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## Balance Sheet Repair and Corporate Investment in Japan

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**IMF Working Paper**

Asia and Pacific Department

**Balance Sheet Repair and Corporate Investment in Japan**

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**Abstract**

We trace Japanese firms' behavior over the last decades using aggregate corporate balance sheet data. Financial health of Japanese corporate sector has improved and firms paid back significant amount of debt and rebuilt their liquidity buffers. They also expanded abroad while the pace of corporate investment moderated. Regarding the latter, model estimates on aggregate corporate investment over the post bubble period show that expectation about future profitability, in particular medium-term demand outlook, has been the major driver, implying that a successful implementation of structural reforms could have positive impact even in the near term by improving the medium-term demand outlook.

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## I. INTRODUCTION

Since the asset prices collapsed in the early 1990s, the Japanese economy experienced “Lost Decades” of slow growth, deflation, and output persistently below potential (Hayashi and Prescott, 2002). Japan’s GDP growth in 2000s, at an average of below 1 percent, was one of the lowest rates among advanced economies. Potential growth has also steadily declined over this period as shrinking labor force outweighed the contributions from steady productivity gains.

The Japanese authorities have embarked on an ambitious agenda—so called Abenomics—and successfully jumpstarted growth to 1½ percent in 2013 on aggressive monetary easing and fiscal stimulus. It is critical now for the economy to successfully transition from a stimulus to private sector-driven recovery. Because of an expected contractionary fiscal stance in the medium to long term and headwinds from Japan’s shrinking labor force due to population aging, capital accumulation and productivity gains need to become the main drivers of potential growth going forward.

In this context, focus has shifted to Japan’s corporate sector. Private investment used to be an important engine of growth during Japan’s boom years in the 1980s, accounting for about a third of overall growth. However, firms’ balance sheets were impaired significantly with the bubble burst in the early 1990s and their contribution to overall economic activity accordingly moderated over the next decade. Following some recovery in the mid 2000s, Japanese corporate cut back their domestic investment again after the recent global financial crisis, being a drag on growth until recently.

Against this backdrop, this paper traces Japanese firms’ behavior over the last decades and analyzes the aggregate corporate investment to understand the main determinants. Specifically, we seek to answer the following questions:

- How healthy are corporate balance sheets and have legacy problems been overcome?
- Are Japanese firms sitting on large cash holdings?
- What is holding back corporate investment?

To answer these questions, we trace aggregate nonfinancial corporate balance sheet database over the last three decades and see how their financial health has evolved after experiencing the asset-price collapse in the early 1990s. We also estimate the aggregate corporate investment based on various time series models to understand the main determinants over the different economic cycles. Main findings are as follows:

- Financial health of Japanese firms has improved over the last two decades. On the back of gradually improving profitability, they have deleveraged significantly while

rebuilding their liquidity buffers. At the same time, their overseas investment has increased.

- Accordingly, net financial balance of Japanese firms turned into surplus since mid-1990s and has continued to improve since then. However, this improved balance sheet did not lead to higher investment until recently.
- Empirical analysis finds that firm's expectation of demand growth outlook over the medium term is a key determinant for corporate investment. In this context, the successful implementation of structural reforms, the third arrow of "Abenomics," is crucial to increase private investment and raise potential growth since it will improve confidence in the domestic demand outlook for the medium term although such measures typically take some time to roll out.

The remainder of the paper is structured as follows. Section II provides discussion on corporate sector behavior over the last three decades based on aggregate balance sheet data. Section III discusses empirical models to estimate the aggregate investment together with estimation results. Policy implications are discussed in Section IV before concluding in Section V.

## **II. CORPORATE SECTOR BALANCE SHEET DEVELOPMENTS**

We rely on three different databases to trace aggregate firm behavior. Closing balance sheet accounts in the national accounts provide the most comprehensive summary of firm behavior over the last 30 years since 1980. By tracing developments in both asset and liability sides of aggregate balance sheet, we can understand how financial health in nonfinancial corporate sector has evolved over time and how resources have been allocated to different activities. Flow of funds data, compiled by the Bank of Japan (BoJ), provide more detailed information on how financial assets and liabilities of corporate sector have evolved. In particular, by comparing stock and cumulative flow data, we can also disentangle the changes in firms' financial conditions into valuation effects and actual changes in investment behavior. Although less comprehensive, Corporate Financial Statements (so called corporate survey), compiled by the Ministry of Finance, also provides additional information about underlying trend in firms behavior, including more details about net worth.

Overall activity of aggregate firm's behavior can be understood by looking at how key items on both asset and liability sides of the balance sheet have evolved over the past decades (Table 1). The developments of total asset and liabilities include information on not only how firms have used their resources on various activities, but also on how fluctuations in asset markets have affected the balance sheet of the corporate sector over different economic cycles (valuation effect). In particular, the developments on the asset side of the balance sheet give us information on firms' investment strategies over time and region (domestically and overseas) and their financial investment. Trends in leverages can be found on the liability side of the balance sheet. The net worth, a difference between total assets and liabilities,

summarizes the overall health of the corporate sector, although change needs to be interpreted with care due to valuation effect.<sup>2</sup>

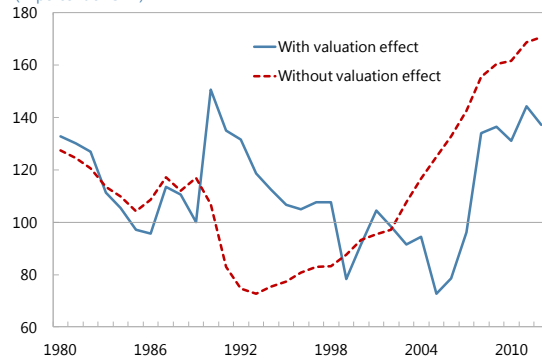
**Table 1. Summary of Nonfinancial Corporate Sector Balance Sheet**  
(in percent of GDP)

	1980	1990	2000	2006	2012		1980	1990	2000	2006	2012
<b>ASSETS</b>	343	467	358	399	393	<b>LIABILITIES</b>	215	318	266	320	255
Fixed Assets	114	118	126	132	142	Loans	82	111	85	67	71
Land	73	143	73	59	58	Securities (excl. Shares)	8	17	15	14	15
Inventories	28	15	12	12	13	Others	125	189	167	239	169
Currency & deposits	31	38	35	37	47		0	0	0	0	0
Overseas investment	1	7	11	16	21	<b>NET WORTH</b>	128	149	91	78	137
Other financial assets	95	145	101	142	111	Retained earnings					

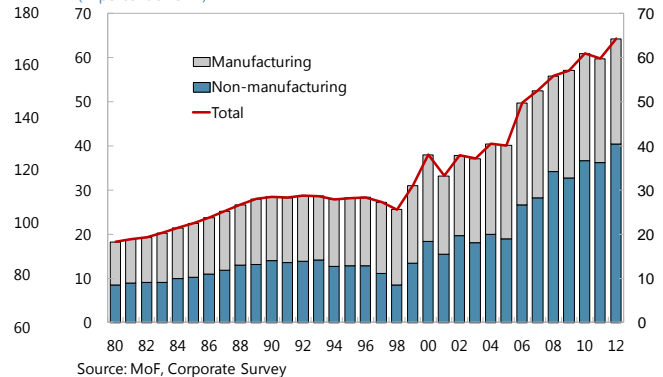
Source: National Accounts, Flow of Funds.

Financial health of Japanese firms has improved over the last two decades. After a steady decline for more than 15 years since the bubble burst, net worth of Japanese firms rebounded sharply in mid-2000s to the levels in the late 1980s (Figure 1). However, by adjusting valuation effects arising from stock market swings and exchange rate developments, we can see that underlying trend of aggregate firm's financial health already began to improve since mid-1990s as evidenced by steady rise of net worth over the last two decades.<sup>3</sup> Consistent with this underlying trend, retained earnings data from a complementary corporate survey database show that profitability gains were broad based over the last two decades and seen in both manufacturing and nonmanufacturing firms (Figure 2).<sup>4</sup>

**Figure 1. Net worth**  
(in percent of GDP)



**Figure 2. Retained Earnings**  
(in percent of GDP)



These developments do not necessarily mean that Japanese firms have been sitting on large cash holdings without any productive activity. The rising retained earnings are often

<sup>2</sup> See Appendix I for more detailed corporate sector balance sheet with and without valuation effect.

<sup>3</sup> Swings in stock prices have caused large fluctuations in Japanese firm's balance sheet. For example, total asset-to-GDP ratio increased by more than 150 percentage points between 1980 and 1989 of which more than 120 percentage points were due to valuation effect (see Appendix I for more details).

<sup>4</sup> Retained earnings data are not available in closing balance sheet accounts in the national accounts.

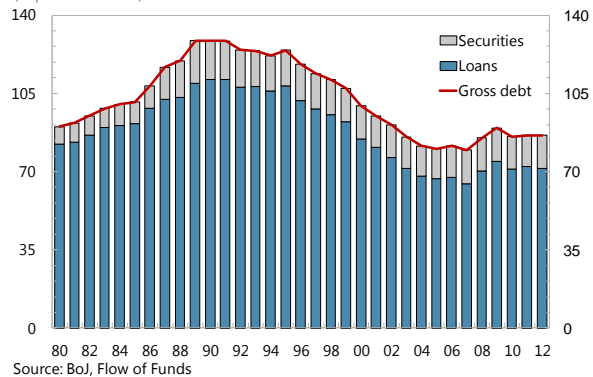
misunderstood as evidence for passive behavior of Japanese firms. Retained earnings are defined as profits net of dividends or other distributions paid to investors. Being recorded under shareholders' equity on the balance sheet, retained earnings provide information on firm's capital structure and tends to rise unless net profit is negative or a firm pays more dividend than profit. The size of retained earnings does not provide information on how firms have allocated their resources into various activities including investment or cash holdings since it does not include information on debit side of the balance sheet. For example, even when there is no change in retained earnings, investment (or correspondingly fixed assets) can rise if a firm uses their cash to purchase plant or equipment. Similarly, if a firm uses all of its retained earnings for investment, there will be no change in cash holdings. Hence, to understand how firms have allocated their resources or accumulated profits, we have to look at details of both asset and liability sides of the balance sheet.

How have Japanese firms allocated their resources to various activities?

- First, over the last 25 years, they paid back significant amount of debt. Disaggregate data on the liability side of the balance sheet, together with detailed information from flow of funds data, show that firms have paid back their loans by about 40 percentage points of GDP between 1991 and 2012 (Figure 3). On the back of this sizable deleveraging effort, their debt levels (loans and securities other than shares) as of 2012 are much lower than those in early 1980s. The leverage ratio, defined as total liability over net worth, has almost halved from more than 350 percent in 1989 to about 185 percent in 2012.

**Figure 3. Gross Debt**

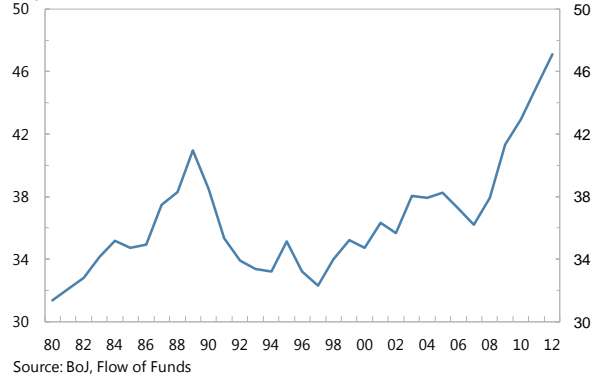
(In percent of GDP)



- Second, Japanese firms have also rebuilt their liquidity buffers. Disaggregate data in the asset side of the balance sheet show that, after drawdown a lot of their cash and deposits to pay their debt through 1990s, firms began to rebuild their cash buffers in the early 2000s to the levels close to the average in 1980s when they made investment very aggressively as noted below (Figure 4). This stylized fact is consistent with a finding in our empirical estimation below that cash buffers did not rise at the cost of lower investment. Firms started to hold more liquidity buffers after the global financial crisis partly due to increased uncertainty about economic

**Figure 4. Currency and Deposit Holdings**

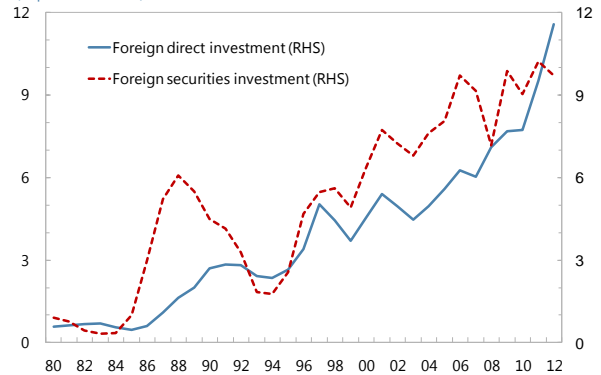
(In percent of GDP)



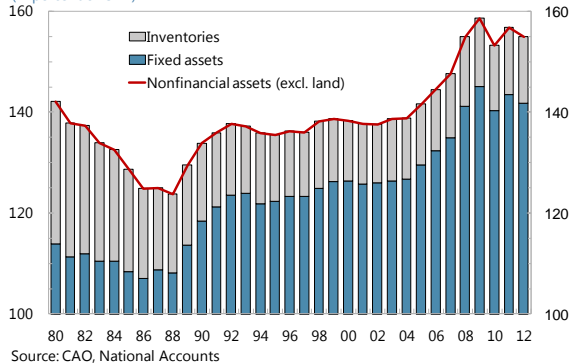
outlook, and this has been a common recent trend in many other advanced economies, including the U.S. and Germany (Ivanova and Raei, 2014).

- Third, Japanese firms have expanded abroad since mid-1990s. As we can see from developments on the asset side of the balance sheet, overseas investment, in the form of both foreign direct investment (FDI) and securities investment, has increased by more than 15 percent of GDP (Figure 5). If we exclude valuation effects due to exchange rate movement, their overseas investment has increased by about 25 percent of GDP over this period. Analysis suggests that labor cost differentials has been a main driver of Japan's FDI and, in the more recent period, host country's market size became another important determinant of Japan's outward FDI (IMF, 2011).
- However, Japanese firms did not expand their domestic capacity until mid-2000s. The total stock of nonfinancial assets (excluding lands) was very stable between mid-1990s and mid-2000s, implying that firms ceased to expand capacity over this period (Figure 6). This is in line with the fact that the growth rate of private nonresidential investment slowed down significantly since mid-1990s which is discussed in further detail in the next section (Figure 7). Firms began to invest again during the mid-2000s, which is also captured in rising fixed assets in the asset side of the aggregate balance sheet, but stagnated again after the recent global financial crisis.

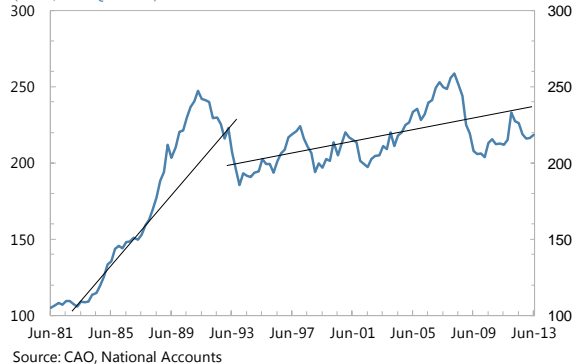
**Figure 5. Overseas Investment**  
(In percent of GDP)



**Figure 6. Nonfinancial Assets (excl. land)**  
(In percent of GDP)



**Figure 7. Real Business Investment**  
(Index, 1980Q1 = 100)

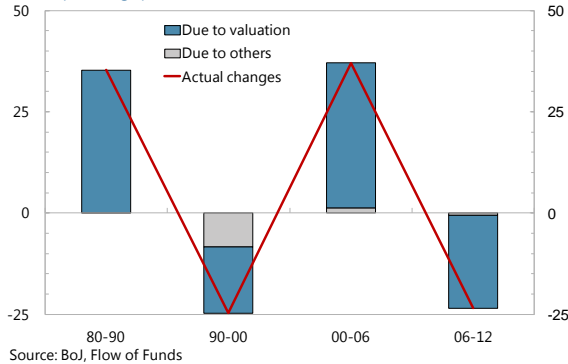


- Lastly, large fluctuations in the stock of financial assets are mostly due to valuation effects. To see this point, we strip out the valuation effect by comparing stock and cumulative flows data using the flow of funds database. We find that large increases in firms equity holdings in 1980s (17 to 53 percent of GDP) and early 2000s (28 to

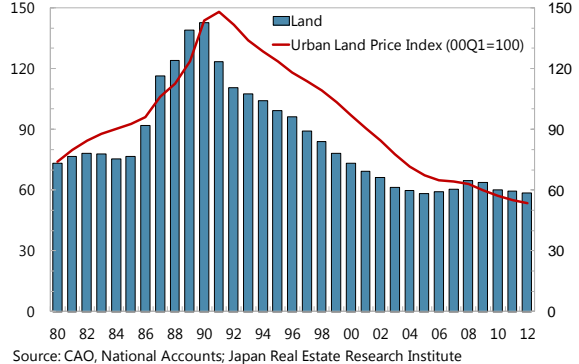


65 percent) as well as a large decline after the recent financial crisis (65 to 41 percent) were almost entirely driven by valuation effects (Figure 8). About two-thirds of the large fall in 1990s (from 53 to 28 percent) were due to valuation effect and only about one-third of the decline can be attributed to more active divestment during this period. Similarly, large swings in firms' land holdings can be attributed to valuation effect on land prices (Figure 9). These findings imply that firms strategies in cross share holdings across firms are unlikely to have affected the other firms' activities to large degree.

**Figure 8. Change in Equity Holdings**  
(In GDP percentage points)



**Figure 9. Land**  
(In percent of GDP)



In sum, Japanese firms' cash and deposit holdings have increased over the last two decades, but much less than the increase of retained earnings because they have allocated their profits also for other various activities including deleveraging and overseas and domestic investment.<sup>5</sup> To better understand the impact of the balance sheet developments over the last two decades on corporate investment, we now turn to the analysis of the determinants of the corporate investment in the next section.

### III. CORPORATE INVESTMENT

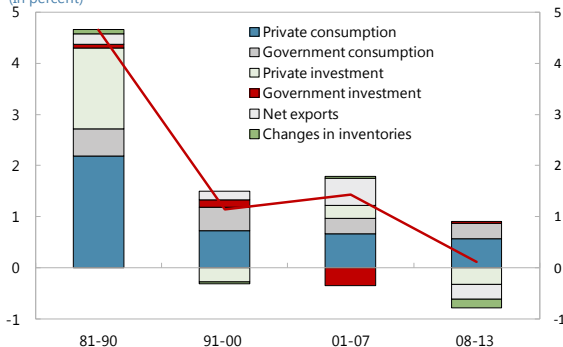
During Japan's boom years in the 1980s with growth averaging 4½ percent per year, private investment was an important driver for growth, accounting for more than a third of growth (Figure 10). However, total investment has declined from more than 30 percent of GDP in early 1990s down to about 20 percent largely due to a trend decline in private investment (Figure 11). In particular, nonresidential investment (corporate investment, hereafter) fell from around 20 percent of GDP to about 13½ percent as of 2013, lower than the post-bubble period average of about 14 percent. The moderation of corporate investment growth

<sup>5</sup> Accordingly, Japanese firms' net financial balance which used to be a deficit about 5 to 10 percent of GDP every year in the 1980s turned into surplus from mid-1990s and increased gradually since then. After peaking at about 7¾ percent of GDP in 2003, net financial surplus declined to about 1¼ percent of GDP in 2008 with recovery of investment, but has increased again to about 5 percent in recent years after the global financial crisis. Koo (2004) emphasizes the importance of this kind of firms' behavioral shift after the bubble burst and notes that deleveraging of Japanese firms reduced aggregate demand, leading Japan into a lost decade.

increased the age of the existing capital stock to 17 years in the manufacturing sector, about 3-4 years older compared to the U.S. Although investment has begun to improve following the large decline during the global financial crisis, its pace has remained moderate until recently.<sup>6</sup>

**Figure 10. Contributions to Growth**

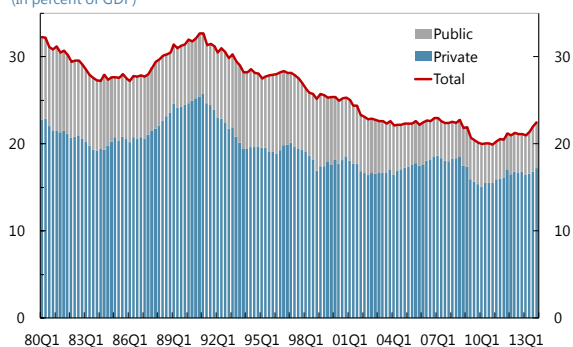
(In percent)



Source: Haver Analytics, IMF staff calculations.

**Figure 11. Investment**

(In percent of GDP)



Source: CAO, National Accounts

What is holding back corporate investment despite improvements in the financial health of the corporate sector? To answer this question, we estimate several traditional single-equation models of investment used in the literature and study the empirical performance of those models in explaining corporate investment in Japan: accelerator model, augmented Tobin's Q model, and a model based on financial market data (see Oliner, Rudebusch, and Sichel for a review). In all cases, we use quarterly data from 1993:Q4 to 2013:Q4 to focus on post-bubble period developments. A Chow test also does reject the null hypothesis of no structural change around that period (see appendix II for a detailed description about data). We then decompose key determinants for aggregate corporate investment over different periods to shed light on which policies would be helpful to lift investment going forward.

There is a vast literature on estimating private investment in different countries. For the U.S. Lee and Rabanal (2010) applied various time series models in estimating the investment in equipment and software for the U.S. to understand its sharp decline during the recent financial crisis. On Japan, Syed and Lee (2010) find that, using firm level data, economic fundamentals, including profitability, liquidity, leverage, and uncertainty, are important factors for driving corporate investment, but with different degrees across different types of firms. Guimaraes and Unterberdoerster (2006) use both aggregate and firm-level data to understand the sluggish recovery of private investment in Malaysia after the Asian crisis.

### *Accelerator model*

<sup>6</sup> Japanese firms' expansion abroad over the last decade does not appear to substitute for domestic investment, with both generally rising in tandem albeit for greater divergence lately. Tanaka (2012) also finds that the empirical evidence does not support that FDI hollows out domestic manufacturing or employment.

The first model is the accelerator model in which the desired capital stock is the main determinant of the level of investment. We regress the investment to current and past changes in real output which are proxy for the changes in the desired capital stock (Clark, 1997; Jorgenson, 1971) as below:

$$\frac{I_t}{K_{t-1}} = \frac{\alpha}{K_{t-1}} + \sum_{i=0}^N \beta_i \frac{\Delta Y_{t-i}}{K_{t-1}} + \delta + e_t$$

where I is real corporate investment, K is the capital stock, Y is real GDP,  $\Delta$  is the first difference operator. We find that, as in Table 2, up to 10 lags are statistically significant in the regression, similar to the findings of Lee and Rabanal (2012) in the case of U.S. for investment in equipment and software. These findings confirm general view that firms have invested in response to the need for the desired capital stock, but do not provide an answer to what factors have driven the desired capital stock.

**Table 2. Accelerator Model**

Independent variable: <i>real investment-to-capital stock ratio</i>				
Parameter	Coefficient	Std. Error	t-Statistics	Prob.
$\alpha$	7376	8465	0.871	0.387
$\beta_0$	0.047	0.081	0.578	0.565
$\beta_1$	0.148	0.084	1.767	0.083
$\beta_2$	0.212	0.084	2.534	0.014
$\beta_3$	0.199	0.082	2.424	0.019
$\beta_4$	0.214	0.084	2.555	0.013
$\beta_5$	0.248	0.084	2.951	0.005
$\beta_6$	0.227	0.083	2.723	0.009
$\beta_7$	0.175	0.080	2.185	0.033
$\beta_8$	0.164	0.079	2.082	0.042
$\beta_9$	0.158	0.078	2.016	0.049
$\beta_{10}$	0.224	0.080	2.818	0.007
$\delta$	8.051	1.182	6.812	0.000
R-squared	0.555	S.E. of regression		0.447
Adjusted R-squared	0.461	Durbin-Watson stat		0.343

#### *A Model with Financial Market Data*

We then estimate a model that focus on the effect of funding cost for investment. This model relates real investment-to-capital ratio to various financial variables as below:

$$\frac{I_t}{K_{t-1}} = \alpha + \beta_0 spread_{t-1} + \beta_1 rr_{t-1} + \beta_3 lev_{t-1} + e_t$$

where *spread* is bank lending spread over sovereign funding cost, *rr* is real policy rate, and *lev* is leverage ratio. The estimation results are presented in Table 3.

**Table 3. Model with Financial Market Data**

Independent variable: <i>real investment-to-capital stock ratio</i>				
Parameter	Coefficient	Std. Error	t-Statistics	Prob.
Constant	11.204	0.176	63.824	0.000
Spread (-3)	-0.776	0.090	-8.583	0.000
Real policy rate (-1)	-0.245	0.048	-5.145	0.000
Leverage ratio (-1)	-0.818	0.111	-7.402	0.000
R-squared	0.698 S.E. of regression			0.333
Adjusted R-squared	0.686 Durbin-Watson stat			0.792

All variables turn out to have the expected negative signs and are statistically significant, suggesting that improving funding conditions have led to more corporate investment over the sample period, consistent with findings of Syed and Lee (2010) on more domestically oriented small and medium-sized firms.

However, empirical performance of both models above is not as great as those for other country cases: the R-squared of the regression implies that the models capture only a half to two-thirds of the variation in investment development and the Durbin-Watson statistic is even smaller than 1, suggesting highly correlated residuals.

#### *Augmented Tobin's Q Models*

Next, we turn to the model that relates the investment behavior to Tobin's Q which predicts that a firm has an incentive to invest when a firm's market value exceeds its replacement cost (Tobin, 1969; Hayashi, 1982). We also consider a so-called augmented Tobin's Q model that includes additional explanatory variables, partly to capture the effect of capital market incompleteness, which help improving the fit of the model empirically as below:

$$\frac{I_t}{K_{t-1}} = \alpha + \beta Q_t + \dots + e_t$$

where Q is the ratio of market value of equities to net worth of nonfinancial corporate and we considered several additional variables, including cash flow, exchange rates, demand outlook, and uncertainty.

Table 4 summarizes the results for this approach with additional explanatory variables. In the regression, we use Q ratio with a three-quarter lag because it shows a better fit than the contemporaneous Q ratio. While the Q ratio itself could account for about half of the corporate investment behavior, the model fit improves substantially up to more than 0.85 of adjusted R-squared with additional variables. All explanatory variables are statistically significant with the expected signs.

**Table 4. Augmented Tobin's Q Model<sup>1/</sup>**

Independent variable: <i>real investment-to-capital stock ratio</i>						
Variables <sup>2/</sup>	1	2	3	4	5	6
constant	8.168***	8.191***	5.408***	5.608***	6.433***	6.410***
Q ratio (-3)	1.219***	0.268	1.014***	0.779***	0.724***	0.711***
Demand outlook (-1)		0.794***	0.821***	0.951***	0.903***	
Domestic demand outlook (-1)						0.963***
External demand outlook (-1)						0.844***
Cash flow (-1)			0.113***	0.104***	0.078***	0.083***
Exchange rate gap (-4)				1.320***	1.130***	1.195***
Uncertainty (-3)					-0.464***	-0.445***
R-squared	0.406	0.691	0.820	0.845	0.862	0.863
Adjusted R-squared	0.398	0.683	0.813	0.837	0.852	0.852
S.E. of regression	0.460	0.334	0.257	0.241	0.229	0.229
Durbin-Watson stat	0.330	0.477	0.890	1.039	1.194	1.197

1/ \*, \*\*, \*\*\* indicate statistically significant coefficients with 10%, 5%, and 1% confidence levels, respectively.

2/ numbers in the parenthesis are the lag for each variable.

- Profitability:** Corporate investment is positively associated with expectations of future profitability, as summarized by Tobin's Q. As an alternative measure for future profitability, we also use forecast of the real demand growth rate of industry demand (demand outlook) and find that investment is positively associated with this demand outlook as well. In particular, explanatory power increases with medium-term demand outlook (3-year ahead) than near-term demand outlook (1-year ahead), implying that firms are investing if they see their demand outlook is improving in the medium term, not necessarily in the near term.<sup>7</sup>
- Liquidity:** The coefficient on cash flow is positive and statistically significant, suggesting that, despite large excess cash holdings typically observed by large firms, capital market is incomplete and average firms are financially constrained.

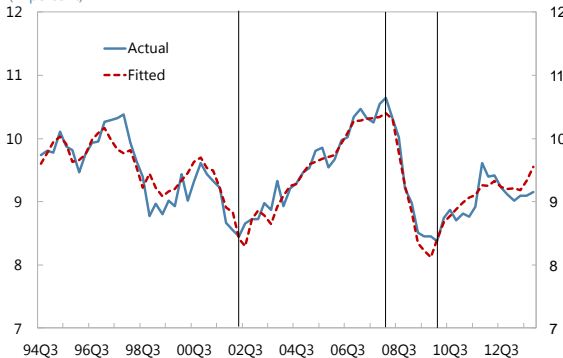
<sup>7</sup> To capture the foreign and domestic components of demand outlook, we regress demand outlook on global growth forecast over the same period in corresponding WEO vintages. Then, the fitted and residual series are used as proxy for foreign and domestic components of business demand outlook. We find that corporate investment is positively associated with both external and domestic demand outlook.

- *Exchange rate*: The Yen has periodically experienced large appreciation on safe-haven flows, lowering the profitability of large exporting manufacturing firms (Botman, Carvalho Fulho, and Lam, 2013). Trend appreciation of Yen has also been one of *the factors* that led many Japanese firms relocate overseas. Consistent with the fact that significant portion of corporate investment is made by large exporting manufacturing firms, corporate investment is positively associated with the gap between break-even yen-dollar rate and the actual rate.<sup>8</sup>
- *Uncertainty*: Investment is negatively associated with a standard deviation of consensus forecast over the next one year, confirming the view that firms are investing less when there are more economic uncertainty going forward.

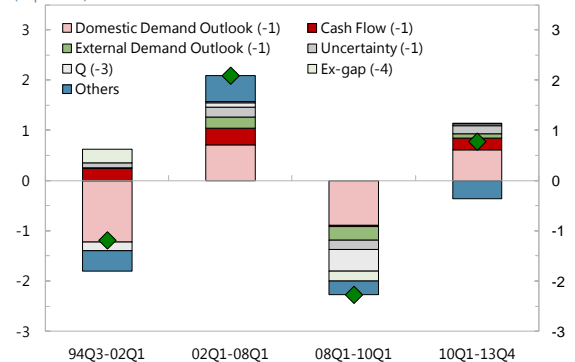
### Economic Relevance

How relevant are these different factors in explaining the ups and downs of corporate investment over the past two decades? Although all explanatory variables that we considered above turn out to have expected signs and are statistically significant, their contributions to corporate investment could vary significantly over different periods. So, based on the estimates from augmented Q model above, we calculate how much each factor has contributed to the actual change in real investment-to-GDP ratio over four different periods: downturns between 94Q3 to 02Q1 and between 08Q1 and 10Q1, upturns between 02Q1 to 08Q1 and 10Q1 to 13Q4 (Figures 12 and 13).

**Figure 12. Real Investment-to-Capital Stock Ratio**  
(In percent)



**Figure 13. Contribution to Changes in I/K Ratio**  
(In percent)



Expectation of future profitability, captured by medium-term demand outlook (both domestic and foreign) and Q ratio have been the major drivers for corporate investment during both slump and recovery periods. This implies that improvement in medium-term demand outlook could have a positive impact on corporate investment even in the near term by improving confidence. The estimation results imply that improving the domestic demand outlook to levels experienced in 2006/07, would raise corporate investment by about 5 percent.

<sup>8</sup> Estimation results remain similar when we use other more general exchange rate variables, such as real effective exchange rates.

Cash holding has not been a brake on corporate investment. Cash flows of firms have contributed positively in most periods except sharp contraction phase right after the recent global financial crisis. It implies that the balance sheet repair over the last two decades and corresponding rebuilding of liquidity buffers have helped firms to invest more not only during the upswings, but also in 1990s when they had to scale back their investment for large deleveraging needs.<sup>9</sup>

Large uncertainty about economic outlook in the wake of the recent financial crisis contributed to sharp drop in corporate investment. In contrast, less uncertainty during the recovery phases in both mid-2000s and recent years led firms to resume their investment. Similarly, large appreciation of Yen after the recent crisis, partly on safe-haven flows, was a drag on investment recovery. But after sharp depreciation since late 2012, the exchange rate began to contribute positively to firms' domestic investment.

The strong pick up in corporate investment in the first quarter of 2014 is consistent with this model implication since the model predicts that large depreciation of Yen and strong stock market rally in the first half of 2013 on the back of aggressive monetary easing would lead to large increase in corporate investment with about 3 to 4 quarter lags.

#### IV. POLICY IMPLICATION

Above findings suggest that policies could focus on the following areas to increase corporate investment: (i) improving the demand outlook, (ii) increasing the return on investment; (iii) reducing uncertainty, (iv) improving funding conditions to reduce the cost of capital, and (v) improving corporate governance.

The successful implementation of structural reforms, the third arrow of "Abenomics," is crucial to increase private investment and raise potential growth. Even though such measures typically take some time to roll out, they could have a positive impact on private investment even in the near term by improving confidence in the domestic demand outlook in the medium term.

Corporate income tax (CIT) reform could stimulate incentives to invest (Hassett and Hubbard, 2002). De Mooij and Saito (2014) find that investment could increase by about 0.4 percent for each point of corporate income tax rate reduction based on international and Japan-specific empirical estimates of corporate tax elasticities. However, they also noted that such rate reduction must be part of a more comprehensive fiscal reform as a CIT rate cut is not self financing and the Japanese government faces tight fiscal constraints.

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<sup>9</sup> Whether current level of cash holdings is excessive or not is different issue. For example, Aoyagi and Ganelli (2014) note that Japan's weak corporate governance is contributing to excessive cash holdings, so improving corporate governance would be important help unlock corporate savings and encourage investment.

Reducing uncertainty would help lower the risks associated with long-term investment decisions. While there are many exogenous uncertainties beyond the governments' control, there are also some risks related to policies. For example, credible and concrete medium-term fiscal consolidation plan that would remove any concerns about tail risks could reduce the concern on debt overhang and potential spike in financing cost. Morikawa (2013) also note that it is essential to improve the predictability of fundamental economic policies and institutions to achieve economic growth by promoting future-oriented investment.

Improving access to external financing would lower the cost of capital for smaller firms and those in the service sector. Potential options include widening the pool of venture capital funding available for start-ups in new emerging sectors, broadening eligible collateral to allow for a wider range of securitization beyond real estate and other fixed assets, and greater risk-based lending (Lam and Shin, 2012).

As noted by Aoyagi and Ganelli (2014), corporate governance reforms would also help, by removing some of the bottlenecks which encourage high corporate cash holdings and prevent a more pro-growth use of resources. In addition to various options that are already considered by the government, more ambitious measures could be considered to further improve corporate governance to discourage excessive corporate savings such as expanding the use of outside directors and complementing the Stewardship Code with a corporate governance code for firms.

## V. CONCLUSION

In this paper, we trace Japanese firms' behavior over the last decades using aggregate corporate balance sheet database. We find that the financial health of the Japanese corporate sector has improved over the last two decades as evidenced by gradual and steady increase of net worth and by rising retained earnings. Over this period, firms paid back significant amount of debt and rebuilt their liquidity buffers as well as expanded abroad in the form of both FDI and securities investment.

We also estimate the aggregate corporate investment based on various time series models to understand the main determinants over the different economic cycles. Private investment behavior can be well explained by fundamental variables. Expectation of future profitability, in particular medium-term demand outlook, is a key determinant for corporate investment. In this context, the successful implementation of structural reforms, the third arrow of "Abenomics," is crucial to increase private investment and raise potential growth since it will improve confidence in the domestic demand outlook for the medium term although such measures typically take some time to roll out. We also find that improved cash holdings and liquidity buffers have not been holding back corporate investment, rather have contributed positively in both upturns and downturns.



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## APPENDIX I. CORPORATE SECTOR BALANCE SHEET

### Japan. Corporate Sector Balance Sheet (with valuation effect)

(in percent of GDP)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
<b>Assets</b>	343	343	342	350	354	351	383	427	457	496	467	435	399	396	397	392	386	367	358	374	358	344	340	347	354	383	399	386	372	392	384	389	393	
Non-financial assets	216	215	217	213	209	207	220	248	255	277	285	266	253	249	240	235	232	225	222	217	212	207	204	200	198	200	204	208	219	223	214	216	214	
Fixed Assets	114	111	112	110	110	108	107	109	108	114	118	121	123	124	122	122	123	123	125	126	126	126	126	126	127	129	132	135	141	145	140	143	142	
Inventories	28	26	25	23	22	20	18	16	16	16	15	15	14	13	14	13	13	13	13	13	13	12	12	12	12	12	12	13	14	14	13	13	13	
Land	73	76	78	78	75	76	92	116	124	139	143	123	110	107	104	99	96	89	84	78	73	69	66	61	60	58	59	60	64	64	60	59	58	
Financial assets	128	129	127	137	144	143	161	179	199	216	182	170	148	148	157	157	153	142	135	158	146	137	136	147	155	183	195	177	152	170	170	173	179	
Currency & Deposits	31	32	33	34	35	35	35	37	38	41	38	35	34	33	33	35	33	32	34	35	35	36	36	38	38	38	37	36	38	41	43	45	47	
Shares and Other Equities	17	16	17	26	28	35	54	68	76	66	53	35	31	32	30	35	29	24	25	38	28	22	22	39	40	61	65	35	25	27	30	31	41	
Trade Credits/Fgn Trade Crec	58	57	54	57	58	52	51	55	56	57	57	54	49	49	51	55	52	47	46	47	49	44	43	43	45	46	51	48	39	46	45	48	43	
Outward Direct Investment	1	1	1	1	1	0	1	1	2	2	3	3	3	2	2	3	3	5	4	4	5	5	5	4	5	6	6	6	7	8	8	10	12	
Outward Investment in Sec	1	1	0	0	0	1	3	5	6	5	4	4	3	2	2	3	5	5	6	5	6	8	7	7	8	8	10	9	7	10	9	10	10	
Others	20	22	21	19	22	21	18	12	21	45	27	39	28	29	39	26	31	28	20	29	24	22	23	16	21	24	26	44	36	38	37	29	26	
<b>Liabilities</b>	215	218	219	240	248	252	284	311	341	387	318	301	270	277	284	285	281	260	250	296	266	240	241	256	259	310	320	289	238	256	253	245	255	
Loans	82	83	86	90	91	91	98	102	103	110	111	111	108	108	106	108	102	98	95	92	85	81	76	72	68	67	67	65	70	75	71	72	71	
Securities Other Than Shares	8	9	9	9	10	10	10	14	16	19	17	17	17	16	16	16	16	16	16	15	15	14	15	14	13	13	14	15	15	15	15	14	15	
Shares & Other Equities	45	43	47	64	64	78	114	143	161	141	114	78	73	77	72	88	73	65	71	107	80	68	58	92	97	148	158	96	64	83	80	83	105	
Trade Credits/Fgn Trade Credits	47	47	43	44	45	39	38	43	44	44	44	41	37	38	39	41	41	37	35	36	38	34	34	34	34	35	36	41	38	29	35	34	37	33
Others	32	36	34	33	39	33	23	9	17	73	31	53	35	38	52	32	49	44	34	46	48	43	59	44	46	46	40	75	60	48	54	39	31	
<b>Net worth</b>	128	125	123	110	106	99	99	116	115	109	149	134	130	119	112	107	105	108	107	78	91	104	98	91	94	73	78	96	134	136	131	144	137	

Sources: National accounts, Flow of funds

**Japan. Corporate Sector Balance Sheet (without valuation effect)**

(in percent of GDP)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Assets</b>	342	337	332	330	327	317	325	352	356	374	364	334	323	322	321	320	319	307	307	308	308	305	308	313	318	326	336	342	352	368	362	376	379
Non-financial assets	215	209	206	200	195	191	199	217	212	220	213	194	190	190	189	188	189	186	186	186	185	184	185	187	190	195	202	207	218	223	217	222	221
Fixed Assets	114	111	112	110	110	108	107	109	108	114	118	121	123	124	122	122	123	123	125	126	126	126	126	126	127	129	132	135	141	145	140	143	142
Inventories	28	26	25	23	22	20	18	16	16	16	15	15	14	13	14	13	13	13	13	13	12	12	12	12	12	12	13	14	14	13	13	13	
Land	73	72	69	66	63	63	74	92	88	91	79	58	52	53	53	52	52	50	48	47	46	46	48	48	51	54	57	60	63	65	64	65	66
Financial assets	127	127	126	129	131	126	126	135	144	154	150	141	134	132	132	132	131	121	121	123	123	121	122	126	128	131	135	135	134	144	145	155	158
Currency & Deposits	31	32	33	34	35	35	35	37	38	41	38	35	34	33	33	35	33	32	34	35	36	37	37	39	40	41	40	38	40	44	46	48	50
Shares and Other Equities	17	17	16	16	15	15	16	18	19	19	17	16	15	15	14	14	14	13	14	13	13	14	15	15	15	14	14	15	15	16	16	16	16
Trade Credits/Fgn Trade Crec	58	57	56	57	58	53	48	51	54	56	57	51	47	45	46	49	49	44	42	42	44	39	38	39	39	40	42	40	34	37	36	40	39
Outward Direct Investment	1	1	1	1	1	1	2	2	3	4	5	5	5	6	6	6	6	7	8	8	9	9	10	11	11	11	12	12	14	16	16	18	19
Outward Investment in Sec	1	1	1	2	3	4	6	7	7	8	8	9	8	8	8	9	10	11	12	13	13	14	14	14	14	14	14	15	16	17	17	19	19
Others	19	19	19	19	18	18	20	20	23	26	25	25	24	25	24	19	19	14	12	10	8	8	8	9	9	10	13	15	15	14	13	15	15
<b>Liabilities</b>	215	212	212	216	217	213	216	235	244	257	257	251	249	249	246	242	239	224	224	221	214	209	211	205	201	201	204	200	197	207	200	208	208
Loans	82	83	86	88	90	91	95	102	104	109	110	110	111	112	110	110	106	102	103	100	94	92	88	84	81	81	81	80	85	88	84	86	87
Securities Other Than Shares	8	8	8	8	9	10	11	16	18	20	19	19	19	19	19	18	18	17	18	17	17	17	17	16	15	16	16	16	16	17	17	17	17
Shares & Other Equities	45	43	43	42	40	39	38	39	39	39	37	37	36	37	37	38	37	37	39	40	41	42	43	43	44	45	46	45	45	49	48	49	49
Trade Credits/Fgn Trade Credits	47	47	44	45	46	40	36	39	41	43	43	38	35	33	34	36	36	32	30	31	32	28	27	28	28	29	31	29	22	24	23	27	25
Others	32	32	32	34	33	33	35	39	42	47	47	47	48	48	45	40	41	35	34	32	30	30	36	34	32	30	31	31	28	29	28	29	31
<b>Net worth</b>	127	125	120	113	110	104	109	117	112	117	107	83	75	73	75	77	81	83	83	88	93	95	97	108	117	125	133	143	155	160	162	169	171

Sources: National accounts, Flow of funds

## APPENDIX II. DATA

The dependent variable in all regressions is the “real investment-to-capital stock ratio”. It is defined as the ratio of real private investment in plant and equipment (from the national accounts) to real capital stock. Following the BoJ methodology, we use real capital stock series in Japanese Industrial Production (JIP) database, which employs economic-based approach for depreciation, and normalize this by the ratio of capital stocks in national account and JIP in 1994. Linear interpolation is used to construct a quarterly series.

“Tobin’s Q” is the ratio of market value of equities to net worth of nonfinancial corporates. Since the market value of equities in aggregate nonfinancial corporates’ balance sheet is not available for the whole sample period, we use stock market capitalization as a proxy.

Following the BoJ methodology, we construct a “cash flow” series that is equal to  $(\text{depreciation} + (\text{net operating surplus} + \text{net property income})/2)$  and normalize it by nominal GDP. Uncertainty is a standard deviation of consensus forecast over the next one year.

“Demand outlook” is a forecast for real growth rate of industry demand over the next three years in the Annual Survey of Corporate Behavior published by Cabinet office. We make linear interpolation to construct a quarterly series.

“Exchange rate gap” is a percentage difference between actual yen-dollar exchange rate and break-even yen-dollar exchange rate also in Annual Survey of Corporate Behavior published by Cabinet office. We make linear interpolation to construct quarterly series.

“Spread” equals to average interest rate on new loans and discounts by domestic licensed banks minus 5-year JGB yields. We use bank lending rates instead of standard corporate bond yields in the literature since bank financing has been the main channel in Japan.

“Real policy rate”, a proxy for monetary policy, equals to policy rate (uncollateralized overnight call rate) minus CPI inflation.

“Leverage ratio” is nonfinancial corporates' total liabilities divided by stock market capitalization.