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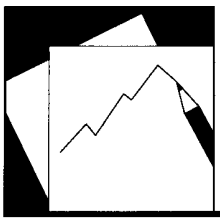

IMF Working Paper

To Fire or to Hoard? Explaining Japan's Labor Market Response in the Great Recession

Chad Steinberg and Masato Nakane

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To Fire or to Hoard? Explaining Japan's Labor Market Response in the Great Recession

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Abstract

The Great Recession pushed Japan's unemployment rate to historic highs, but the increase has been small by international standards and small relative to the large output shock. This paper explores Japan's cyclical labor market response to the global financial crisis. Our findings suggest that: (i) employment responsiveness has been historically low but rising over time with the increasing importance of the non-regular workforce; (ii) the labor market response was consistent with historical patterns once we control for the size of the output shock; and (iii) the comparatively lower employment response vis-à-vis other countries can in part be explained by the quick implementation of an employment subsidy program, a more flexible wage system, and a corporate governance structure that places workers rights above shareholders.[1]

JEL Classification Numbers: E24, E32, J23, J31, J64

Keywords: Japan, Okun's Law, Unemployment, Wages, Great Recession

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[1] We are thankful to Ravi Balakrishnan, Stephan Danninger, Kenneth Kang, and participants in a seminar held at the IMF for providing many insightful comments.

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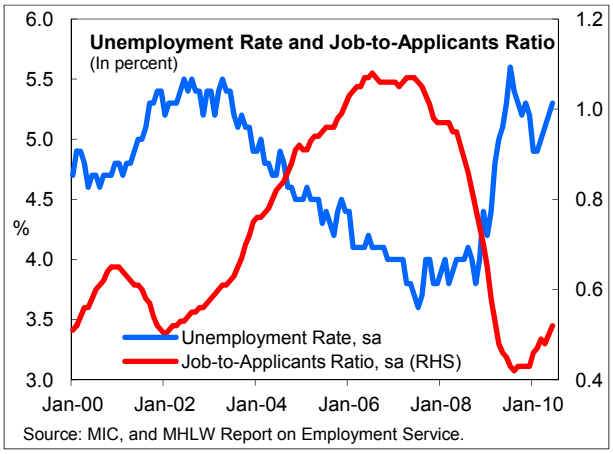
I. INTRODUCTION

1. In the aftermath of the global financial crisis, a key policy challenge for Japan and other advanced economies is the high level of unemployment. With real GDP contracting by 6.3 percent in 2009, Japan's unemployment rate rose to 5.6 percent in July 2009. Employment losses were concentrated in the manufacturing and construction industries, in firms with fewer than 100 employees, and amongst young workers on non-regular contracts. The introduction of a large work subsidy program, which at its peak covered 3.8 percent of the labor force, and a nascent economic recovery both contributed to the stabilization of the unemployment rate starting in August 2009.



2. There has been significant variation in unemployment dynamics across countries, however, with Japan faring relatively well vis-à-vis the rest of the G-7. Compared to the U.S., employment losses were about a third as high, while the cumulative output loss was about twice as high. This comparatively low response to output is also captured in Balakrishnan, Das, and Kannan (2010)'s estimates of Okun's Law. Their analysis suggests that for a 10 percent change in output, unemployment would change by one to two percentage points compared to about four percent in the rest of the G-7.

3. Against this background, this paper focuses on the following questions:

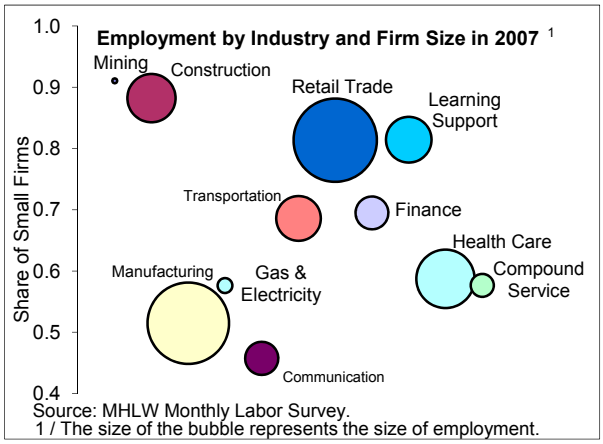
- Was Japan's labor market response in the Great Recession similar to past recessions?
- Can greater wage flexibility help explain Japan's labor market outcomes?
- What are the near-term prospects for employment in Japan?

Our findings broadly suggest that the employment response has not been extraordinary relative to the large output loss, as the rise in unemployment is in line with historical estimates of Okun's Law. In manufacturing, where employment losses were less-than-predicted, we surmise that the quick implementation of a subsidy program for SMEs and greater wage flexibility in large companies helped firms weather the crisis. On a cross-country basis, we find that Japan's labor market has fared well and that this is in part due to a flexible wage system. Finally, we conjecture that the labor market will remain weak in the near-term with slow growth and a high level of structural unemployment in the period ahead, as displaced workers will need to be retrained for employment in the expanding service sector.

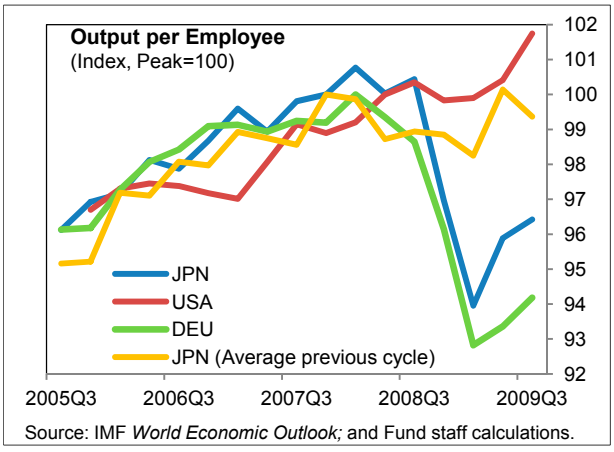
4. This paper is structured as follows. After providing an overview of recent events, we will empirically explore the causes of differences in past employment responses within Japan. We will then benchmark Japan's performance against past recessions using estimates derived from the first section. Next, we will explore the importance of wage flexibility in explaining Japan's job response. Finally, we will use these findings to provide clues about the nature of the recovery and will attempt to draw some policy conclusions. Throughout this paper, our findings and methods often draw directly from Balakrishnan, Das, and Kannan (2010).

II. Broad Trends during the Great Recession

5. Employment in Japan is concentrated in manufacturing and retail sales.[2] The figure shows the size of employment (the size of the bubble) and the share of employment in that industry in firms of 99 people or less, which accounts for 70 percent of total employment. The two largest industries by employment have very different industry structures. Where the manufacturing sector is characterized by large firms with small- and medium-sized enterprises (SMEs) working its supply chains, the retail sector is mainly composed of SMEs of less than 29 employees.



6. Japan's firms largely preserved employment during the global recession thereby reducing labor productivity (output per employee). The figure shows labor productivity trends during the recession for Japan, Germany, and the U.S., in addition to an average for Japan's past recessions.[3] The main feature of the figure is the large reduction in productivity in Japan commensurate with the near eight percent fall in output. Relative to past recessions, the output shock and the labor response were also both larger in magnitude. In

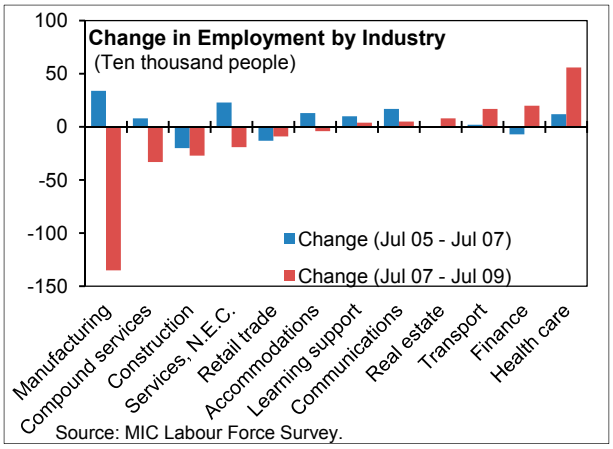


[2] Across countries, Japan's share of manufacturing in total employment (19%) is less than Germany (24%), but greater than France (16%), the U.K. (14%) and the U.S. (10%). Similarly, the share of employment in retail sales (18%) is on average higher than comparative countries (Germany 14%, France 14%, U.K. 15%, and U.S. 15%).

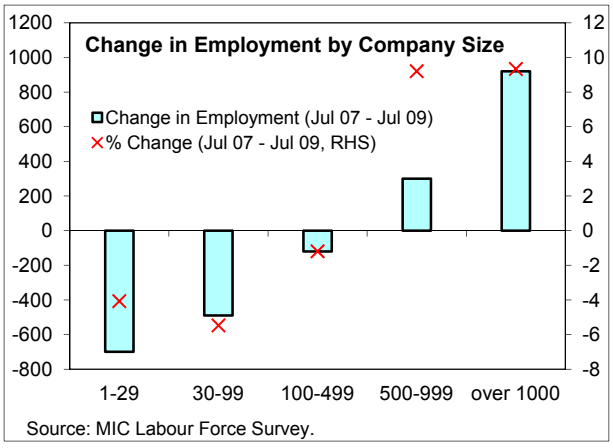
[3] This is an average of recessions in 1993, 1997, and 2001.

comparison, the U.S. labor markets responded by decreasing employment with productivity increasing through the crisis.

7. Still, there were significant disruptions in employment. With the shock concentrated in both manufacturing and construction, employment losses in these two industries accounted for 87 percent of all job losses from trough (July 2007) to peak (July 2009) in the unemployment rate. Ongoing structural changes also explain some of the variation across industries. With demand growing for services in health care, finance, and communication, changes in employment continued to expand in these sectors.[4] In declining industries—such as construction and some parts of manufacturing—the sharp output decline likely hastened already ongoing trends in employment.



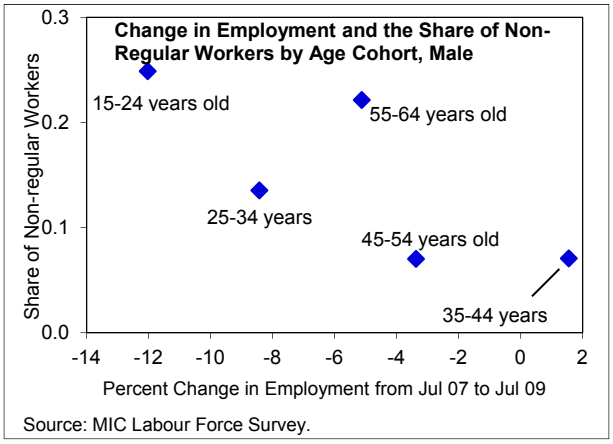
8. Employment losses were concentrated among SMEs, with nearly all net employment losses occurring in firms with less than 100 employees. Tighter cash flows in SMEs—who entered the crisis with weaker balance sheets and lower profitability than larger firms—is one possible explanation. SMEs also pay a smaller share of their wage bill in bonuses and overtime pay; therefore, limiting the size of the adjustment that could be achieved through a cut in wages. In contrast, adjustment at larger firms—see text figure in paragraph 6—was possibly through wages, as firms protected their workforce against the output shock.[5]



[4] Employment in the health sector has increased around 40 percent since 2002.

[5] Wages in Japan consist of base wages, bonuses, and overtime pay. Base wages are referred to as scheduled wages, while overtime pay and bonuses are included in non-scheduled wages. The share of non-scheduled wages in the total wage bill is higher for larger firms (33 percent for firms with more than 500 employees) than for smaller firms (18 percent for firms with 5–29 employees).

9. Moreover, younger workers were disproportionately affected due to the large share of non-regular contracts held by this cohort. In recent years, a rising share of young male workers have entered into non-regular employment contracts, as the number of regular employment contracts has diminished (see Box 1).[6] The figure shows that younger cohorts with higher shares of non-regular workers were seriously affected by the crisis, while middle aged cohorts whom have greater employment security were less affected by the downturn.



III. How has Employment Responded to Output in the Past?

10. In this section we analyze unemployment dynamics in Japan over the past half-decade. As output fluctuations often drive these dynamics, we use Okun's Law—the relationship between changes in the unemployment rate and changes in output—as an organizing framework, and we estimate Okun coefficients across a variety of time periods, industries, firm sizes, gender, and age groups. Similar to the methodology employed in Balakrishnan, Das, and Kannan (2010), we use a general dynamic specification of Okun's law to account for the likely lags between changes in output and the unemployment response:

$$\Delta u_t = \alpha + \sum_{i=0}^{p} \beta_i \Delta y_{t-i} + \sum_{i=1}^{q} \gamma_i \Delta u_{t-i} + \varepsilon_t$$

where Δu and Δy refer to the change in the unemployment rate and the level of output growth respectively.[7] Furthermore, because the estimated equation allows for lagged effects, the short-term effect can differ from the long-term impact. In this paper we focus on the long-term impact, henceforth, referred to as the "dynamic beta".[8]

[6] Japan's dual labor force is divided between non-regular and regular workers. Within the non-regular category there are a variety of employment contracts, including part-time workers, contract workers, and dispatched workers. Non-regular workers more generally are outside of the normal employment system and are considered to have significant disadvantages.

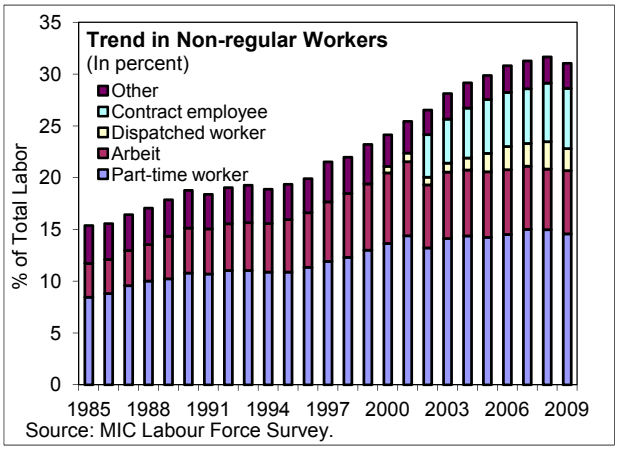
[7] The parameters p and q denote the autoregressive lag lengths, which are chosen based on Bayesian information criterion. All variables are seasonally adjusted. For industry and firm size estimates employment is used instead of unemployment.

[8] The dynamic beta is defined as $\sum_{i=0}^{p} \beta_i / \left(1 - \sum_{i=1}^{q} \gamma_i\right)$.

Box 1. Employment Dualities

There are four types of non-regular workers: dispatched, contract, part-time, and *arbeit* workers. Dispatched workers are hired by an employment agency and in many cases dispatched to large manufacturing firms. Contract workers include retirees who have been hired back by their own firm or a subsidiary of that firm. The number of contract workers increased following pension reforms that have gradually raised the pension age from 60 to 65 relative to the normal retirement age of 60. Part-time and *arbeit* workers, meanwhile, are often employed in the service sector, generally work shorter hours, and are paid less than dispatched and contract workers.

The share of non-regular workers has markedly increased in the last quarter century, with the pace of increase accelerating in the late 1990s (see graph). There are two reasons for this trend.



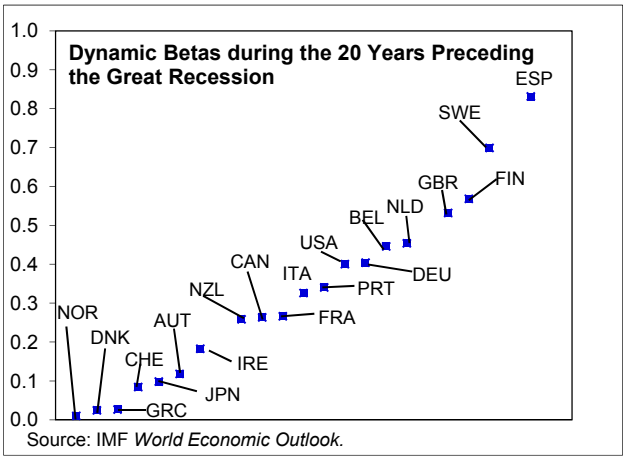
- First, following the collapse of the bubble, firms were forced to hire a more flexible labor force that could quickly adjust to changes in demand and rising uncertainty about the future (Asano, Ito, Kawaguchi 2010). They achieved this largely by allowing their regular workforce to naturally attrition. They hired fewer new graduates and offered voluntary retirement packages to their oldest employees. As a result, non-regular employment is heavily concentrated in the generation of workers that first entered the labor market after the bursting of the bubble (broadly workers under the age of 40) and in the oldest cohort.

- Second, the government started to deregulate the rules governing dispatch workers, with major reforms coming in stages. The Worker Dispatching Act was first enacted in 1985 but the fields in which dispatched workers could be engaged were limited. In 1999, the number of acceptable fields was expanded, and in 2003 the manufacturing sector was permitted to receive dispatched workers, with the maximum contract term extended from one to three years.

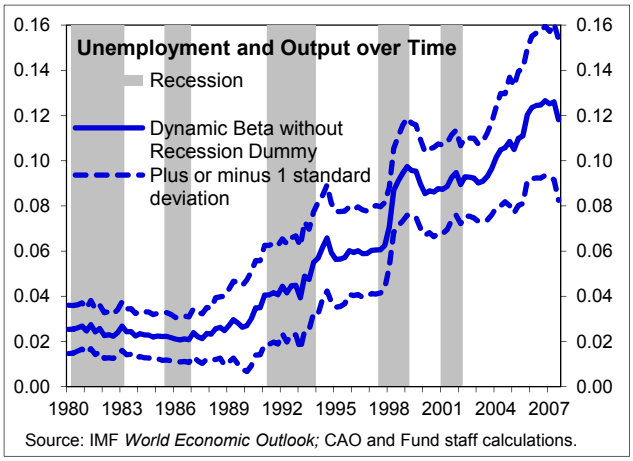
As non-regular workers are usually unable to convert their employment contracts to regular employment, the rising share of non-regular workers has resulted in a dual labor market (Okudaira and others, 2010). In addition, as salaries of non-regular workers do not increase with age, the difference in the wages between regular and non-regular workers is larger among the old (1: 0.5 for 50 to 54 years old workers) than among the young (1:0.8 for 20 to 24 years old workers).

The current crisis has exposed weaknesses in the current employment system forcing the government to reevaluate its policy stance to limit the employment of non-regular workers. Following the onset of the current crisis, 270 thousand non-regular workers lost their jobs, as employers allowed non-regular workers' contracts to expire. As many workers were not entitled to receive full unemployment insurance, it was broadly reported that many former non-regular workers became homeless. Pressure from the media forced the government to reconsider its position, with the bill to revise the Worker Dispatching Act under consideration in the Diet that would, amongst other things, again prohibit the manufacturing sector from receiving dispatched workers, with possible adverse side effects on employment in the near-term.

11. Balakrishnan, Das, and Kannan (2010) find a significant variation of dynamic betas across countries. In particular: (i) "over the past 20 years, Spain has had the largest average response of the unemployment rate to changes in output (about 0.8)"; that (ii) "the high dynamic betas of Sweden and the United Kingdom likely reflect significant labor market reforms over the past 20 years"; and that (iii) "the big continental European countries (France, Germany, Italy) along with the United States have dynamic betas somewhere in the middle of the distribution." Japan, however, is near the bottom of the distribution.



12. Estimates of the dynamic beta for Japan reveal a low Okun coefficient that has increased over time. [9] The upward trend started after the bursting of the Japanese bubble, which could be related to the new corporate structure that emerged following both aggressive corporate restructuring and the introduction of new non-regular contracts for second tier workers. In addition, the estimated coefficient appears to shift during recessions. This asymmetry around the business cycle is possibly related to search costs in the employment market, where job destruction is quick but job creation is time consuming as firms and employees search for appropriate matches.



13. To account for shifts in the business cycle, we introduce a dummy variable that takes on a value of 1 if the economy is in a state of recession and 0 otherwise. We then interact this dummy variable with output to allow the coefficients related to the responsiveness of changes in the unemployment rate to growth to take on different magnitudes depending on the state of the business cycle. Regression estimates with the recession dummy variable included due indeed confirm that dynamic betas differ over the business cycle. The recession dummy is both positive and significant and implies that during a recession a 10 percent reduction in output would result in a 2.4 percentage point increase in the unemployment rate.

[9] Estimates are based on quarterly data covering a rolling twenty year window through 2007Q3. The methodology is based on Balakrishnan, Das, and Kannan (2010) but uses a different statistical technique to define the business cycle. The estimates use one lag for output and three for unemployment.

But in the upswing, the same change in output would only result in a 1.2 percentage point reduction in the unemployment rate.[10]

14. We next focus on sectoral data to help uncover differences that may be masked in the aggregate statistics. This may help explain why Japan's dynamic beta has increased over time, or why Japan's aggregate elasticity is relatively small. For example, structural shifts in employment may have resulted in more employees working in industries with higher dynamic betas. Alternatively, the rise of the number of non-regular employees in specific industries and age groups may explain why the dynamic beta has gradually increased.

15. Dynamic beta estimates for different industries, firm sizes, gender, and age groups are presented in tables one and two. In switching from aggregate to disaggregate statistics we also switch the focus of the analysis from an unemployment rate specification of Okun's law to an employment specification of Okun's law. Thus, coefficient estimates by sector and firm size use the log of employment as the dependent variable. These estimates should be broadly similar to the unemployment rate specification if changes in the size of the labor force are not large in the cycle.[11] Estimates by gender and age group continue to use the unemployment rate specification of Okun's law. The choice of analysis was dependent on data availability.

16. The main finding of the disaggregate analysis is that since the bursting of the bubble a rise in the non-regular workforce appears to be responsible for Japan's gradual rise in employment flexibility. The specific sectoral findings are as follows:

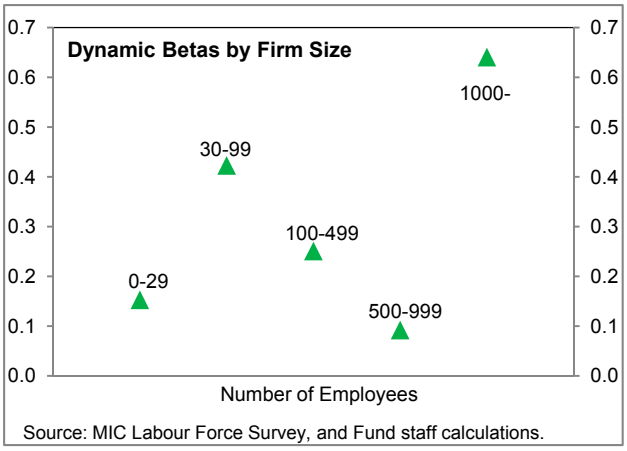
- *Employment in manufacturing industries tends to respond stronger to output fluctuations than in service industries.* This may be related to the greater use of dispatched workers at manufacturing firms and the need to quickly adjust to production demands, which are often driven by fluctuations in the global economy. Given the large standard errors of the estimates, we cannot however firmly establish that the manufacturing estimate is statistically larger than the service industry estimate. Within industries the results are also not uniform. For example, the highest dynamic beta estimated was for the service industry "road freight" at 0.75; and one of the lowest betas estimated was for the auto manufacturing industry (0.03).

- *Estimates for very large firms and small firms have significantly higher dynamic betas (see chart).* We surmise that this finding is related to the composition of employment in these firms; very large manufacturing firms tend to hire many dispatched workers for factory production, while smaller service-oriented firms often hire part-time workers. This larger elasticity for the smaller firms is also consistent

[10] To account for the possibility of endogeneity between unemployment and output, we also instrument for the contemporaneous output variable with its own lagged values. The estimated coefficient is broadly of the same magnitude but with a much higher standard error. These results are available from the authors upon request.

[11] Long-term changes in the labor force will be picked up in the constant.

with the losses experienced in the Great Recession, and may also be reflective of their tighter cash flow situation as discussed in section II.



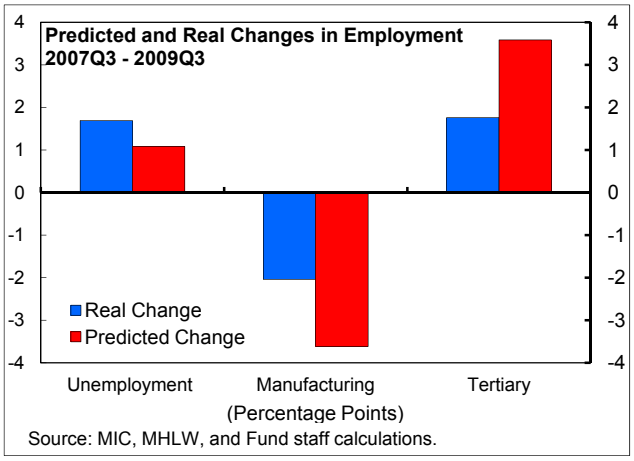
- *Finally, estimates across gender and age groups show a consistently higher beta in age groups and gender classes that have a higher share of non-regular contracts.* For males, the lowest dynamic beta is estimated for the cohort most secure in lifetime employment positions (45–54), while the estimated beta for the youngest cohort is nearly five times the estimate for the older generation. For females, the cohort re-entering the workforce following childbirth (35 to 44)—and also the cohort with the highest share of non-regular contracts—experiences the largest fluctuations in employment.

17. In summary, Japan's elasticity of employment to output—the so-called Okun coefficient—is relatively small vis-à-vis other countries, but has been rising in recent years. Estimates by sector, firm size, and age group tend to support the hypotheses that the rise of the non-regular workforce in the aftermath of the bursting of the bubble is an important factor in explaining these changes.

IV. Was Japan's Employment Response During the Great Recession Extraordinary?

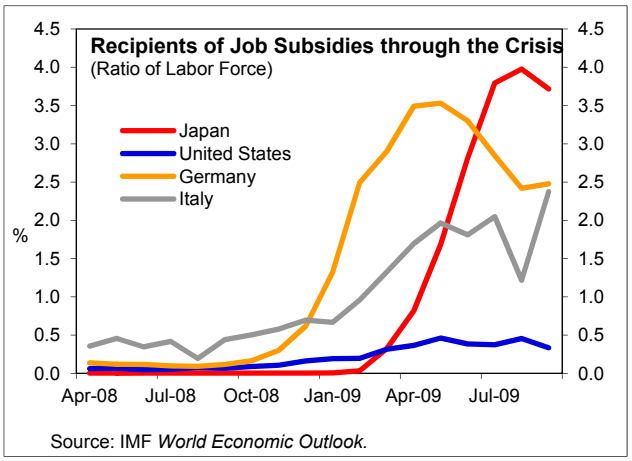
18. This section uses the Okun estimates obtained in section III to help explain the unemployment response during the Great Recession. Our general methodology is to produce out-of-sample forecasts for changes in the unemployment rate (and employment level). We then compare these predicted values against the actual change in the unemployment rate for the period.

19. The model performs well in predicting the rise in unemployment during the global recession, with some variation across industry and firm size. The model predicts a somewhat smaller change in unemployment than the actual change (1.7 vs. 1.1), but the actual outcome is well within one standard deviation of the predicted value. Looking further at large industry groupings, the estimates suggest that the manufacturing



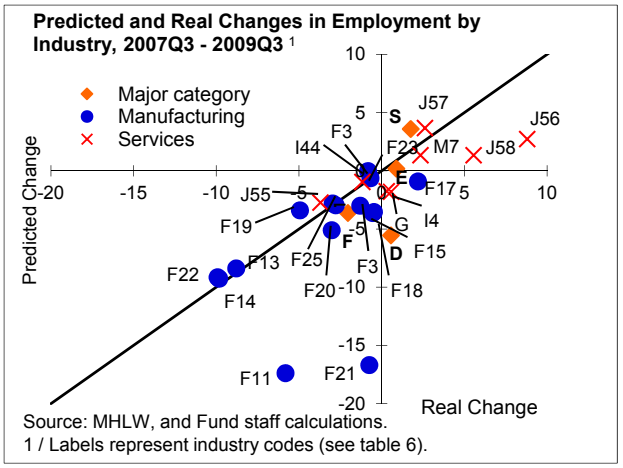
sector and the service sector had quite different outcomes. In manufacturing, where output plunged, the actual decrease in employment was less than the model predicted. We speculate that this better-than-predicted outcome was due to the positive impact of a wide-scale work subsidy program primarily for SMEs (see Box 2) and wage flexibility through cuts in bonuses and overtime pay at larger firms. In services, where output actually increased through the crisis, employment increased less than the model predicted. This worse-than-predicted outcome is possibly due to a skill-mismatch, as many industries are now finding it difficult to find workers with the correct qualifications, especially in health services.

20. During the crisis, Japan introduced a work subsidy program that at its peak covered nearly 3.8 percent of the labor force, the largest coverage amongst industrialized countries. The main recipients were firms in the manufacturing sector and SMEs, with both categories accounting for approximately eighty percent of the subsidy in FY2008–09. The size of the program also far exceeded its utilization in the past. Although its net effect on employment is unclear, the subsidy program likely contributed to the relatively smaller change in employment in the manufacturing sector than predicted.



21. The estimates also show some variation across industries and firm sizes, revealing several interesting patterns. (The full set of results is presented in tables 3 and 4.) The two text figures to the right plot the predicted changes in employment against the actual changes. Sectors above the forty-five degree line performed worse than predicted and sectors below the line performed better than expected. The main findings are:

- First, most of the observations are clustered around the forty-five degree line indicating that output fluctuations do a good job in explaining the general employment response during the Great Recession.



Box 2. Employment Adjustment Subsidy Program

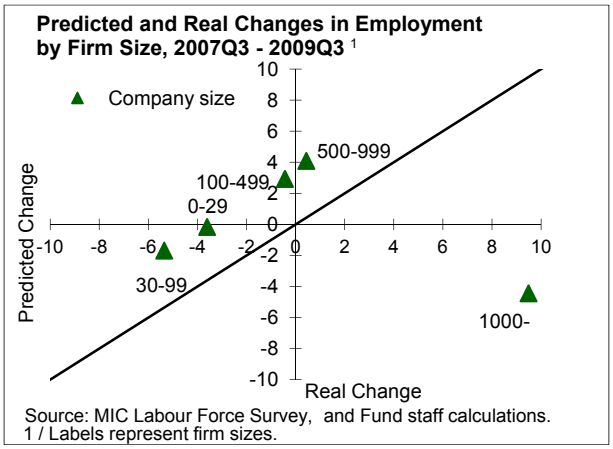
Japan's employment adjustment subsidy program was established in 1975 following the oil shock. The program initially consisted of two schemes: one to safeguard jobs in industries affected by temporary shocks, and one to support firms in their restructuring process, with the two schemes eventually merging into a single program. Over time, the government has expanded this program during downturns and in response to specific shocks. In the late 1980s, for example, the subsidy was provided to export-oriented firms following the appreciation of the yen. Traditionally the program has targeted manufacturing firms, with manufacturing firms receiving approximately 4/5 of the subsidy between FY2003-09 (Japan Rodo Press 2009).

Following the onset of the crisis, the government increased the budget allocation for the subsidy more than tenfold to 659 billion yen (0.1 percent of GDP in 2009) in total. At the same time, eligibility requirements were eased, the subsidy rate was raised (from 2/3 to a maximum of 3/4 for large companies, and from 4/5 to a maximum of 9/10 for SMEs), and the limit on use was increased from 200 to 300 days. At the height of the crisis, nearly 3.8 percent of the workforce was covered by the subsidy.

Firms apply for the program at the local office of the Ministry of Health, Labour and Welfare (MHLW) and are required to submit a monthly operation plan. To be eligible, for example, firms need to have experienced a loss of revenue equal to 5 percent relative the previous year. (During the crisis the comparison period was changed to pre-crisis levels.) Once approved, the subsidy is paid to the firm and not the employee, but the firm must obtain the employees' consent. To continue receiving the subsidy, firms must resubmit their operation plan monthly up to the maximum receiving period of 300 days.

The subsidy can be used to subsidize one of three activities, which need to be specified in the initial operation plan: (i) partial wage subsidy for employees on temporary leave (two-thirds for large companies and four-fifths for SMEs); (ii) partial wage subsidy for employees temporarily transferred to another firm to work (same subsidy rate); or (iii) education and training for idle workers (4,000 yen per day per worker for large companies and 6,000 yen for SMEs per day per worker). To date, the majority of subsidies have covered the first activity.

- *Second, despite performing worse than the model in the aggregate, several sub-sectors in the service industry performed better than predicted.* Retail sales of vehicles (J58)—which may have been boosted by the government's subsidy program—and retail sales of apparel (J56) both outperformed model predictions.[12]

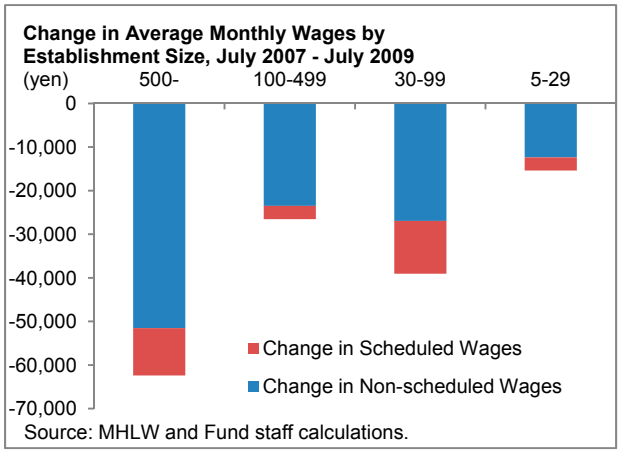


Source: MIC Labour Force Survey, and Fund staff calculations.
1 / Labels represent firm sizes.

[12] Within manufacturing, there are two large outliers, textile (F11) and leather (F21) production. Both sectors were predicted to decline by 17 percent, with actual employment changes much less.

- *Finally, smaller firms experienced larger employment losses than predicted by the model, while the largest firms actually increased employment.* This is probably explained by larger firms' ability to cut wages rather than workers during the crisis. SME's disproportionate access to the subsidy program during the crisis, meanwhile, likely helped those firms perform better-than-expected given the adverse conditions they faced following the onset of the crisis.

22. Wage data by establishment size indeed confirm the importance of non-scheduled wages for large establishments in adjusting the overall wage bill during the Great Recession. The figure shows the change in the average wage from the peak to the trough of the business cycle, with the change in the wage divided between non-scheduled and scheduled wage payments. The figure reveals that across establishment sizes, firms adjusted wages primarily through reductions in overtime and bonus payments, non-scheduled wages. Further, the figure shows that these cuts were largest in the larger establishments—where a higher share of total wages is paid in bonuses and overtime pay (see footnote 5)—helping adjust wage bills and preserve the level of employment through the crisis. We conjecture that this is a primary reason why Japan's labor market response was different from other advanced economies.[13]

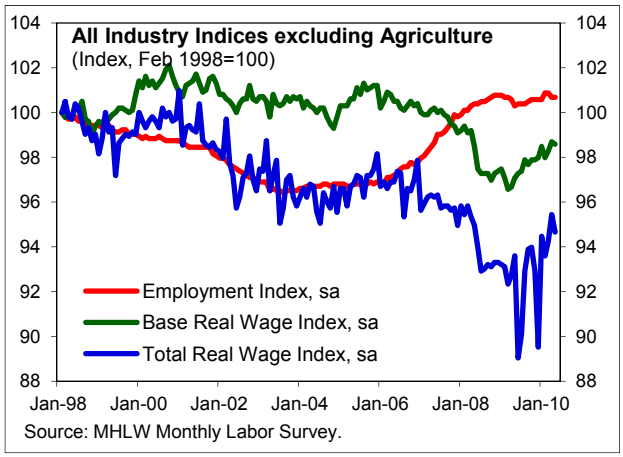


V. Can a Flexible Wage System Explain Japan's Lower Employment Response to Output?

23. Faced with a sharp drop in output firms can reduce labor costs by shedding workers, reducing hours worked, or reducing wages per hour. In the previous section we noted that Japan tended to hoard labor, especially when compared across similar countries. In this section, we investigate the extent to which Japanese firms exercise greater wage flexibility than firms elsewhere. That is, was wage flexibility a substitute for employment flexibility? In the subsequent discussion of wage flexibility, we use changes in compensation per employee, a concept that includes both changes in hours worked per employee and wages per hour.

[13] Large firms may have also relied on wage cuts, rather than cuts in employment, during the crisis because they perceived the shock to be temporary and not permanent. See for example Darius *et al* (2010).

24. In Japan, the large share of bonuses and paid overtime in contracted pay enables companies to adjust wages downward under adverse economic conditions. Non-scheduled wages account for over one-quarter of total wages in the full sample and more than one-third of total wages in firms with more than 500 employees. As a result, over the last decade and prior to the current recession, wages have helped absorb temporary fluctuations in output, with the correlation coefficient between output and wages twice as large as the coefficient with employment. In 2009, for example, nominal wages fell by 4.4 percent primarily through the reduction of overtime pay and bonus payments, which is also consistent with the picture of labor hoarding depressing productivity presented at the start of this paper.



25. To measure the importance of wage flexibility, we first estimate a version of Okun's Law for real wages per employee. The estimated equation is equivalent to that run for unemployment except we substitute real wages for unemployment:

$$\Delta w_t = \alpha + \sum_{i=0}^{p} \beta_i \Delta y_{t-i} + \sum_{i=1}^{q} \gamma_i \Delta w_{t-i} + \varepsilon_t$$

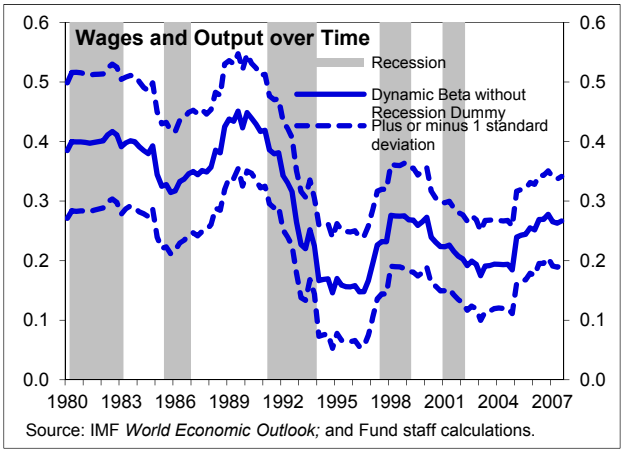
where Δw and Δy refer to the change in the real wage rate and the level of output growth, respectively. This estimation technique allows us to measure the elasticity of compensation to output fluctuations through the business cycle similar to the elasticity of unemployment (or employment) in our measurement of Okun's Law. Also, like the estimated coefficient for unemployment, we combine the estimated betas to construct a dynamic beta measure that captures the long-term elasticity of real wages per employee to changes in output.[14]

26. Estimates for Japan show that the elasticity of wages to output is larger than the previously measured Okun coefficient and, similar to the Okun coefficient, has been on the rise in the last decade.

- *The estimates suggest that a 10 percent change in output would result in a 2.9 percent change in the wage rate.* While this is only slightly larger than the estimate for unemployment in a recession (2.4 percent) it is almost 2.5 times the size of the coefficient in the upswing (1.2 percent). That is, wages are quicker to recover than employment.

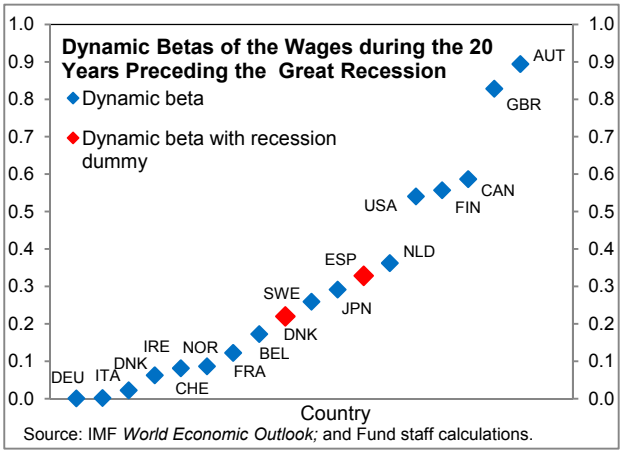
[14] The parameters p and q denote the autoregressive lag lengths, which are chosen based on Bayesian information criterion. All variables are seasonally adjusted. The regressions are run over 80 quarters through the quarter prior to the start of the recession. The dynamic beta for wages is defined similarly to the dynamic beta for unemployment.

- *Similar to unemployment, wage flexibility appears to be on the rise.* A graph of real wages in Japan is an inverted U, with wages rising through the 1980s and then declining thereafter. This is thus reflected in the estimate of the elasticity of wages to output over time to the right.[15] In the first half of the graph the elasticity is high reflecting the growing share of wages in GDP. After the bottoming out in the early 1990s, however, the estimates start to increase again. We conjecture that this reflects Japanese firms' increasing willingness to adjust wages downward to shocks through the lost decade.



- *Finally, the estimated trend (or constant in the difference equation) is negative and significant at the 5 percent level.* We argue that this reflects the growing share of non-regular workers in the labor force (see Box 3).

27. We next estimate dynamic betas for seventeen advanced economies where comparable data on real wages is available. In addition to estimating a dynamic beta for each country prior to the current recession, we also estimate dynamic betas for prior recessions, with the number of observations per country depending on the number of recessions experienced in this time period.[16] Results are provided in table 5, with the results for the current recession presented in the chart below. We find that:



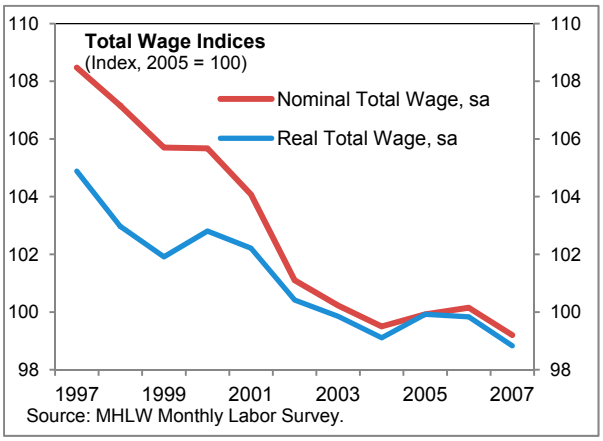
- *Japan's "flexibility" ranking vis-à-vis other advanced economies is higher in wages than employment.* Japan moves from the bottom one-third of the distribution in the estimates of Okun's coefficients to the top one-half of the distribution in the chart to the right.

[15] The figure shows the dynamic beta for Japan estimated over rolling 80-quarter windows. The estimates use no lags for either output or real wages.

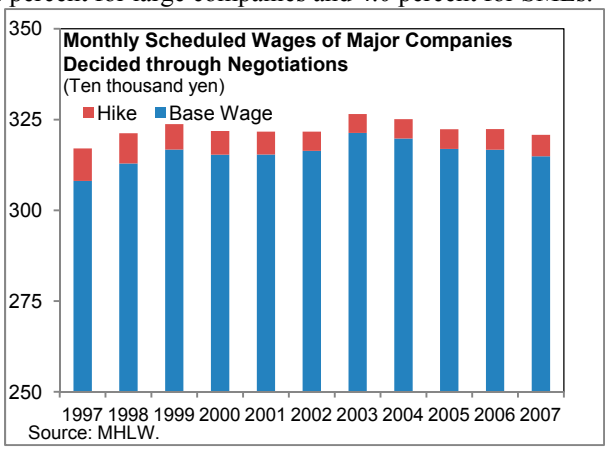
[16] In defining the recession periods, we follow the definitions set out in Balakrishnan, Das, and Kannan (2010).

Box 3. Falling Wages

Average wages in Japan have fallen steadily since the late 1990s, with nominal wages decreasing 9.4 percent in the decade between 1997 and 2007 (see chart). While various theories have been put forth to explain this decline, three explanations have received particular attention: deflation, demographics, and the increasing share of the non-regular workers in the labor force. This box attempts to disentangle these effects. (See also Sommer (2009) for a broader analysis of sluggish wage growth in Japan.)

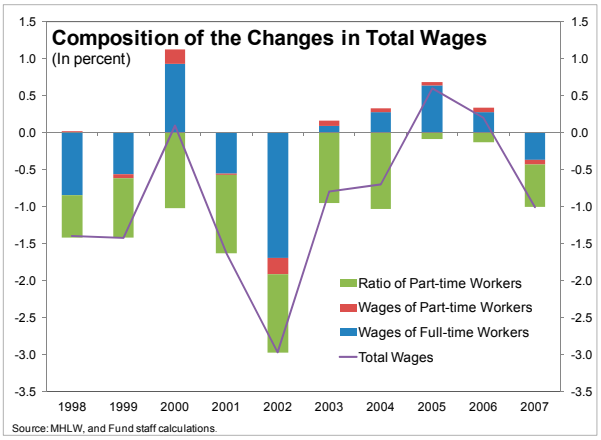


First, the volatility of wages and the constant decline in prices in the past decade (a cumulative 2.3 percent) have led many to believe that deflation explains part of the decline in average wages. We find, however, that this may not be entirely true. Data on negotiated wages between labor unions and management show that employers have promised their workers a pay rise in every year (see chart), with average base wages increasing 2.2 percent for large companies and 4.0 percent for SMEs. Furthermore, the data shows that bonuses for large companies—an easy target for pay cuts—increased 10 percent over the same period.



Second, it is argued that as the baby boomers retire, the highly-paid older workers are being replaced by younger-not-so-well paid workers. Again we find little evidence in the data to support this theory. For the average wage to decline the older cohort share of the workforce would need to decline at a faster rate than the younger cohort; but, we find the opposite is true. The share of older workers in the labor force has actually increased (from 11.8 to 14.9 percent), while the share of younger workers has declined (from 12.9 to 8.5 percent). This is further supported by the rise in the average base wage—and not the decline—presented in the previous paragraph.

Finally, it is argued that the rise of the non-regular workforce, with lower wages, explains the decline. Using factor analysis of the wage index, we find this explanation to be the most compelling (see chart). We break down the changes in the wage index into three components: 1) that which can be attributed to a change in full-time employees' wages 2) that which can be attributed to a change in part-time employees' wages, and 3) that which can be attributed to the increasing share of part-time employees in total. The key finding is that the rising share of part-time employees, one component of the non-regular workforce, explains over 80 percent of the fall in wages.



- *Countries with greater economic flexibility overall have high elasticities for both wages and unemployment.* Countries with more liberal economic systems fall into this category, including Canada, the United States, and the United Kingdom. We believe this could be related to corporate governance, including the rights of shareholders.

- *Firms adjust wages quicker than they adjust employment levels in most countries.* In country-by-country, fewer lags were required in the wage equation than in the previous unemployment equation, with the short-term impact of a change in output often very close to the long-term impact.

28. We next use these findings to help explain differences in estimated Okun coefficients across countries. First, we postulate that in countries in which the elasticity of wages to output is high will at the same time have a lower elasticity of unemployment to output. That is, the two are substitutes, either firms mainly adjust through wages, or firms mainly adjust through employment, with this difference in wage and employment flexibility arising due to differences in the relative costs of each action through, for example, employment restrictions or wage rigidities. Second, and based on the observation above, we postulate that countries with corporate governance structures that protect shareholders rights, and are therefore much more likely to respond to shareholders demands, are also more likely to adjust total labor costs quicker to raise profits. These countries would tend to have both higher elasticities to employment and higher elasticities to wages.

29. To test these hypotheses we regress the estimated dynamic betas for unemployment by country on: 1) the estimated dynamic betas for wages to capture wage flexibility; 2) a proxy for shareholder rights; and 3) controls for institutional variables found to be important in Balakrishnan, Das, and Kannan (2010), namely the share of temporary workers, the level of employment protection, and unemployment benefits. To capture the role of shareholders rights we turn to La Porta, Lopez-de-Silanes, Schleifer and Vishny (LLSV), 1998. They find, in particular, that shareholders rights are strongest in countries with common law systems. Thus, we include a dummy for common law countries in our specification.[17] Results are presented in the text table, with the key findings as follows:

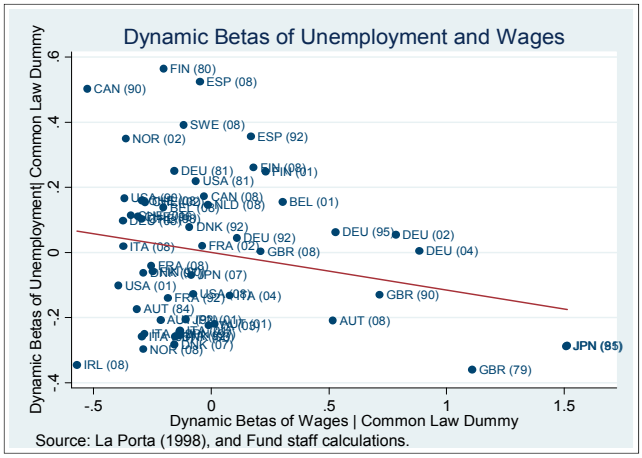
Table: Explaining Dynamic Betas Across Countries

Variables	(1)	(2)	(3)	(4)
	Okun's Law with Optimal Lag Length			
Dynamic Betas of Wages	-0.0735		-0.116*	-0.0635
	[0.0630]		[0.0605]	[0.0561]
Common Law Dummy		0.221*	0.249**	0.285***
		[0.112]	[0.105]	[0.0847]
Share of Temporary Workers				0.0308***
				[0.00537]
Constant	0.378***	0.307***	0.351***	-0.0177
	[0.0677]	[0.0586]	[0.0645]	[0.0763]
Observations	56	56	56	46
R-squared	0.018	0.117	0.160	0.505

Clustered standard errors by country in brackets
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF *World Economic Outlook;* and Fund staff calculations.

[17] LLSV provide several other proxies for shareholders rights. Results are similar across variables due to a high degree of correlation between the different proxies. The commonly used proxy "antidirector's rights" has a near identical result to the common law dummy variable.

- *Common law countries are indeed very much strongly associated with greater flexibility in both wages and employment.* The coefficient is significant at the one percent level and its size is economically significant. If Japan, for example, was a common law country its Okun coefficient would more than double in size.[18]



Source: La Porta (1998), and Fund staff calculations.

- *Wage flexibility is a substitute for employment flexibility in the cross-section.* This result, however, is only significant once we control for shareholders' rights. The size of the coefficient (third regression) is also not economically large, suggesting that wages are only about one-tenth of a substitute for changes in employment.[19]

- *A higher share of temporary workers is associated with a larger Okun coefficient.* This finding is robust across a variety of specifications, and is consistent with our Japan-specific results and the results presented in Balakrishnan, Das, and Kannan (2010). The inclusion of this variable also markedly increases the explanatory power of the regression from 16 to 51 percent of the variation in dynamic betas across countries.[20]

30. Finally, we look to see if we can identify similar relationships across industries within Japan. We again use regression techniques using the employment dynamic betas we estimated by industry in section III and listed in Table 1 as the dependent variable. Our main independent variable and proxy for wage flexibility across industries is the share of overtime and bonus pay (or non-scheduled wages) in overall compensation. This differs from the measure of wage flexibility in the cross-country analysis as it is an institutional variable describing the wage structure (as opposed to the previously estimated behavioral variable). The hypothesis is that in industries with a higher share of overtime and bonus pay in overall compensation, firms can more easily adjust wages to shocks.

[18] The OECD's employment protection legislation (EPL) variable, which is strongly correlated with the common law dummy and significant at the 10 percent level in Balakrishnan, Das, and Kannan (2010), is insignificant in this specification. We surmise that this variable is effective at explaining the extreme values—there is almost a perfect overlap between the top EPL countries and the common law countries—but is less effective at middle levels of protection. For example, both Japan and Switzerland have relatively good scores on the EPL but very low Okun coefficients.

[19] The variable is insignificant once we control for temporary workers, which is due to the exclusion of part of the sample in regression 4.

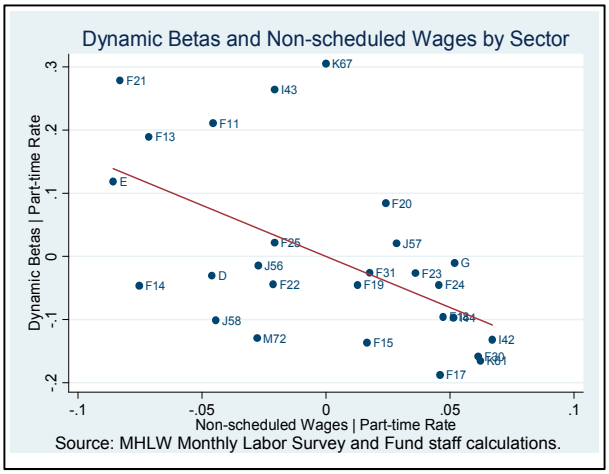
[20] A variable for unemployment benefits was also included but was insignificant due to differences in the sample selection.

- A regression of industry dynamic betas (for employment) on the share of non-scheduled wages reveals that indeed the relationship is robust and economically significant. (See regressions in the text table and the figure to the right.) For every one standard deviation increase in the share of scheduled wages, the elasticity of employment to output declines by 0.1 (or approximately 2/3 of a standard deviation).

Explaining Dynamic Betas Across Industries

Variables	(1)	(2)	(3)
	Okun's Law with Optimal Lag		
Non-scheduled Wages	-0.848**		-1.621***
	[0.384]		[0.424]
Ratio of Part-time Workers		-0.0671	-0.508***
		[0.120]	[0.162]
Constant	0.410***	0.194***	0.683***
	[0.113]	[0.0356]	[0.142]
Observations	27	27	27
R-squared	0.143	0.005	0.311

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1
Source: MHLW Monthly Labor Survey and Fund staff calculations.



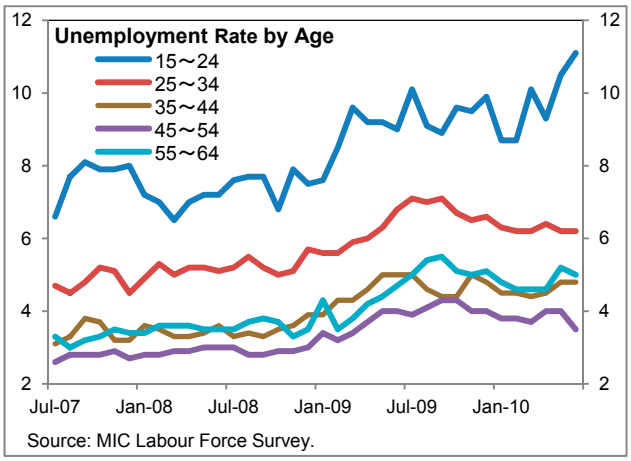
Source: MHLW Monthly Labor Survey and Fund staff calculations.

- Furthermore, we find a strong negative correlation between the share of part-time workers and the share of non-scheduled wages (a correlation that also shows up in the cross-country regressions). This may be related to skills of workers within each industry. On the one hand, if the industry hires workers with *specific* skills, then firms will be more likely to hoard labor and adjust costs through wages. In these firms the share of non-scheduled wages may be higher to help in the adjustment process. On the other hand, if workers have *general* skills, firms may be more likely to lay off employees. In these industries firms may increasingly rely on non-regular workers to help in the adjustment process.

31. In sum, the results suggest that Japan's low employment response vis-à-vis other countries can in part be explained by a more flexible wage system in addition to a corporate governance structure that protects the rights of workers over shareholders. We find that this result rings true in both the country cross-section and the industry cross-section. In this sense, Japan's flexible wage system has helped cushion the blow from the Great Recession to the labor market. We also find that the share of temporary workers in the workforce is an important determinant of employment flexibility. Next, we turn to the implication of these findings for the job market in the recovery.

VI. What are the Potential Implications for the Labor Response in the Upswing?

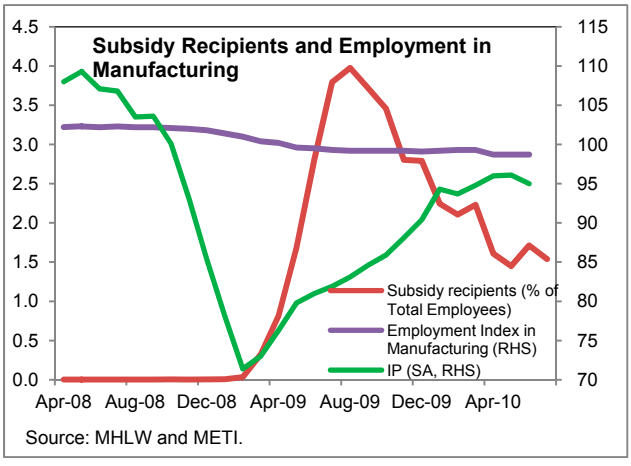
32. Since the trough of the recession the labor market has improved steadily, but the employment picture varies across sectors and firm sizes. Consistent with structural trends in the Japanese job market, most of the recent job gains continue to be in the service sectors, such as health care and finance, with employment in the manufacturing sector continuing to struggle. The employment situation for 15 to 24 year olds also remains tight, with unemployment rates over 11 percent and news media reports often highlighting the difficult job market for new graduates (see chart).



33. Looking ahead, the outlook for the labor market is more uncertain, with recent wage and unemployment statistics showing increasingly mixed signals. This reflects in part the different elasticities of these two variables to output.

- *Wages have begun to rise in line with the output recovery reversing some of their fall during the crisis.* During the great recession, firms adjusted wages primarily through overtime pay and bonus payments. These payments are now rising, but may remain below their pre-peak levels for some time. Overtime hours fell close to 25 percent and have recovered about one-half of that gap. Bonus payments fell 13 percent and have recovered between a quarter and a third of the gap. Bonuses are likely to continue to climb with a lag as companies return to a more normal operating environment. The outlook, however, is highly uncertain, with wages expected to eventually return to their long-term downward trend of this past decade.

- *Given the comparatively lower employment response during the crisis, the unemployment response in the upswing has been muted.* Labor hoarding has depressed productivity and as the economy recovers, firms are unlikely to quickly hire new workers until output per employee returns to pre-crisis levels. The unwinding of the work subsidy program has also contributed to slow employment growth (see chart). As



production rebounded in the manufacturing sector, firms reduced the amount of the subsidy they were receiving instead of hiring new workers. Given the current projected growth path, there is a risk that the unemployment rate may not improve to below pre-crisis levels in the first half of this decade.[21]

34. As a result, Japan may be entering a period with higher unemployment as output recovers only gradually and employment needs to shift from shrinking old sectors to growing new sectors (e.g., from manufacturing to health services). This is also evident in the asymmetric employment effects (Okun coefficients) during recessions and recoveries. The human and social costs of this higher unemployment may also be more far-reaching than the immediate temporary loss of income. They include a loss of lifetime earnings, loss of human capital, worker discouragement, adverse health outcomes, and loss of social cohesion (Mao and Loungani, 2010).

35. Thus, a key issue in this environment is how to minimize these costs and help employment return to pre-crisis levels. The first part of the strategy should be to support aggregate demand through monetary and fiscal policy actions. Supporting the recovery in real GDP is one of the most direct ways to help the labor market, as demonstrated by the power of the Okun coefficients in explaining the change in unemployment during the Great Recession. The second part of the strategy should be policies to directly stimulate labor demand and enhance the movement of labor to sectors with higher growth potential. What policies then could be adopted to help the labor market better adjust to the new environment?

- *First, workers could be given incentives to change occupational fields.* As jobs created in services pay less on average than in manufacturing, employees have shown resistance to switching fields. Increasing wages by raising productivity in these sectors should hence be a priority including through deregulation and new investments. As this takes time, job mobility could be encouraged by temporarily compensating workers for wage losses occurred for moving between industries (see Kling 2006). Finally, workers could also receive training for skills needed in new growth sectors of the economy.

- *Second, employers could be given incentives to hire and train low-wage workers.* Edmund Phelps (2010) has recently argued for a program of tax credits for companies employing low-wage workers in the United States. This would help deter costs incurred by firms in training new employees that do not match their required skill set. Given the potential fiscal costs associated with such a program its benefits would have to be carefully assessed.

[21] Forecasts are calculated using the estimated Okun coefficients and staff's projection of the current growth path.

- *Third, policies could be adopted to encourage new start-ups that would help create new jobs, including in the regional economies.* This would be particularly important for SMEs, a point made in Steinberg and Ogawa (2009) and Syed (2010), with Syed listing many possible policy options for jump starting the venture capital business. Providing additional incentives for start-ups in the regional economies would also help retard the decline of these economies following major job losses in both construction and manufacturing.

- *A final option to promote job hires is to modify regular work contracts to include phased-in employment protection*. Such a new regular work contract would gradually increase the dismissal costs to employers over the course of a worker's tenure. This would help reduce hiring risks given unknown skills of new workers, while maintaining employment protection for tenured employees. Such a contract may raise incentives for workers to accumulate human capital thereby increasing productivity. It would also encourage more hiring under regular contracts given greater employment flexibility, which could draw in more women to the labor force. A more flexible contract would also address concerns about equity between regular and non-regular workers (IMF 2010).

36. The rising unemployment rate in Japan has been a difficult issue for policymakers. This paper finds that by historical standards the unemployment response has not been extraordinary relative to the large output loss. In addition, the smaller-than-predicted loss in employment in the manufacturing sector may have resulted from the quick implementation of a job subsidy program for SMEs and wage flexibility for larger firms. On a cross country basis, Japan has also fared well, with employment losses about one-third of the U.S. We argue that this is in part due to Japan's flexible wage system, which has helped Japan's labor market absorb this unprecedented shock to the global economy. The outlook for the labor market is however not positive as wages are likely to continue on their long-term downward trend and displaced workers will need to be retrained for employment in the now-actively-growing service sectors, such as health care. Thus, achieving the government's goal of unemployment between 3 and 4 percent may require further policy action.

Table 1. Dynamic Betas by Industry[1]

	Dynamic Beta		Optimal Lag			
Group	Estimate	S.E.	*dy*	*dl*	D	BIC
All industries	0.188	0.197	1	1	No	-681.82
Mining	0.160	0.147	0	1	No	-377.54
Construction	0.310	0.241	0	2	No	-455.95
Manufacturing	0.313	0.133	1	1	No	-628.30
Textiles	0.396	0.438	2	0	No	-264.45
Wood	0.377	0.195	0	1	No	-470.28
Furniture	0.141	0.064	0	1	No	-483.19
Pulp and paper	0.049	0.055	0	0	No	-552.05
Chemicals	0.002	0.029	0	0	No	-566.62
Petroleum and coal	0.096	0.145	1	0	No	-411.25
Plastics	0.136	0.114	0	1	No	-509.75
Rubber	0.269	0.156	0	1	No	-533.23
Leather	0.458	0.093	3	0	No	-451.90
Ceramics	0.145	0.110	0	1	No	-503.61
Iron and steel	0.165	0.185	0	1	No	-530.72
Non-ferrous metals	0.143	0.119	0	1	No	-539.67
Fabricated metal	0.209	0.126	0	1	No	-569.93
Transportation	0.032	0.055	0	1	No	-548.77
Precision	0.160	0.048	0	1	No	-562.16
Tertiary	0.068	0.409	3	0	No	-388.26
Utilities	0.182	0.149	0	1	No	-475.35
Transport	…	…	…	…	…	…
Railway	0.061	0.406	1	1	No	-389.69
Road Freight	0.450	0.095	3	0	No	-501.14
Wholesale and Retail	…	…	…	…	…	…
Retail, General	0.065	0.177	1	1	No	-492.75
Retail (Apparel)	0.154	0.140	0	0	No	-326.41
Retail (Food)	0.172	0.123	0	2	No	-524.46
Retail (Vehicles)	0.090	0.126	0	1	Yes	-446.83
Finance	…	…	…	…	…	…
Banking	0.023	0.162	1	1	No	-435.83
Insurance	0.497	0.209	3	1	No	-426.03
Accommodations	0.041	0.050	0	0	No	-464.51

Source: MHLW Monthly Labor Survey; and Fund staff calculations.

[1/] Regressions use employment as the dependent variable, and Japan's activity index as the explanatory variable. Data for employment is obtained from MHLW's *maikin* database rather than MIC's Labour Force Survey, since the industry-level time-series data is more consistent and reliable. The top row shows the estimate for total employment (from *maikin*) on the all activities index (rather than GDP) to provide a benchmark for the remaining estimates. Optimal lag lengths were determined using Bayesian Information Criterion (BIC).

Table 2. Dynamic Betas by Firm Size, Gender, and Age Group[1]

	Dynamic Beta		Optimal Lag			
Group	Estimate	S.E.	*dy*	*dl*	D	BIC
Firm size (# of employees)						
0-29	0.153	0.151	1	0	No	-515.34
30-99	0.423	0.149	0	0	No	-477.95
100-499	0.251	0.104	0	1	No	-472.05
500-999	0.092	0.218	0	1	No	-379.06
1,000+	0.641	0.241	1	0	No	-440.54
Male	-0.279	0.078	1	3	Yes	-84.95
15-24	-0.385	0.123	0	0	Yes	95.82
25-34	-0.101	0.033	1	3	No	0.41
35-44	-0.046	0.015	0	2	No	-32.24
45-54	-0.087	0.030	1	3	No	-28.69
55-64	-0.174	0.039	1	1	No	43.89
Female	-0.055	0.022	1	0	No	-84.34
15-24	-0.093	0.036	1	2	No	110.81
25-34	-0.109	0.048	2	3	No	76.88
35-44	-0.219	0.060	1	0	Yes	-26.19
45-54	-0.070	0.026	2	1	No	-36.94
55-64	-0.049	0.022	0	1	No	18.84

[1/] The regressions by age group use unemployment as the dependent variable. The regressions by firm size use employment statistics from MHLW's maikin database.

Source: MHLW, MIC Labour Force Survey, and Fund staff calculations.

Table 3. Percent Change in Employment by Industry
(Between 2007Q3 and 2009Q3)

Industry	Actual	Predicted	Difference
Total (unemployment)	1.69	1.08	0.61
Mining	0.56	-5.55	6.11
Construction	0.89	0.18	0.71
Manufacturing	-2.04	-3.62	1.58
Textiles	-5.81	-17.38	11.57
Wood	-8.79	-8.39	-0.41
Furniture	-9.83	-9.27	-0.56
Pulp and paper	-0.54	-3.63	3.09
Chemicals	2.19	-0.91	3.11
Petroleum and coal	-0.47	-3.54	3.07
Plastics	-4.94	-3.40	-1.54
Rubber	-3.02	-5.10	2.08
Leather	-0.75	-16.69	15.94
Ceramics	-9.92	-9.14	-0.78
Iron and steel	-0.82	-0.02	-0.80
Non-ferrous metals	-2.96	-2.80	-0.16
Fabricated metal	-2.78	-2.96	0.18
Transportation	-0.67	-0.64	-0.04
Precision	-1.30	-3.00	1.70
Tertiary	1.76	3.59	-1.83
Utilities	0.31	-1.75	2.06
Transport	…	…	…
Railway	0.57	-1.80	2.37
Road Freight	-1.16	-0.96	-0.21
Wholesale and Retail	…	…	…
Retail, General	-3.70	-2.72	-0.98
Retail (Apparel)	8.80	2.73	6.07
Retail (Food)	2.62	3.68	-1.06
Retail (Vehicles)	5.56	1.34	4.22
Accommodations	2.35	1.34	1.01

Source: MHLW Monthly Labor Survey and Fund staff calculations.

Table 4. Percent Change in Employment by Firm Size, Gender, and Age Group
(Between 2007Q3 and 2009Q3)

Group	Real	Predicted	Difference
Firm size (# of employees)			
0-29	-3.61	-0.17	-3.44
30-99	-5.36	-1.69	-3.67
100-499	-0.44	2.92	-3.36
500-999	0.43	4.09	-3.66
1000+	9.49	-4.44	13.93
Male	1.93	1.40	0.54
15-24	3.40	2.86	0.54
25-34	2.60	0.49	2.11
35-44	1.37	0.15	1.21
45-54	1.30	0.63	0.67
55-64	2.40	1.52	0.88
Female	1.30	0.63	0.67
15-24	0.40	0.40	0.00
25-34	2.03	1.19	0.84
35-44	1.17	1.77	-0.60
45-54	1.43	0.65	0.78
55-64	1.90	0.39	1.51

Source: MIC Labour Force Survey and Fund staff calculations.

Table 5. Dynamic Wage Betas by Country

Group	Quarter	Dynamic Beta		Optimal Lag			
		Estimate	S.E.	*dy*	*dw*	D	BIC
Austria	1983q4	0.061	0.184	0	1	No	-239.97
	1992q3	0.161	0.120	0	1	No	-420.25
	2001q1	0.391	0.284	0	4	No	-487.87
	2008q3	0.894	0.361	0	4	No	-611.43
Belgium	2000q4	0.680	0.210	0	1	No	-578.10
	2008q3	0.173	0.132	0	0	No	-581.40
Canada	1990q1	0.090	0.172	1	0	No	-479.96
	2008q3	0.587	0.168	0	0	No	-526.28
Denmark	1992q3	0.284	0.175	0	0	No	-483.13
	1997q2	0.088	0.144	0	0	No	-499.12
	2006q2	0.223	0.242	4	4	No	-520.56
	2007q3	0.220	0.493	0	4	Yes	-527.84
Finland	1980q3	0.174	0.124	0	1	No	-473.78
	1990q1	0.128	0.114	0	1	No	-463.13
	2001q1	0.607	0.108	1	1	No	-475.06
	2008q2	0.557	0.099	0	1	No	-471.72
France	1992q1	0.192	0.165	0	1	No	-627.69
	2002q3	0.338	0.120	1	0	No	-646.12
	2008q1	0.122	0.116	0	0	No	-629.79
Germany	1981q3	0.220	0.162	0	1	No	-516.52
	1992q1	0.485	0.804	0	3	Yes	-525.91
	1995q3	0.905	0.452	0	0	Yes	-518.68
	2002q3	1.161	0.631	0	0	Yes	-509.59
	2004q1	1.261	0.608	0	0	Yes	-509.64
Ireland	2008q1	0.001	0.152	0	0	No	-514.16
	2007q4	0.048	0.063	0	0	No	-452.33
Italy	1981q4	0.093	0.202	0	1	No	-485.56
	1992q1	0.238	0.155	0	0	No	-465.90
	1996q1	0.082	0.176	0	0	No	-484.45
	2001q1	0.244	0.203	0	0	No	-496.81
	2002q4	0.365	0.185	0	0	No	-512.58
	2004q3	0.455	0.206	0	0	No	-511.73
Japan	2008q1	0.002	0.170	0	1	No	-486.57
	1985q2	1.889	0.711	1	3	Yes	-505.41
	1991q1	1.885	0.972	0	3	Yes	-545.59
	1997q2	0.242	0.088	0	0	No	-575.17
	2000q4	0.268	0.073	0	0	No	-590.00
Netherlands	2007q3	0.291	0.073	0	0	No	-591.92
	2008q3	0.362	0.230	0	0	No	-482.65
Norway	2002q2	0.014	0.204	4	3	No	-487.62
	2008q2	0.087	0.098	0	0	No	-506.98
Spain	1992q1	0.545	0.172	1	0	No	-503.48
	2008q2	0.328	0.529	0	1	Yes	-574.48
Sweden	2008q1	0.259	0.172	0	1	No	-452.08
Switzerland	1996q1	0.065	0.123	1	0	No	-586.92
	1998q3	0.080	0.104	0	2	No	-592.79
	2001q1	0.035	0.128	0	1	No	-602.14
	2002q2	0.096	0.102	0	2	No	-608.70
	2008q2	0.081	0.145	0	4	No	-571.82
United Kingdom	1979q2	1.726	0.504	0	0	Yes	-341.70
	1990q2	1.333	0.322	0	0	Yes	-437.16
	2008q2	0.828	0.266	0	1	No	-459.35
United States	1981q3	0.552	0.147	0	3	No	-602.32
	1990q3	0.248	0.087	0	1	No	-585.13
	2000q4	0.222	0.119	0	1	No	-492.73
	2008q2	0.540	0.178	0	1	No	-484.45

Source: IMF *World Economic Outlook;* and Fund staff calculations.

Table 6. Industry Group Abbreviations

Group	Abbreviation
All industries	TL
Mining	D
Construction	E
Manufacturing	F
Textiles	F11
Wood	F13
Furniture	F14
Pulp and paper	F15
Chemicals	F17
Petroleum and coal	F18
Plastics	F19
Rubber	F20
Leather	F21
Ceramics	F22
Iron and steel	F23
Non-ferrous metals	F24
Fabricated metal	F25
Transportation	F30
Precision	F31
Tertiary	SL
Utilities	G
Transport	I
Railway	I42
Road Freight	I43
Wholesale and Retail	J
Retail, General	J55
Retail (Apparel)	J56
Retail (Food)	J57
Retail (Vehicles)	J58
Finance	K
Banking	K61
Insurance	K67
Accommodations	M72

Source: MHLW.

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