for CASHACC, indicating that a certain part of accumulated cash reserves are withdrawn to spend on domestic investments, M&A, and FDI[35]. However, whether these investments covered by cash reserves are efficient should be questioned in the light of the free cash flow problem first pointed out by Jensen (1986). In this regard, although Tobin's q in this paper is a rather noisy proxy for investment opportunities, it is also worth noting that the coefficient of q is significantly estimated with a negative sign. Meanwhile, lumpy investment has a robust impact on excessive savings and cash holdings regardless of enterprise size, as shown in the previous chapter. Cash reserves based on this motive are not necessarily inefficient.

Table 8 shows the results of estimating the cash flow usage function when dividing the sample into four capital size categories before and after the Global Financial Crisis. Looking at the coefficient of CFTA (propensity to spend), we find substantial differences among tiers of capital size. The propensity to spend for FIXINV, OTHERINV, and DIVIDEND get smaller as the enterprise capital size gets smaller, whereas CASHACC gets larger as the enterprise capital size gets smaller. Meanwhile, compared to these four usages, the propensity to spend for DEBTRED has a less clear trend. Given these results, we can point out that a

---

[34] Although there are small differences in statistical significance before and after the Global Financial Crisis, they do not suggest any systematic change, so here we only discuss the result of the entire 20-year period.
[35] This is consistent with observation for aggregate data in Chapter II that the increase in cash reserves was not so significant.

Table 7. Baseline Estimation Results of Cash Flow Usage Function

Dependent Variable: FIXINV

	Entire Period	FY 1996-2007	FY 2010-15
CFTA	0.2213 ***	0.2165 ***	0.2293 ***
LNTA	-0.0104 ***	-0.0113 ***	-0.0078 ***
LNTASQ	0.0004 ***	0.0004 ***	0.0002 ***
FIBDUM	-0.0015 ***	-0.0017 ***	-0.0018 **
SMEFIBDUM	-0.0011 **	-0.0023 ***	0.0026 ***
ESPLTA	0.0004	0.0018	-0.0006
TANGIBILITY	-0.0155 ***	-0.0147 ***	-0.0186 ***
Tobin's q	-0.0064 ***	-0.0063 ***	-0.0066 ***
OTINVTA	-0.0219 ***	-0.0238 ***	-0.0208 ***
MULTIDUM	-0.0011 ***	-0.0014 ***	-0.0004
LNEMPL	0.0061 ***	0.0058 ***	0.0061 ***
LNEXEC	-0.0008 ***	-0.0008 **	-0.0004
CASHTA	0.0102 ***	0.0109 ***	0.0090 ***
DEBTTA	0.0004	0.0022 *	-0.0013

Dependent Variable: OTHERINV

	Entire Period	FY 1996-2007	FY 2010-15
CFTA	0.0120 ***	0.0099 ***	0.0148 ***
LNTA	-0.0032 ***	-0.0032 ***	-0.0036 ***
LNTASQ	0.0002 ***	0.0002 ***	0.0003 ***
FIBDUM	0.0016 ***	0.0011 ***	0.0023 ***
SMEFIBDUM	0.0003	0.0002	0.0007
ESPLTA	0.0033 ***	0.0042 ***	0.0025 ***
TANGIBILITY	-0.0018 ***	-0.0008	-0.0029 ***
Tobin's q	0.0009 ***	0.0010 ***	0.0008 ***
OTINVTA	-0.0343 ***	-0.0361 ***	-0.0268 ***
MULTIDUM	-0.0001	-0.0002	0.0003
LNEMPL	0.0004 ***	0.0007 ***	-0.0001
LNEXEC	0.0019 ***	0.0019 ***	0.0019 ***
CASHTA	0.0106 ***	0.0113 ***	0.0086 ***
DEBTTA	-0.0036 ***	-0.0053 ***	-0.0013

Dependent Variable: CASHACC

	Entire Period	FY 1996-2007	FY 2010-15
CFTA	0.2131 ***	0.2040 ***	0.2361 ***
LNTA	-0.0112 ***	-0.0107 ***	-0.0111 ***
LNTASQ	0.0003 ***	0.0002 ***	0.0003 ***
FIBDUM	0.0032 ***	0.0011 **	0.0045 ***
SMEFIBDUM	-0.0047 ***	-0.0042 ***	-0.0040 ***
ESPLTA	0.0063 ***	0.0058 ***	0.0050 ***
TANGIBILITY	-0.0052 ***	-0.0069 ***	-0.0025 *
Tobin's q	0.0037 ***	0.0037 ***	0.0038 ***
OTINVTA	0.0065 ***	0.0037 ***	0.0107 ***
MULTIDUM	0.0009 ***	0.0004	0.0019 ***
LNEMPL	0.0012 ***	0.0015 ***	0.0008 ***
LNEXEC	0.0039 ***	0.0035 ***	0.0047 ***
CASHTA	-0.0930 ***	-0.1123 ***	-0.0583 ***
DEBTTA	-0.0141 ***	-0.0149 ***	-0.0142 ***

Dependent Variable: DEBTRED

	Entire Period	FY 1996-2007	FY 2010-15
CFTA	0.2749 ***	0.2933 ***	0.2280 ***
LNTA	0.0144 ***	0.0136 ***	0.0131 ***
LNTASQ	-0.0005 ***	-0.0005 ***	-0.0005 ***
FIBDUM	0.0007	0.0021 ***	-0.0002
SMEFIBDUM	-0.0063 ***	-0.0059 ***	-0.0070 ***
ESPLTA	-0.0006	-0.0015	-0.0017
TANGIBILITY	0.0052 ***	0.0029 **	0.0113 ***
Tobin's q	0.0009 ***	0.0008 ***	0.0008 ***
OTINVTA	0.0117 ***	0.0143 ***	0.0092 ***
MULTIDUM	-0.0008 *	-0.0002	-0.0020 ***
LNEMPL	-0.0043 ***	-0.0048 ***	-0.0032 ***
LNEXEC	-0.0026 ***	-0.0025 ***	-0.0029 ***
CASHTA	0.0385 ***	0.0459 ***	0.0262 ***
DEBTTA	0.0540 ***	0.0559 ***	0.0471 ***

Dependent Variable: DIVIDEND

	Entire Period	FY 1996-2007	FY 2010-15
CFTA	0.0139 ***	0.0106 ***	0.0223 ***
LNTA	0.0002 ***	0.0003 ***	0.0003
LNTASQ	0.0000 ***	0.0000	0.0000 ***
FIBDUM	-0.0031 ***	-0.0020 ***	-0.0042 ***
SMEFIBDUM	-0.0001	-0.0004 ***	0.0001
ESPLTA	0.0067 ***	0.0064 ***	0.0066 ***
TANGIBILITY	-0.0008 ***	0.0005 ***	-0.0031 ***
Tobin's q	0.0013 ***	0.0011 ***	0.0016 ***
OTINVTA	-0.0036 ***	-0.0022 ***	-0.0058 ***
MULTIDUM	-0.0007 ***	-0.0005 ***	-0.0012 ***
LNEMPL	0.0007 ***	0.0005 ***	0.0010 ***
LNEXEC	-0.0013 ***	-0.0007 ***	-0.0020 ***
CASHTA	-0.0061 ***	-0.0042 ***	-0.0085 ***
DEBTTA	-0.0049 ***	-0.0046 ***	-0.0057 ***

Note 1. Standard errors are heteroscedastically robust (Huber–White estimator), with ***, **, and * denoting significance at the 1%, 5% and 10% levels, respectively.

    2. The results of the year dummies, industry dummies, and constant term are omitted from the table.

fundamental characteristics of gross savings usage is that larger enterprises tend to spend a greater proportion of funds toward dividends or investments in other companies, such as M&A and FDI, whereas smaller enterprises tend to spend a greater proportion of funds toward cash accumulation. However, paying attention to changes after the Global Financial Crisis, the propensity to spend for capital investments declined significantly and those for other usages increased in major enterprises compared to before the GFC period. On the other hand, in small enterprises the propensity to spend for reduction of interest-bearing debt declined significantly and those for other usages increased. In other words, we could say that a decline in propensity to spend for domestic investments was one of the main drivers of financial surpluses in major enterprises after the GFC period, and that a greater proportion of the surpluses went toward cash accumulation than before, even though the propensi-

Table 8. Estimation Results of Cash Flow Usage Function by Size of Capital

Dependent Variable: FIXINV

FY 1996-2007	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises	FY 2010-15	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
CFTA	0.3094 ***	0.2391 ***	0.1730 ***	0.1780 ***	CFTA	0.2594 ***	0.2253 ***	0.2360 ***	0.1899 ***
LNTA	-0.0083 ***	-0.0209 ***	-0.0221 ***	-0.0154 ***	LNTA	0.0050	-0.0087 ***	-0.0141 ***	0.0011
LNTASQ	0.0002 *	0.0011 ***	0.0011 ***	0.0006	LNTASQ	-0.0004 **	0.0003 *	0.0006 ***	-0.0012 *
FIBDUM	-0.0052 ***	-0.0050 ***	0.0029 **	0.0022	FIBDUM	-0.0028 **	-0.0023 **	0.0021 **	0.0084 *
SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***	SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***
ESPLTA	0.0181 ***	0.0066 ***	-0.0058 ***	-0.0109 ***	ESPLTA	0.0075 ***	-0.0024 *	-0.0025 **	-0.0040
TANGIBILITY	-0.0219 ***	-0.0119 ***	-0.0094 ***	-0.0295 ***	TANGIBILITY	-0.0089 **	-0.0136 ***	-0.0253 ***	-0.0381 ***
Tobin's *q*	-0.0065 ***	-0.0065 ***	-0.0053 ***	-0.0073 ***	Tobin's *q*	-0.0056 ***	-0.0060 ***	-0.0071 ***	-0.0097 ***
OTINVTA	-0.0311 ***	-0.0175 ***	-0.0114 ***	-0.0306 ***	OTINVTA	-0.0166 ***	-0.0242 ***	-0.0189 ***	-0.0162
MULTIDUM	-0.0025 ***	-0.0005	0.0001	0.0034	MULTIDUM	-0.0033 ***	0.0002 *	0.0026 **	0.0060
LNEMPL	0.0051 ***	0.0041 ***	0.0080 ***	0.0112 ***	LNEMPL	0.0050 ***	0.0056 ***	0.0071 ***	0.0125 ***
LNEXEC	-0.0018 **	-0.0014 **	0.0013 *	0.0046 ***	LNEXEC	-0.0014	0.0000 *	0.0005 **	0.0042
CASHTA	-0.0138 ***	0.0109 ***	0.0181 ***	0.0151 **	CASHTA	-0.0065	0.0053 *	0.0159 ***	0.0270 **
DEBTTA	0.0173 ***	0.0059 ***	-0.0076 ***	-0.0070 *	DEBTTA	0.0077 **	-0.0046 *	-0.0022 **	0.0061

Dependent Varible: OTHERINV

FY 1996-2007	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises	FY 2010-15	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
CFTA	0.0186 ***	0.0126 ***	0.0070 ***	0.0065 **	CFTA	0.0376 ***	0.0139 ***	0.0123 ***	0.0060
LNTA	-0.0079 ***	-0.0029	-0.0021 **	-0.0005	LNTA	-0.0050	-0.0014 *	-0.0013 **	0.0011
LNTASQ	0.0004 ***	0.0001	0.0001	-0.0002	LNTASQ	0.0003 **	0.0001 *	0.0001 **	-0.0003 *
FIBDUM	0.0011	0.0029 ***	0.0005	0.0014 *	FIBDUM	0.0034 ***	0.0031 ***	0.0007 **	0.0009
SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***	SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***
ESPLTA	0.0171 ***	0.0058 ***	0.0025 **	0.0017	ESPLTA	0.0035 *	0.0022 *	0.0023 **	0.0049
TANGIBILITY	-0.0021	-0.0002	-0.0050 ***	-0.0040 ***	TANGIBILITY	-0.0021	-0.0034 ***	-0.0041 ***	-0.0088 **
Tobin's *q*	0.0018 ***	0.0010 ***	0.0002	0.0002	Tobin's *q*	0.0017 ***	0.0005 ***	0.0004 **	0.0005
OTINVTA	-0.0369 ***	-0.0423 ***	-0.0417 ***	-0.0272 ***	OTINVTA	-0.0079 *	-0.0404 ***	-0.0346 ***	-0.0479 ***
MULTIDUM	0.0008	0.0000	-0.0005	0.0001	MULTIDUM	0.0003	-0.0004 *	0.0018 **	-0.0029 *
LNEMPL	0.0001	0.0008 ***	0.0010 ***	0.0010 **	LNEMPL	-0.0004	-0.0001 *	-0.0001 **	0.0025 ***
LNEXEC	0.0016 ***	0.0022 ***	0.0005	0.0011	LNEXEC	0.0032 ***	0.0018 ***	0.0010 **	-0.0019
CASHTA	0.0312 ***	0.0182 ***	0.0023 *	0.0027	CASHTA	0.0106 ***	0.0117 ***	0.0067 ***	-0.0020
DEBTTA	-0.0056 ***	-0.0049 ***	-0.0017 *	0.0000	DEBTTA	-0.0090 ***	-0.0010 *	0.0021 **	0.0022

Dependent Varible: CASHACC

FY 1996-2007	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises	FY 2010-15	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
CFTA	0.1242 ***	0.1637 ***	0.2322 ***	0.2677 ***	CFTA	0.1534 ***	0.2116 ***	0.2612 ***	0.2984 ***
LNTA	-0.0207 ***	-0.0366 ***	-0.0279 ***	-0.0253 ***	LNTA	-0.0201 ***	-0.0224 ***	-0.0128 ***	-0.0278 ***
LNTASQ	0.0007 ***	0.0017 ***	0.0015 ***	0.0020 ***	LNTASQ	0.0008 ***	0.0010 ***	0.0003 **	0.0015
FIBDUM	-0.0001	0.0011	-0.0020	-0.0108 ***	FIBDUM	0.0018 **	0.0047 ***	-0.0003 **	-0.0110 **
SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***	SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***
ESPLTA	0.0055 ***	0.0013	0.0203 ***	0.0219 ***	ESPLTA	0.0044 **	0.0016 *	0.0182 ***	0.0263 **
TANGIBILITY	-0.0030 *	-0.0041 ***	-0.0120 ***	-0.0180 ***	TANGIBILITY	-0.0044 *	-0.0001 *	-0.0093 ***	-0.0099
Tobin's *q*	0.0028 ***	0.0033 ***	0.0051 ***	0.0046 ***	Tobin's *q*	0.0021 ***	0.0027 ***	0.0059 ***	0.0074 ***
OTINVTA	0.0071 ***	0.0069 ***	-0.0030	-0.0158 ***	OTINVTA	0.0078 ***	0.0201 ***	-0.0058 **	-0.0122
MULTIDUM	-0.0009 *	0.0007	-0.0001	-0.0006	MULTIDUM	0.0021 **	0.0028 ***	-0.0007 **	-0.0017
LNEMPL	0.0009 ***	0.0011 ***	0.0037 ***	0.0046 ***	LNEMPL	0.0003	0.0002 *	0.0031 ***	0.0066 ***
LNEXEC	0.0037 ***	0.0043 ***	0.0037 ***	0.0025	LNEXEC	0.0038 ***	0.0048 ***	0.0049 ***	0.0047
CASHTA	-0.1356 ***	-0.0994 ***	-0.1272 ***	-0.1326 ***	CASHTA	-0.0391 ***	-0.0365 ***	-0.0963 ***	-0.1157 ***
DEBTTA	-0.0088 ***	-0.0110 ***	-0.0118 ***	-0.0145 ***	DEBTTA	-0.0065 ***	-0.0121 ***	-0.0125 ***	-0.0137

Table 8. Estimation Results of Cash Flow Usage Function by Size of Capital (continued)

Dependent Variable: DEBTRED

FY 1996-2007	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises	FY 2010-15	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
CFTA	0.2439 ***	0.3088 ***	0.2973 ***	0.3066 ***	CFTA	0.2507 ***	0.2385 ***	0.2003 ***	0.2780 ***
LNTA	0.0023	0.0161 ***	0.0154 ***	0.0033	LNTA	0.0013	0.0124 ***	0.0046 **	0.0046
LNTASQ	-0.0001	-0.0007 ***	-0.0005 **	0.0006	LNTASQ	-0.0001	-0.0005 **	0.0001 **	0.0012
FIBDUM	0.0016	0.0029 **	-0.0062 ***	0.0056 **	FIBDUM	0.0002	-0.0017 *	-0.0062 ***	0.0014
SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***	SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***
ESPLTA	-0.0202 ***	-0.0110 ***	0.0198 ***	0.0315 ***	ESPLTA	-0.0097 ***	-0.0036 *	0.0070 **	0.0221 *
TANGIBILITY	-0.0051 *	-0.0037	0.0057 *	0.0226 ***	TANGIBILITY	0.0073 *	0.0076 **	0.0150 ***	0.0183
Tobin's q	0.0006 **	0.0008 ***	0.0003	0.0021 ***	Tobin's q	0.0003	0.0006 *	0.0014 ***	0.0018
OTINVTA	0.0026	0.0115 ***	0.0138 ***	0.0338 ***	OTINVTA	-0.0010	0.0117 **	0.0130 **	0.0464 **
MULTIDUM	-0.0007	-0.0009	0.0002	0.0017	MULTIDUM	-0.0003	-0.0015 *	-0.0053 ***	0.0046
LNEMPL	-0.0018 ***	-0.0034 ***	-0.0071 ***	-0.0128 ***	LNEMPL	-0.0010 **	-0.0025 ***	-0.0051 ***	-0.0143 ***
LNEXEC	0.0005	-0.0027 ***	-0.0050 ***	-0.0029	LNEXEC	-0.0005	-0.0034 ***	-0.0040 ***	-0.0086 *
CASHTA	0.0607 ***	0.0325 ***	0.0476 ***	0.0585 ***	CASHTA	0.0243 ***	0.0187 ***	0.0279 ***	0.0586 ***
DEBTTA	0.0626 ***	0.0447 ***	0.0702 ***	0.0818 ***	DEBTTA	0.0554 ***	0.0447 ***	0.0504 ***	0.0727 ***

Dependent Variable: DIVIDEND

FY 1996-2007	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises	FY 2010-15	Major Enterprises	Medium-sized Enterprises	Small Enterprises	Micro Enterprises
CFTA	0.0245 ***	0.0155 ***	0.0067 ***	0.0012 ***	CFTA	0.0458 ***	0.0385 ***	0.0083 ***	0.0008
LNTA	-0.0012 **	0.0042 ***	0.0019 ***	0.0002 *	LNTA	-0.0002	0.0038 ***	0.0025 ***	-0.0004
LNTASQ	0.0001 ***	-0.0003 ***	-0.0002 ***	0.0000	LNTASQ	0.0000	-0.0002 ***	-0.0002 ***	0.0001
FIBDUM	-0.0011 ***	-0.0027 ***	-0.0017 ***	-0.0001	FIBDUM	-0.0026 ***	-0.0040 ***	-0.0040 ***	-0.0001
SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***	SMEFIBDUM	0.0000 ***	0.0000 ***	0.0000 ***	0.0000 ***
ESPLTA	0.0136 ***	0.0115 ***	0.0021 ***	0.0011 ***	ESPLTA	0.0140 ***	0.0088 ***	0.0011 **	0.0004
TANGIBILITY	-0.0015 ***	-0.0004	0.0015 ***	0.0005 ***	TANGIBILITY	-0.0022 **	-0.0051 ***	-0.0021 ***	-0.0004
Tobin's q	0.0015 ***	0.0014 ***	0.0006 ***	0.0002 ***	Tobin's q	0.0024 ***	0.0019 ***	0.0006 ***	0.0002 ***
OTINVTA	-0.0033 ***	-0.0057 ***	-0.0010 **	0.0002	OTINVTA	-0.0019 *	-0.0108 ***	-0.0052 ***	-0.0007
MULTIDUM	-0.0004 ***	-0.0003 ***	0.0000	-0.0002 *	MULTIDUM	-0.0011 **	-0.0009 ***	-0.0006 **	0.0004
LNEMPL	0.0004 ***	0.0005 ***	0.0004 ***	0.0000	LNEMPL	0.0013 ***	0.0007 ***	0.0007 ***	0.0002 **
LNEXEC	-0.0020 ***	-0.0010 ***	-0.0002	0.0003 ***	LNEXEC	-0.0039 ***	-0.0020 ***	-0.0009 ***	-0.0001
CASHTA	-0.0037 ***	-0.0077 ***	0.0010 *	0.0014 ***	CASHTA	-0.0074 ***	-0.0111 ***	-0.0018 **	0.0004
DEBTTA	-0.0056 ***	-0.0033 ***	-0.0034 ***	-0.0010 ***	DEBTTA	-0.0080 ***	-0.0070 ***	-0.0045 ***	-0.0005

Note 1. Standard errors are heteroscedastically robust (Huber–White estimator), with ***, **, and * denoting significance at the 1%, 5% and 10% levels, respectively.

    2. The results of the year dummies, industry dummies, and constant term are omitted from the table.

ty to accumulate cash reserves is still lower than for smaller enterprises.

We looked at the coefficients of CASHTA with respect to FIXINV to see whether the accumulated cash reserves increase capital investments and find it negative in the major enterprises, although it is significantly positive in smaller tiers of capital size. At the same time, the coefficients of CASHTA with respect to OTHERINV are significantly positive in every tier of capital size except for micro enterprises. These findings suggest that even though the accumulation of cash reserves is a standby fund for future investment opportunities, as far as major enterprises are concerned, it will not go toward domestic capital investments but toward M&A and FDI. This means that domestic capital investments in major enterprises became a non-strategic expenditure item with a high degree of interlocking with current cash flow.

Regarding the influence of corporate governance, the negative effect of MULTIDUM and LNEXEC on FIXINV observed in the pooled estimation is basically a feature found only in major enterprises, whereas positive effects are dominant in the smaller tiers of capital size. However, whether such positive effects are efficient is another matter.

V.   Conclusion and Future Research Issues

In this paper, using the survey slips data of FSSCI, the stylized facts and determinants of financial surpluses (excess savings), cash holdings, and investment behavior by enterprise size categorized by capital size are explored with both descriptive and regression analyses. In observation with aggregate data, excess savings in the Japanese corporate sector defined before dividends payout has been established since the mid-1990s. The level of excess savings normalized by total assets has continued to expand until around 2002 under the influence of a long-lasting bad loans problem. However, even after the problem ended, the excess savings ratio continued to hover at a high level until very recently. A majority of the excess savings is generated by major enterprises if we define them on the before dividends payout basis. However, the extent of excess savings of SMEs also reaches a considerable scale, which motivates us to conduct analysis by enterprise size using microdata.

From the estimations of the excess savings function and the cash holdings function based on microdata over 20 years from 1996 to 2015, when the excess savings trend in the corporate sector persistently continued, we obtained the following results. The tendency of financial constraints to raise the excess savings rate and the cash holdings rate was confirmed significantly for small and micro enterprises. Regarding the impact of investment opportunities, we found no clear evidence that firms with large outstanding investments in other companies such as M&A and FDI tend to have excess savings or hold large amounts of cash. From the relationship with the cash reserves ratio and the interest-bearing debt ratio, the view that excess savings are escalated in order to increase cash reserves or repay interest-bearing debt was not supported. However, from the relationship between variables of business diversification and board size, the possibility of excessive accumulation of cash reserves caused by corporate governance problems was suggested. Among them, the influence of business diversification is a remarkable feature for large and medium-sized enterprises, whereas the influence of board size was common regardless of enterprise size. From the relationship with lumpy investment variables, the effect of preparing for lumpy investment to increase excess savings was confirmed significantly. The above characteristics did not change significantly even if we divide the sample period into the periods before and after the Global Financial Crisis.

In order to deeply discuss the influence of corporate governance on excess savings and cash holdings, it is necessary to see the overall picture of the flow of funds, including the allocation of cash flow. Therefore, we also estimated the cash flow usage function, in which five major usages of cash flow (capital investments, investments in other companies such as M&A and FDI, accumulation of cash reserves, reduction of interest-bearing debt, and dividend payments) are taken as a dependent variable respectively. As a result, we found that accumulation of cash reserves along with reduction of interest-bearing debt and capital investments made up a large portion of the propensity to spend from cash flow. Moreover, with respect to the changes after the Global Financial Crisis, the propensity to spend for reduction of interest-bearing debt declined substantially while that for accumulation of cash

reserves went up, indicating Japanese firms came to put greater priority on securing liquidity than before the GFC. Looking at differences in enterprise size, smaller enterprises have a higher propensity to spend for cash accumulation in general. At the same time, the propensity to spend for cash accumulation increased in every tier of capital size after the GFC. Furthermore, enterprises featuring business diversification and larger boards tend to restrict the outflow of cash. This tendency is prominent particularly among major enterprises. For major enterprises, the effect of cash reserves on domestic capital investments is negative, and even if accumulated cash is standby funds for future investment opportunities, it is not going to cover domestic capital investments. In other words, it can be said that domestic capital investments in large enterprises are now categorized as a non-strategic expenditure item with high linkage to cash flow.

This paper explored the stylized facts and the determinants of financial surpluses as well as the background of restrained investments in Japanese corporate sector by paying attention to differences in enterprise size based on huge microdata covering a wide range of companies in terms of scale. Instead of putting priority on the coverage this time to get new findings, we had to give up to form panel data and therefore could not control the simultaneity biases and capture any dynamic aspect of the issue. Performing strict statistical verification on the findings of this paper using the panel data set, even with limited coverage such as listed firms, remains a future research agenda.

References

Brufman, L., Martinez, L., and R. P. Artica (2013), "What are the Causes of the Growing Trend of Excess Savings of the Corporate Sector in Developed Countries? An Empirical Analysis of Three Hypothesis," Policy Research Working Paper, World Bank.

Caballero, R., T. Hoshi, and A. Kashyap (2008), "Zombie Lending and Depressed Restructuring in Japan," *American Economic Review*, 98, pp.1943-77.

Chang, X., S. Dasgupta, G. Wang, and J. Yan (2014), "Cash Flow Sensitivities and the Allocation of Internal Cash Flow," *Review of Financial Studies*, 27, pp.3628-57.

Doms, M. and T. Dunne (1998), "Capital Adjustment Patterns in Manufacturing Plants," *Review of Economic Dynamics*, 1, pp.409-29.

Fukuda, S. and J. Nakamura (2011), "Why did 'Zombie' Firms Recover in Japan?" *World Economy*, 34, pp.1124-37.

Goto, Y. (2014), "Funding of the SME Sector," *Macroeconomic Performance of SME Sector in Japan*, Nikkei Publishing Inc., Chapter 8. (In Japanese)

Hadlock, C. J., and Pierce, J. R. (2010), "New Evidence on Measuring Financial Constraints: Moving beyond the KZ index," *Review of Financial Studies*, 23, pp.1909-40.

Hanazaki, M. (2008), *Corporate Finance and Corporate Governance: An Informational and Institutional Approach*, University of Tokyo Press. (In Japanese)

Jensen, M. C. (1986), "Agency Cost of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review*, 76, pp.323-9.

Nakamura, J. (2017), "Why Does Capital Investment by Japanese Firms Remain Sluggish? A Reexamination from Secular Stagnation Perspective," *Economic Analysis* (Keizai Bunseki), 193: 51-82. (In Japanese)

Nakamura, J. and S. Fukuda (2013), "What Happened to 'Zombie Firms' in Japan?: Reexamination for the Lost Two Decades" *Global Journal of Economics*, 2(2), pp.1-18.

Nakamura, J., K. Tonogi, and K. Asako (2017), "Investment Behaviors by Capital Good and Enterprise Size: Testing Capital Goods Heterogeneity and Capital Market Imperfection with the FSSCI," *Public Policy Review*, 13, pp.71-101.

Opler, T., L. Pinkowitz, R. Stulz, and R. Willamson (1999), "The Determinants and Implications of Corporate Cash Holdings," *Journal of Financial Economics*, 52, pp.3-46