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Employment and Wage Adjustments at Firms under Distress in Japan: An Analysis Based upon a Survey*

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Abstract

We use the result from a survey of Japanese firms in manufacturing and service to investigate the choice of wage and employment adjustments when they needed to reduce substantially the total labor cost. Our regression analysis indicates that the large size reduction favors the layoffs of the core employees, whereas the base wage cuts are more likely if the firms do not feel immediate pressures from the external labor market or the strong competition in the product market. We also find some evidence that the concerns over adverse selection or demoralizing effects of wage cuts are real. Firms *do* try to avoid using base wage cuts if they consider these factors more important.

1 Introduction

The decade long stagnation of the economy left visible and perhaps also invisible scars in many facets of the Japanese economy. During the decade of the stagnation (take,1992-2001, for example, as the decade), the economy lost 3.5million regular and full time jobs. Although the precise breakdown is not readily available, the severity of the recession is shown in the proportion of the job loss due to outright layoffs, rather than those by not replacing retiring employees. Figure 1 can be used to

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compare the lost decade with past recessions. The share of layoffs was indeed large during the period. Still it is comparable to the figure in the recession after the first oil shock.

Prior to the decade long stagnation of the economy, a conventional wisdom was that Japanese firms exhaust all other means available before they finally resort to shedding their permanent employees. They can adjust over time work hours, they reduce work shifts, reduce bonus payments, or cut off some of temporary workers. Notable among these is the extent of wage flexibility due mainly to the importance and its flexibility of bonus payments and over time wages. As a result of the availability and flexible use of these means, Japanese firms rarely resorted to outright layoffs of employees, especially those with regular, full time status.

The lost decade changed the perception, if not the reality, of the Japanese firms' adjustment under distress. The Japanese firms no longer appear committed not to use layoffs as a means of adjustments. If a firm deems it necessary, layoffs of permanent employees are used, sometimes without exhausting other means of adjustments. There are also indications suggesting that the dichotomy between the base wage and bonus may no longer be applicable, at least for some segments of employees. Seniority based wage system have been altogether abolished in many major firms[1]. Even at firms retaining some features related to the seniority, the impact of the tenure on base wage has been reduced. Mincer and Higuchi (1988) emphasized the intensive investment in firm specific human capital as the underlying cause for the steep wage-seniority profile. Their analysis also highlighted the rapid technological changes as the major factor responsible for the heavy investment, and hence, the steeper wage profile. Consistent with their thesis, we have several indications suggesting the diminished investment in training at work place, as well as reduced commitments of the employees to the continued employment[2].

The lost decade was also a prolonged period of the deflation. The

[1]Probably the best known earlier example is Fujitsu, one of the largest and oldest electronics-computer firm. in 1993, Fujitsu introduced a package of new personnel management, pay, and evaluation system wherein they completely abolished seniority wage and replaced by flat annual salary which is adjusted according to performance based evaluation. After series of stagnant company performance, internal fighting and mounting problems and conflicts, Fujitsu rescinded many of these features in 2001. Other well known examples include Mitsui Trading and Namco (arcade games and entertainment).

[2]For example, using a panel data (Keio Household Panel Survey), Toda and Higuchi and(2005) finds the decline in the incidence of firm level training in the 1990s, as well as the shifting emphasis more towards general, than firm specific contents. Kato(2003) and Kambayashi and Kato(2008)

economy hovered around zero to some negative inflation rate for nearly a decade. Without the buffer of mild inflation, nominal rigidity in price or wage directly resulted in the real rigidity The other side of the deflation in the late 1990s was the important change in the product market competition. The consumer spending dwindled while newer types of retailers rapidly invaded the markets, with the help by lifting of the crucial regulation on the entry of large scale retailers. The joint outcome of deregulation and intensified retailer competition was the rapid shifts away from traditional retailers, especially, mom and pup shops and department stores. Price cost ratio continued decline during and beyond the lost decade. Even after the weak recovery from 2002 onward, the gross profit margin of the retail sector remained at a level well below the one in early 1990s[3]. Deteriorations in the price cost margins and the weakening in the labor market induced the downward age adjustment in the latter half of the lost decade: Kimura and Ueda (2001) and Kuroda and Yamamoto (2005) agree that the nominal rigidity disappeared sometime in late 1990s [4]. Although it is still not clear if the deflationary experienced also changed the degree of real wage rigidity, the increased uncertainty and the potential of future job loss might have had lessened the worker's resistance against the nominal wage cut[5]

These changes have brought about several ramifications on the macroeconomic fluctuations of the Japanese economy. The most important implication is on the slope of the Phillips curve. To the extent that the wage flexibility diminished, the impact of negative shock on the economy may be transmitted more directly to the quantity adjustments, hence flattening the slope of the Phillips curve[6].

[3]The ratio of the operating profit to the total asset of the retail sector average at 4.5-5% in the late 1980's to the early 1990s, then bottomed to 1.9% in 1998. As of 2007, the ratio is still 2.7%.

[4]Actually, the nominal wage rigidity could have been a savior of the country if the deflation pressure did push the economy in the direction of the downward spiral.

[5]Ohtake (2007) uses a unique survey in which sample workers are asked the choice between wage cut and the probability of layoffs. He reports that the choice shifts toward the probability of layoffs as these two magnitudes are increased. When asked about 5% wage cuts and 5% of layoffs, more than 85% preferred wage cut, whereas comparing 30% wage cut with 30% layoffs, the share preferred wage cut is reduced to 59%. If this is representative, worker can tolerate only small changes in wage, so wage flexibility may not be relied upon if the large scale cut in labor cost was deemed necessary.

[6]Several studies try to trace out the possible impact of the change in employment and wage adjustments on the slope of Phillips Curve. See also Yamamoto (2008) for a review of recent studies on this subject. Ariga (2006) found that procyclical fluctuations in mark-up had been partially responsible for relatively steep Phillips Curve up until early 1990s, but, the reduced magnitude of the mark-up fluctuations might have contributed to the flattening of the Phillips curve.

A flattening of the Phillips curve (if it is real) is consistent with the popular view that Japanese employment system (and its adjustment mechanism) is long gone. Nevertheless, we have no shortage of empirical studies supportive of the constancy, rather than any major changes. Even a cursory look at some of numbers indicates that we should not take for granted that Japanese firms adjust wages and employments in a manner fundamentally different from the one operative say, in 1980s or earlier. Even as of now, the impact of tenure on earning is the largest among major OECD countries, and the impact remains statistically significant. After incorporating the severity of the recession in the last 15 years, no conventional econometric analysis can make a strong case that the core of the Japanese labor market has become more fluid, either in terms of turnover rates, changes in transition probabilities in and out of employment, or, in terms of adjustment speed of employment towards the target or long run equilibrium[7].

Given the multitudes of changes during the last 15 years or so after the bursting of the bubbles, it seems important to re-visit the question on wage and employment flexibility. In this paper we try to sheds some new lights on this important issue of employment and wage adjustments at individual firm levels. We do so by using a large scale survey of Japanese firms that we conducted. The key set of questions in the survey ask if the sample firms had an experience in which they needed to reduce substantially the labor cost. To those who said yes, we asked both qualitative and quantitative adjustments they actually took. We use the survey to recover the major factors responsible for both employment and wage adjustments, together with other covariates which might have generated important impacts on these decisions. Included among those are the set of proxy variables representing the nature of the competition and their market powers in the product market.

Our focus in these adjustments are the base wage cuts and layoffs of the core employees, i.e., regular and full time workers. There is not much doubt that even in the past, Japanese firms readily adjusted the size of non core employees and bonus payments do respond to short term fluctuations in firm performances. By focusing directly on the adjustments of the base wage and the size of the core employees, the subsequent analysis highlight the difference in wage and employment adjustment in Japan after the lost decade. Based on regression analysis, we make the following points: (1) some of the proxy variables representing the effect of the base wage cut tend to reduce respective adjustment size or prob-

[7]See a comprehensive review of the recent literature in Ohta, Genda, and Teruyama (2007)

abilities, (2) however, in some other responses, notably in employment adjustments, we also find puzzling results, (3) firms facing the competitive pressure at the labor market tend to rely more on employment adjustment, than wage adjustments, and (5) if the size of adjustment is large, the burden is more on employment, than in the base wage adjustment. These findings broadly supports our thesis that the base wage flexibility is not an indication of the labor market competitiveness, instead, it is a proxy for the wage premium or rents which enable them to flexibly adjust the base wage downward under the distress. On the other hand, firms facing the immediate competition in the labor market have little room to adjust the wage without damaging the cooperation or coordination with their employees, hence resort to the employment adjustments.

The sequel of the paper is organized as follows. In the next section, we offer a selected survey of the past empirical studies on employment and wage adjustments in Japan. Section 3 introduces our survey and provide summary statistics to offer a bird eye view of the data. Section reports our regression results. Section 4 concludes.

2 Employment and wage adjustments in Japanese firms

Up until the beginning of the lost decade, the sizable body of empirical literature on employment and wage adjustments were nearly unanimous in portraying Japanese firms with more flexible wage but relatively rigid employment, especially in shedding the core employees, in comparison with firms in other major developed countries[8]. For several reasons, it is unclear if such a stylized view still applies to the Japanese labor market today[9].

Several recent studies focused upon nominal downward wage rigidity during the lost decade. Using macro time series data, Kimura and Ueda (2001) find significant nominal downward rigidity up until 1996, whereas the rigidity disappeared after the onset of the second wave of downturn from 1997 onward. They also find supporting evidence that ' wages do

[8]Although all the studies are virtually unanimous in confirming nominal wage flexibility prior to the lost decade, there are some indications that Japanese wages exhibit some degree of rigidity against real shocks. See for example, Branson and Rotemberg (1980).

[9]See, as a representative collection of recent studies, Chuma (2002), Kato (2001) and Kato and Kambayashi (2008). Tachibanaki (1987) reviews the typical studies on relative wage flexibility in Japan before the bubble period. There exist some important dissidents on both wage flexibility and employment rigidities. Notable among them is an early study by Ohtake (1988) on wage adjustment in which he finds nominal wage flexibility but not in real wage.

converge to their equilibrium levels with the passage of time,' a conclusion shared by Kuroda and Yamamoto (2004)[10]. The characterization of the nominal wage rigidity in the lost decade is consistent with the changes in real wage during the period: the real wage and labor share in national income continued upward trend in the early 1990s, but, it peaked out in the mid 1990s, when the nominal wage started to erode. Unfortunately, these studies do not cover the period prior to the lost decade so that it is not clear if the results are in direct conflict with the earlier studies. At the least it seems possible that the Japanese wage flexibility prior to the lost decade was due at least partly to the sizable core inflation which lasted up until the latter half of the 1980s.

Additional factors accounts for apparently contradictory pieces of evidence found for the wage rigidity. For one thing, most of the studies on wage adjustments up to early 1990's used either macro time series data or publicly available cross section data on wages. It is only in the last 15 years or so that we started to use microscopic data in Japan. Since most of the data used in the recent studies do not cover years prior to 1990, it is not at all clear if shifting conclusion is due to the use of microscopic data, or to the different time coverage. If anything, earlier studies using the data prior to 1990s tend to be more favorable for wage flexibility, especially those using macro time series data. Even so, the flexibility refers mainly to the bonus or total wage compensations, and less to the base wage. During the lost decade, bonus and over time wage payments have declined far more than the base wage[11]. For these reasons, it is not clear if the wage, especially the base wage flexibility applies to the most recent years after sizable declines in the flexible components of the total wage.

Another misgiving of the past empirical studies on wage adjustments is that these studies are largely silent as to exactly what the "equilibrium" or long run wage rate is, and how it is determined. In a typical macroeconomic study, wage adjustment is presumed in response to macroeconomic imbalance between the labor demand and supply, without explicit modeling of the labor market equilibrium. "Adjustment cost" is transplanted to a conventional model of supply and demand in the labor market without much justification or checking if the amalgamated 'adjustment model' is really internally consistent.

Compared to wage adjustment studies, those focusing on the employ-

[10]They conclude that their analysis indicate that the nominal rigidity led to an increase in unemployment of approximately 1 percentage point at the most until 1997.

[11]According to the basic wage survey, base wage increased by 4.5% from 1995 to 2005, whereas the bonus payment decreased by 16.5% for the same period.

ment side tend to reach broadly similar conclusions, irrespective of the data type or the time period[12]. Specifically, they find that the adjustment speed of the employment at Japanese firms is substantially smaller (slower) than those found in comparable studies on the United States. Second, the slow adjustment is particularly robust finding for the core employees, full time, regular workers.

The apparent rigidity may well be due to the fact that, up until 1990's, the economy experienced healthy growth with relatively short lived and shallow recessions. They simply did not feel compelled to cut off its permanent staffs. This view is certainly consistent with findings from some recent studies using panel data of individual firms that firms do resort to layoffs of the core employees if they sustain sizable and persistent (operating) profit loss. Studies by Suruga (1997) and others use panel data of (large) firms and find that not only consecutive profit losses significantly predict sizable downward adjustment of the employees, financial difficulties of firms accentuate and accelerate these adjustments [Ogawa (2003)]. Related to this is a well known study of Zombie firms due to Caballero, Hoshi and Kashyap (2008), wherein "ever-greening" by mainbanks of the corporate lending gives rise to forbearance and continue lending to firms which are practically bankrupt. Studies by Fukao, Miyagawa and others demonstrate that during the lost decade many low productivity firms were allowed to survive, retarding significantly the productivity growth[13].

Ohta, Genda and Kondo (2007) focuses on the generational inequality caused by the sluggish employment adjustments. They find that firms employing large shares of older workers are far less likely to post vacancies. In other words, the age composition of employees seems to have important impact on adjustment speed. It is also well known that employment adjustments tend to be faster in services, than in manufacturing, whereas there is no robust correlation between the adjustment speed with the firm size [Muramatsu (1995), Suruga (1997)]. In sum, these studies indicate that the size and the age composition of employees, as well as technological factors all do play significant, if not decisive roles in the magnitude and the speed of employment adjustments.

[12]Muramatsu(1995) offers the survey of representative studies which used the data prior to the lost decade.

[13]The studies of the lost decade [e.g.,Fukao et al (2008)] found that the slow and hard earned recovery from the long recession was made possible through costly and sizable reduction of permanent staffs, together with other measures to streamline organization, accommodate advances in IT technology, etc. In other words, productivity recovery was largely an outcome of re-structuring. Therefore, over all picture is that firms reducing the size tend to have higher productivity than those retaining or expanding its employment.

One study somewhat similar to our own is the paper by Tachibanaki and Morikawa (2002), in which they use census of manufacturers micro data and estimate first whether or not sample plants survive into the next period, and then estimate wage and employment adjustments as the second stage. Using the two stage estimation, they find statistically significant negative impact of wage adjustment on employment adjustment equation, thus arguing that two adjustments are substitutes.

Except for the study by Tachibanaki and Morikawa, virtually all the past empirical studies we found focus only on wage or employment adjustments, which might lead to serious bias, or at least inefficient estimates of the adjustment mechanism. As a matter of general principle, it goes without saying that employment and wage adjustments should be treated as an integral part of the firms' overall adjustments to changing product demand, or other factors facing them. For example, consider a firm employing labor from highly competitive labor market. Such a firm does not have power to adjust the wage. They can only adjust employment. On the other hand, firms earning extra profits due to the market power in the product market may well be sharing part of the profits in terms of wage premium. If so, these firms might have more room to adjust wage downwards, along with the decline in profit, without generating serious adversely reaction from the labor.

After reviewing the past studies, we find three issues are of particular importance. First of all, it is important to have a framework of analysis in which joint decision on employment and wage adjustments are analyzed. Secondly, in view of the multitudes of the changes the Japanese corporate sector experienced, it is important also to use individual firm data by which we can identify and measure key characteristics in the labor and product markets they face. Finally, given the severity and the length of the general stagnation, cares must be taken to account for the possible impacts of the size of the necessary adjustments on the choice between wage and employment.

3 The Survey

In September 2008, we conducted a survey on employment and wage adjustments. The survey asks 31 questions in total and they are divided into three sections. In the first section, we ask the sample firms if in the past (since 1990) they needed to substantially reduce the total labor cost. For those answered yes to the question, we ask the nature of the problem they faced, employment and wage adjustments they planned, and adjustments actually taken, as well as a variety of questions pertaining to both explicit and implicit costs associated with employment and wage reductions. Some of those questions are based on their experience

and others are on hypothetical situations. In section 2, we collect questions on competitions at the product market. The last section covers questions on key indicators for broad characteristics of the sample firms.

We obtained 2645 responses from 22,757 mailed questionnaires, thus the response rate is 11.6%[14]. The mailing list is based upon the list of firms that covers 26,574 firms compiled by Basic Survey of Japanese Business Structure and Activities. We chose manufacturing and services as our target industries. Table 1 offers summary statistics for the entire sample of the firm. The crucial first question we asked was if in the past (since 1990) they needed to substantially reduce the total labor cost. 763, or, roughly 30% of the total sample said yes. Table 1 shows that general characteristics of the sample firms do not differ markedly depending upon the answer to this question. The data indicates, however, that firms said yes to the this question are on average: more in manufacturing, slightly younger, with some what large shares of workers with long tenure (more than 15 years), slightly smaller both in terms of employment and sales, and wage cost per capita is slightly smaller. The differences in these averages are order of magnitude smaller than the corresponding standard deviations. Thus it is safe to say that there is no immediate differences between the two sub samples.

Table 2 shows chronological distribution of the episodes of the cost reduction as perceived necessary by the sample firms. As we expected, most of the reported episodes occurred after the latter half of the lost decade, especially in the first 3 years of this century, which comprises roughly one third of the total incidents. The unemployment rate of the economy peaked at 5.4% in 2002 and in only these three year period, the unemployment rate remained above 5%. Thus the concentration of the distress during these three years are in accordance with the cyclical changes in the labor market. As shown in Table 3, 75% of the incidences are due to the decline of sales, with 'other reasons' (not specified) accounting for 18%. Table 4 shows the actual adjustments taken. Our key question was (1) if the firm cut the base wage, and if so by how much, and (2) if the firm permanently laid off some of the regular, full time employees, and if so, by how much. Henceforth, until noted otherwise, wage adjustments refers to the base wage cut, and employment adjustment refers to the layoff of regular, full time employees. Somewhat surprisingly, about a quarter of them did not make base wage or employment adjustments in spite of the apparent need for the adjustment[15]. Roughly 30% of firms adjusted both employment and wage, and

[14]The final valid responses we used is 2574.

[15]We also asked if the firm reduced wage cost by replacing regular full time employees by either temporary or part time workers, or by outsourcing. Only 23% of

about an equal number of firms adjusted employment only. Slightly less than 20% of firms adjusted wages only, the smallest share among four cells in the Table 4.

The mean of the wage cost reduction is 12.9% of the total labor cost, which is somewhat smaller than 14.3% reduction originally planned. When asked to decompose the reductions to wage and employment adjustments, the actual reduction of the employment was 15.7% on average, and the average size of the base wage cut was 8.7%. About 17% of firms reduced the employment size more than they planned, whereas less than 5% of wage adjustment was more than the original plan.

Table 5 shows the changes in a few key variables during the 3 year period surrounding respective episodes. Except for the recruits of new school graduates, Table 5 shows that the firms were on average still struggling in the year after the distress episode. Even as of 2008, average figures indicate that they have not fully recovered from those in the year immediately before the incidence. This is consistent with the view that cost reduction was inevitable, given the severity and permanent nature of the shock.

The survey asked to assess qualitatively the relevance of potential factors preventing base wage cuts or the dismissals of full time, regular employees.

Table 6 and 7 summarize the responses to these questions. Our survey agrees with many similar surveys done on wage rigidity in terms of the respondents' view of the relevance. The respondents think the negative impact on worker morale as the most important factor preventing the base wage cut[16]. The fear that the firm may loose the most productive employees is the distant second, followed by the concern over the relative wage. The hypothesis that a wage cut is against the implicit contract is the least popular, again echoing the results of the past surveys, including our own in Kambayashi and Ariga (2008).

The second column shows the average score among the sample firms who answered 'yes' to the first question on the past distress. The last column is the subset of the second sample who actually reduced the base wage during the episodes. Across all questions except for the least pop-

the firms with the distress experience employed such means. The share of firms using these means is largest (33%) for the firms that did not use either base wage cut or the layoffs of the core employees. On the other hand, even among the firms that used both means, roughly the same (26%) of the firms also employed these additional means.

[16]This is the most popular answer in our previous survey (Kambayashi and Airga, 2008), in 12 country surveys jointly conducted by member countries of ECB Wage Dynamics Network (2008), and also the one endorsed in Bewley's book (1999). See Berttola et al (2008) and Druant et al (2008) for the WDN survey results.

ular implicit contract hypothesis, the firms with the distress experiences consider each of these factors more important than the average sample. For four of the seven questions listed in Table 6, Pearson's Chi^2 tests indicate significant difference in the response between the entire sample and the sub sample with distress experiences. We find the exact analogue in Table 7 wherein we show the scores on 7 questions in which we asked the relevance of factors preventing dismissals of regular, full time employees. Namely, except for the last question, the second column average is always higher than the first column. In five questions, Pearson's Chi^2 indicate significant difference at least with 5% confidence level. On the other hand, figures in the last column provides us with somewhat puzzling results. In many questions in Tables 6 and 7, those who did reduce base wage (laid off permanent employees) on average find those factors even *more* important in comparison with the entire sample of distress firms. On the other hand, the differences between the second and the third is smaller, and the same Pearson's Chi^2 test shows only 2 questions in Table 7 indicate significant differences between the two groups. In Table 6, none of the comparison between the second and the third groups shows statistically significant difference.

The responses to other questions related to wage and employment adjustments costs are more consistent with the adjustments they actually took. For example, when asked about the likely impact on the recruiting by 10% wage cut, those who did adjust the base wage downward consider the potential impact less severe than those who did not. One unexpected result is found in the expected time (in days) required for the overall efficiency of the organization to fully recover to the normal after 10% reduction in staffs. The response shows on average that firms adjusted wage only assess the length to be significantly *shorter* than the others, while those who adjusted employment, but not wage, expect it takes the *longest* time on average.

Among those who adjusted both wage and employment, when asked about the sequential order of adjustments, 21% said wage first, whereas 27% said employment first, and, the remaining 51% more or less simultaneously[17].

Finally, we tabulate characteristics of the product market competitions in Table 8. Somewhat surprisingly, we find consistent tendency in deviations of the mean responses between those with and without the

[17]Kuroda and Yamomoto (2005) finds that labor cost adjustments were generally carried out in the following order: overtime pay, bonuses, employment adjustments including restriction of hiring younger employees and promotion of early retirement programs, and finally elimination of annual wage increases and reductions to regular salaries.

episodes of the distress. Compared to the sample average, firms with distress experiences are: less likely to adopt mark-up pricing, more likely to face price competition than the competition in quality; and find the price competition fierce, more likely to follow a 10% price cut by a rival firm, and their average frequency of price change shorter. All of these characteristics indicate that the distressed firms face more competitive markets than the sample average. Pearson's Chi^2 test indicate the difference is significant in all but one question. The last two columns show the corresponding averages for firms who did reduce the base wage and laid off the core employees during the reported incidences. In comparison with the second column, evidence is mixed. Among the base wage cut group, they change price more frequently, but less likely to respond to a 10% price cut by a rival firm. Similarly, the difference between the second and the last columns are small and no clear patter emerges whereas comparisons with the wage cut group show that the layoff group is closer to incidence group, or at least lies in between the incidence and wage cut group, possibly an indication that firms are likely to use employment adjustment if they face less severe competition. In either case, the differences are relatively small, compared to the difference between the first and the second.

These simple tabulations are at least suggestive of possible links between the need and actual reduction of labor cost and the competitions the sample firms face in the labor as well as the product market. It is clear that firms tend to be more vulnerable to external shocks if they face highly competitive product market. The joint outcomes of the competitions in the product and labor markets may have systematic influence of the measures taken to reduce labor cost, which simple tabulations cannot reveal. If they command a large profit margin with highly secured market share, they may be able to absorb negative productivity shock without resorting to a major cost reductions, thus firms are less vulnerable to the shock. Costs or deadweight loss associated with information imperfection and agency costs may also play important roles in shaping the actual adjustments taken. We take up these issues more systematically in the next section.

4 Econometric Analysis

4.1 Model specifications

In order to explain the magnitude and the direction of adjustments taken by the sample firms in distress, we use the following sets of the explanatory variables. First we employ variables that represent the magnitude of the shock that gave rise to the need for labor cost reduction: the size

of the 'planned amount of cost reduction' (in % of the total labor cost). It is possible that this variable can be endogenous. For example, consider a negative demand shock. The amount of reduction in production depends on the size of price adjustment (unfortunately we do not observe this). Ceteris paribus, firms adjusting more in price have smaller adjustments in quantity thus smaller 'planned amount', and vice versa. We take up this endogeneity issue later on. We also use the % change in the year of the distress from the previous year for the following variables as additional proxy for the impact of the shock: total sales (output), the bonus per employee, the number of new hiring of new school graduates, and over time work hours. For the full list of variables used in the regressions below, see Appendix.

In the second set of variable, we consider two potential costs of downward base wage adjustments as seen by individual firms. First of all, we can consider administrative and bargaining costs associated with adjusting base wage, which typically requires formal agreement between the firm and the representative of the employee. Sometimes, such an agreement can be ironed out only after lengthy negotiations between the party. This type of adjustment is potentially important also if the firm needs to reduce the size of its core employees. We also use the scores in the qualitative assessments of the relevance of factors preventing base wage cuts.

A significant change in the employment size may also require reshuffling its employees across establishments and/or functional units. The firm may experience lower productivity until the reshuffled employees can adjust to new organization, tasks, etc. These can be construed broadly as those under the rubric of adjustment costs. We also use the scores in the qualitative assessments of the relevance of factors preventing the dismissals of regular, full time employees. These comprise the third set of variables representing the cost of employment adjustment.

Fourth set of variables are proxies to represent the nature and strength of product market competitions. Finally, in the fifth set, we include variables to represent the nature and the strength of the labor market competition. We proxy the pressure from the competition by the following variables. (1) Separation rate, the share of employees with 15 years or more tenure. We would expect that separation rate to be negatively related to the overall satisfaction of the employees, thus this represent negatively the strength of the labor market competition. The share of employees with long tenure also negatively proxy the competition. (2) The share of employees with age 23 or younger. This share represents recent growth as well as overall success of the firms hiring. We expect this should proxy negatively the strength of the labor market competition

Denote by Δw^D the amount of base wage reduction (in %) as reported in the survey. Since only subset of firms under the distress actually reduced the base wage, we posit

$$\Delta w_i^D = \max\left[\sum_{k=1}^{K} \omega_k X_i^k + \omega_s \overline{s}^i + u^i, 0\right] \tag{W}$$

wherein Δw_i^D is the actual adjustment size in the base wage, X_i^k is the set of explanatory variables explained above, and $\overline{s}^i$ is the planned adjustment size of the total labor cost, and u^i is the error term. (W) can be estimated for the probability of wage adjustment, or the size.

Similarly,

$$\Delta l_i^D = \left[\sum_{k=1}^{K} \lambda_k X_i^k + \lambda_s \overline{s}^i + \varepsilon^i, 0\right] \tag{E}$$

is the equation for the actual amount (in %) of the reduction in regular full time employees. Again, only subset of firms reduced the employment. Hence we can estimate for the probability of employment adjustment, or the size. Given the potential correlations of the error terms in the two equations, the system can be estimated as bivariate probit. Since we also observe the magnitude of adjustments, the system can be estimated also by tobit.

4.2 Estimation results

4.2.1 Major findings

Our major results are shown in two tables. The first four columns [(1)-(4)] in Table 9 report the probit and tobit regressions for the probability of wage and employment adjustments. We also include additional estimations. The last two columns in Table 9 reports bivariate probit specifications. Table 10 reports instrumental probit and tobit results in which we instrumented the *planned_ amount_ of_ cost_ reduction* variable to correct for possible endogeneity.

Let us begin with group of variables representing the impact of shocks. As expected, the adjustments are more likely and the estimated size is larger when the planned cost reduction is larger. The estimated coefficient is highly significant in employment equations, but only marginally so in the wage adjustment[18]. The estimated impacts of the shock variables suggest that the employment adjustment size is larger than

[18]In a tobit regression (not reported), we find the share of wage adjustment (wage adjustment divided by the sum of the two adjustments) is decreasing in the *planned_ amount of_ cost_ reduction.*

the wage and also the ratio increases at a larger shock, indicating the obvious that there exists fairly narrow margins of the adjustment in the base wage[19]. Decline in sales in the distress year[20] also exerts the downward adjustments in both wage and employment. The coefficients are often significant. The other three proxies, reductions in bonus payments, hiring of new school graduates, and overtime hours, are typically insignificant.

The second group of variables $[CW]$ represent the costs of base wage adjustments and are mostly negative and some of them are significant or nearly so: the number of meeting with worker representatives needed to negotiate 10% wage cut [*cost_ of_ base_ wage_ reduction*1], and the expected increase in quits after 10% cut of the base wage [*cost_ of_ base_ wage_ reduction*2] . Another statistically significant impact in the wage cut regression is found for the score on the relevance of the impact of adverse selection; i.e., those who fear that they lose the most productive employees are less likely to cut the base wage. All in all, these variables proxying the cost of wage adjustment broadly support the prior that they should reduce the size (probability) of the wage cut.

On the other hand, we cannot find any supporting evidence in the variables representing the cost of downward employment adjustment (variables in *CL* group). Especially surprising is the positive and significant impact of the time needed to recover the full productivity after the 10% reduction in employment [*cost_ of_ employment_ reduction*2].

The third group of the variables represents the product market characteristics. The price elasticity of the product demand[21] [*demand curve*] exerts significant negative impact on employment adjustments, whereas its impact on wage reduction is typically insignificant. Although mostly not significant, the coefficient on the degree of price competition (in-

[19]Using the tobit regressions in (3) and (4) of Table 9, the estimated adjustment size of the base wage peaks out at 8.5% when *planned_ amount_ of_ cost_ reduction* is 19%, whereas the employment adjustment is monotonically increasing in the same variable, and roughly the same magnitude of the wage adjustment up to *planned_ amount_ of_ cost_ reduction* is about 10(%). The predicted effect on employment adjustment is about 15% at 22%, and roughly 20% when the planned reduction is about 30%.

[20]Each of these "*change*" variables measures the % change in the year of the adjustment from the previous year. For example, if *sales_ change* is -10(%), this corresponds to 10% decline in the sales in the year that adjustments were made in comparison with the previous year. Thus we would expect the estimated coefficient to be negative.

[21]The price elasticity of the product demand is computed from the answer to the following question."Upon 10% increase in the price of your main product, how much do you anticipate the decline (in %) in sales?"

versely ordered) is negative on employment but typically positive on wage adjustment. The wage cut is less likely if the price competition is fierce. The top two dummy variables measures the impact of price formation method (relative to the mark-up). In comparison with firms whose product prices are determined by the customer or the parent firm, firms using markup pricing are more likely to adjust wage. Firms reluctant to cut its own price against a 10% price cut by a rival firm is significantly less likely to cut wage. This result is not easy to interpret, though. For one thing, concerted price changes may be a symptom of market concentrations and oligopoly. If the firm is a major player in the market, however, the reluctance to match the price cut by a rival firm can be a signal of the dominance of the firm in the market. Overall, we have more evidence that wage cuts are more likely if the firm has some market power in the product market. In employment adjustment regressions, the *degree of price competition* variable is consistently negative and in one case marginally significant. Aside from price elasticity and this variable, no other variables appear to be important. In sum, evidence are somewhat mixed in this group of variables. At the least, we find no strong evidence that the wage cut is positively influenced by product market price competition. On the contrary, we have some evidence indicating the employment adjustments are more likely if the product market is more competitive.

Another fairly strong evidence in support of the observation above is the impact of m variable that represent the share of labor cost in total sales (adjusted for the industry means). This can be interpreted as representing the inverse of the productivity, or, loosely speaking, the size of the slack between the value added and the labor cost. Higher the productivity relative to the wage cost, there exists more room for wage reduction. To the extent that we expect the product market competition reduces this margin, the ratio of the wage to the value added should be closer to unity, leaving smaller room for wage adjustments. The impact on wage adjustments by this variable is always negative and in two regressions significant. The Impact on employment adjustment is negative but none of them are statistically significant.

The last group of variables represent the strength of competition they face in the labor market [L]. The coefficients in wage regressions all indicate the competitive pressure in the labor market actually reduces the wage adjustment size and probability. Firms enjoying low separation rate is more likely to reduce the base wage than using layoffs. Wage cuts are more likely at firms with the higher share of employees with 15 years or more tenure. Firms with larger shares of senior employees are also more likely to cut base wages. Unfortunately, none of these

estimated coefficients in this group are significant in wage regressions. The impact of separation rate on employment adjustment is positive and often significant. The impact of other labor market variables on employment regressions are mostly insignificant and tend to be unstable. Taken together, these impacts of the labor market suggest strongly that firms facing the immediate competitive pressure from the labor market is more likely to use employment, not base wage adjustment.

To sum up, regression results shown in Tables 8 support the following broad characterizations. First of all, we find evidence showing that the firms are more likely to use the base wage cut when they do not fear immediate repercussions either by increased quits, difficulty in hiring, demoralizing workers, etc. The evidence suggests that it is not the competitiveness in the labor market that induces the base wage cut. On the contrary, the major factor inducing the wage cut is the ability and room of adjustment in the base wage without jeopardizing the harmony, loyalty of the employees and reputation as a good employer in the labor market. Only firms not facing strong competition vis-a-vis the external labor market can afford to cut the base wage. The evidence we found for the impacts of product market characteristics also lends support to this thesis. On the other hand, the size of the shock has the dominant impact on the employment adjustment, which we do not find in wage adjustment[22]. Among the proxy variables representing labor and product markets, the only robust and significant impact on employment adjustment is perceived price elasticity of the product demand. Firms facing lower elasticity is significantly more likely to use employment adjustment.

4.2.2 Robustness checks

We briefly review additional sets of regression results[23]. First, (5a) and (5b) in Table 9 shows the estimation results of a bivariate probit model. The estimation results are qualitatively similar to the main results in Table 9. Moreover, the reported covariance term is small and statisti-

[22]Suruga (1997) and other similar analysis report that the consecutive losses in operating income significantly predict layoffs of the core employees. Unfortunately, they do not investigate the wage adjustments in those firms.

[23]Aside from those reported in Table 9 and 10, we also conducted alternative set of regressions including two additional controls. One variable is the type of shock as reported as the underlying cause of the distress. The other is the year in which the distress occurred. Qualitative results as reported in the text remain unaffected by introduction of these additional control variables. We also ran regressions in which the impact of shocks are estimated separately by the type or the year of the shock but failed to find significant break in terms of the estimated coefficient of the shock size variable (*cost_reduction_planned*). These additional results are available upon requests from the authors.

cally insignificant. On *apriori* ground the presumption should be that the error terms in the two regressions should be highly correlated, but it is not the case. We have no clear cut explanations why so. Most likely, the result reflect the fact that we have employed a large set of dummy variables representing industry classification, employment size, as well as a rich set of variables representing the magnitude of the shock responsible for the reported distress. They are probably enough soak up the correlations in the residuals.

The final set of regressions in Table 10 use instruments for the crucial variable, the size of the planned cost reduction. The regressions' overall fits deteriorate significantly, even when we allow a large number of instrumental variables. The bottom line is that available set of variables do not predict well the size of the shock. The other side of the poor fit is that the shock variable is safely treated as being exogenous and orthogonal to the explanatory variables we used.

5 Concluding Remarks

In this paper, we revisit the issue of wage and employment adjustments at individual firms in Japan. We use the results of a survey on this very topic that we conducted for the sample of Japanese firms. Our data from the survey covers the recent episodes of the distresses and we use their reported incidences of employment and wage adjustments to investigate the determinants on the magnitudes of these adjustments.

Prior to the long stagnation of the Japanese economy, the wage flexibility was often singled out as the major factor responsible for the rapid recovery from the two recessions after the major price hike of the crude oil. Although our data do not extend back to those early years, the major findings that emerges from the analysis points a somewhat different direction, or at least, allows us to draw a different implication. Our findings indicate that firms adopt the base wage cut in distress if they are insulated from the competitive pressure in the external labor market, and if they do not face strong competition in the product market. Our speculation is that their wages include some premium or rents and the presence of such a "slack" facilitates the downward adjustment in the base wage[24].

On the other hand, our analysis is not conclusive enough even to speculate if there is any change in the speed of the employment adjustment. We also failed to detect quantitatively significant interactions between the wage and employment adjustments. Our regression analysis

[24]The rapid decline in employment started in late 2008 might well be the consequence of the fact that such a slack might have been all but depleted during the weak recovery in which labor share of the value added lost more than 3 %.

only confirm the obvious that the severity of the shock necessitated the downward adjustment of employment. For some firms, the shocks were simply too large to be absorbed by the wage adjustments alone.

If we place these findings in the context of the slope of the Phillips Curve, it seems that the apparent flattening of the curve may well be a simple but inevitable outcome of the disappearance of the wage premium, after the decade of stagnation that reduced or even washed away the extra profits that some Japanese firms used to share with their employees. Firms paying only the market wage rate cannot possibly reduce the wage rate without losing their employees. If so, the flatter Phillips curve may well be real and it is here to stay with us as long as the stagnation of the economy continues.

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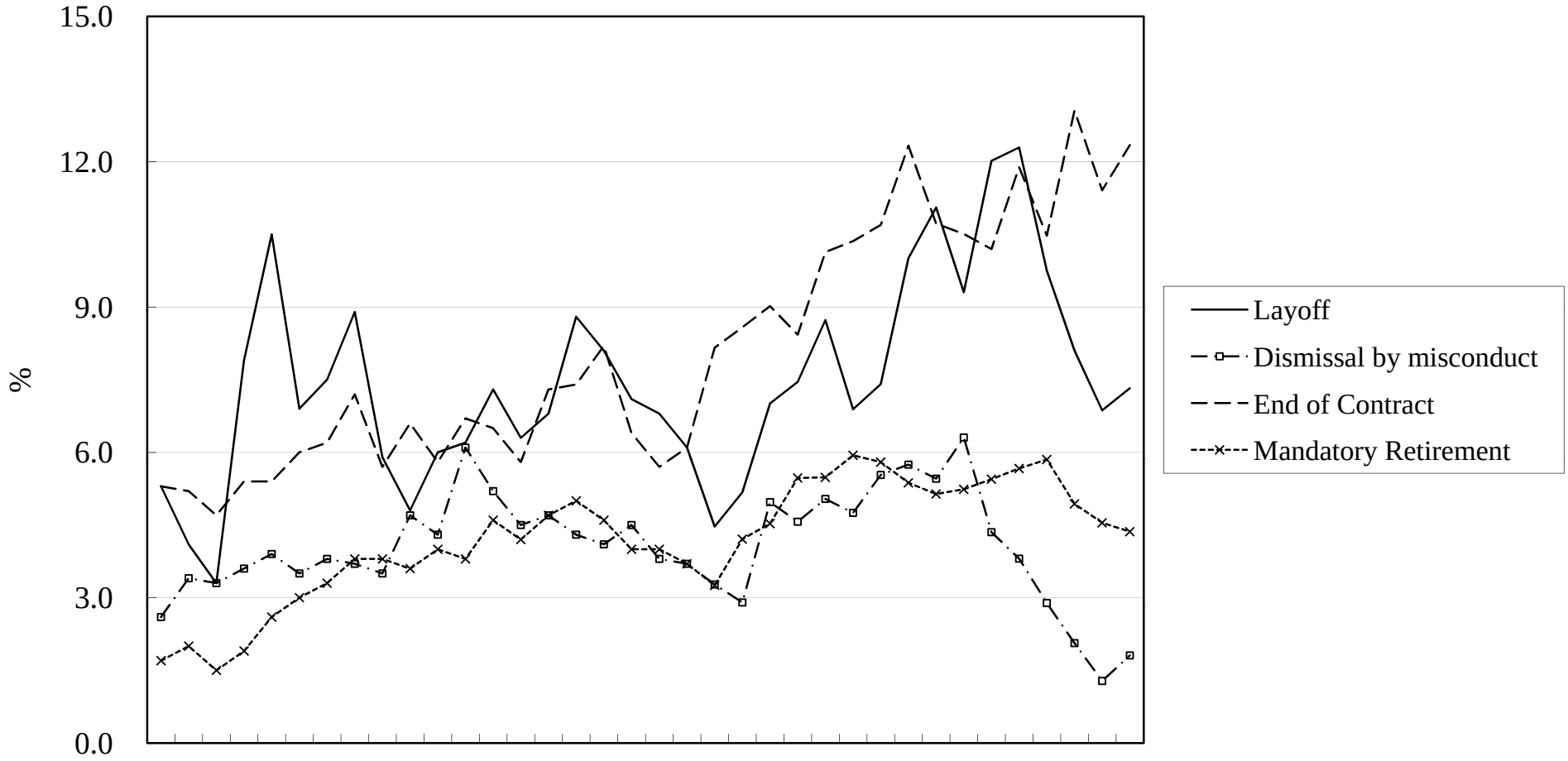
Figure 1: The Composition of Reasons for Separation in Japan (1971-2006)



source: Employment Trend Survey

Table 1: Summary Statistics

Episodes of Distress	Share of employees (%)		Firm characteristics			
	Age<24	Tenure>15yrs.	Employment	Mfg. (%)	Sales pc.	Total sales
no	16.41	30.51	225	45.95	311.1	953.1
yes	19.46	36.93	211	51.51	248.6	603.1
total	17.32	32.45	221	47.61	292.7	864.7

Table 2: The year in which they experienced major distresses

Year	Cases	%	Cumulative %
Before 1995	30	1.05	5.5
1995	14	1.83	7.34
1996	9	1.18	8.52
1997	21	2.75	11.27
1998	50	6.55	17.82
1999	42	5.5	23.33
2000	56	7.34	30.67
2001	76	9.96	40.63
2002	109	14.29	54.91
2003	86	11.27	66.19
2004	51	6.68	72.87
2005	46	6.03	78.9
2006	54	7.08	85.98
2007	59	7.73	93.71
2008	48	6.29	100

Table 3: The source of the negative shock

Underlying shocks	Freq.	Percent
Decline of sales	627	75.2
Rise of input Price	31	3.7
Innovation	7	0.8
Others	156	18.7
n.a.	13	1.6
Total	834	100.0

Table 4: Employment adjustment and base wage adjustment

		Employment Adjustments		
		No	Yes	Total
Base Wage Adjustments	No	191	218	409
	Yes	143	211	354
	Total	334	429	763

Table 5: Change of key variables during the three year period

	Year -1	The Year	Year +1	2008
Total sales (output)	108.3	100.0	97.9	111.5
Average bonus per employee	118.6	100.0	97.8	116.8
Hiring of new school graduates	94.8	100.0	71.3	94.1
Average Overtime per employees	102.0	100.0	95.6	99.9

Table 6: Qualitative assessments on the impacts of base wage cuts: How important are each of these factors in preventing base wage cuts?

	Average Score#		
	Total	Incidence	Wage cut
Regulations / collective agreements	3.03	3.21(**)	3.22
Damages worker morale	4.31	4.34	4.33
Damages firm reputation, future recruitment made difficult	3.40	3.46(*)	3.40
Induces quits of the most productive workers	3.72	3.74	3.69
Induces quits, leading to higher training costs	2.97	3.05(*)	3.09
Against implicit agreement for a fair wage	2.82	2.82	2.82
Employees concern over relative wage	3.45	3.54(*)	3.57

In parenthesis, **[*] indicates Pearson chi2 test indicates significant difference at 1 [5]% confidence level in response vis-à-vis total sample (for distress group), or distress group(those actually cut the base wage). # respondents are asked to pick 1: totally irrelevant, …2,3, 4,… to 5: highly important. The numbers shown are simple average.

Table 7: Qualitative assessments on the impacts of layoffs: How important are each of these factors in preventing dismissals of regular, full time employees?

	Average Score#		
	Total	Incidence	Layoff
Regulations / collective agreements	2.88	3.11(**)	3.17(*)
Aggravates worker (union) relation and possible conflicts	3.28	3.41(**)	3.46(**)
Damages worker morale	3.71	3.79(**)	3.79
Damages job security and future prospect, inducing quits	3.64	3.71(**)	3.72
Damages firm reputation, future recruitment made difficult	3.26	3.30	3.29
Early retirement program invites quits of the most productive employees	3.53	3.61(*)	3.62
Loss of key staffs makes skill and know-how transfers to the younger employees difficult	3.75	3.75	3.74

respondents are asked to pick 1: totally irrelevant, …2,3, 4,… to 5: highly important. The numbers shown are simple average.

In parenthesis, **[*] indicates Pearson chi2 test indicates significant difference at 1 [5]% confidence level in response vis-à-vis total sample (for distress group), or distress group(those actually laid off its core employees)

Table 8: Product market characteristics

	Total	Incidence	Wage cut	Layoff
Dominant form of competition: Price [or Quality]?	.59	.64(**)	.66	.64
Adopt Mark-up Pricing?	.44	.38(**)	.37	.37
Average score on the severity of price competition†	1.90	1.79(**)	1.74	1.80(**)
How likely you follow to a 10% price cut by a rival firm? ‡	2.32	2.29	2.25(*)	2.29
Average Frequency of price change: 6 months or shorter	.26	.29(**)	.32	.29(**)

†average scores corresponding to 1: fierce, 2,…5: almost none,

‡average scores corresponding to 1: always follow,2,3…5: never follow

In parenthesis, **[*] indicates Pearson chi2 test indicates significant difference at 1 [5]% confidence level in response vis-à-vis total sample (for distress group), or distress group(those actually laid off its core employees)

Table 9 Main Results

	dependent variable	(1) base wage adjustment	(2) employment adjustment	(3) % of base wage adjustment	(4) % of employment adjustment	(5a) base wage adjustment	(5b) employment adjustment
		probit	probit	tobit	tobit	bivatiate probit	
S	planned amount of cost reduction (%)	0.066	0.049	1.076	0.739	0.071	0.059
		(0.037)*	(0.017)***	(0.290)***	(0.260)***	(0.038)*	(0.018)***
	squared planned amount of cost reduction	-0.003	-0.000	-0.032	-0.002	-0.003	-0.001
		(0.001)**	(0.000)**	(0.009)***	(0.005)	(0.001)**	(0.000)***
	sales change (%)	-0.005	-0.002	-0.043	-0.096	-0.005	-0.001
		(0.002)**	(0.003)	(0.018)**	(0.027)***	(0.002)**	(0.003)
	bonus change (%)	-0.001	0.002	-0.009	0.041	-0.001	0.003
		(0.002)	(0.001)*	(0.010)	(0.017)**	(0.002)	(0.002)**
	new graduate hiring change (%)	-0.001	0.001	-0.004	0.021	-0.001	0.001
		(0.001)	(0.001)	(0.006)	(0.013)	(0.001)	(0.001)
	overtime change (%)	0.003	-0.000	0.018	0.032	0.003	0.000
		(0.002)*	(0.002)	(0.013)	(0.032)	(0.002)*	(0.002)
CW	cost of base wage reduction (1)	-0.384		-2.558		-0.387	
		(0.204)*		(1.379)*		(0.204)*	
	cost of base wage reduction (2)	-0.204		-1.358		-0.186	
		(0.094)**		(0.636)**		(0.091)**	
	cost of base wage reduction (3)	0.000		0.000		0.001	
		(0.004)		(0.030)		(0.004)	
	cost of base wage reduction (4)	-0.026		-0.359		-0.017	
		(0.097)		(0.671)		(0.096)	
	obstacle for base wage reduction (adverse selection)	-0.071		-1.119		-0.080	
		(0.069)		(0.441)**		(0.068)	
	obstacle for base wage reduction (reputation)	-0.071		-0.296		-0.074	
		(0.097)		(0.707)		(0.095)	
CL	cost of employment reduction (2)		0.037		1.062		0.074
			(0.213)		(2.764)		(0.228)
	cost of employment reduction (3)		0.419		5.234		0.428
			(0.242)*		(2.831)*		(0.242)*
	cost of employment reduction (4)		0.336		4.945		0.374
			(0.217)		(2.663)*		(0.231)
	obstacle for employment reduction (adverse selection)		0.003		-0.626		0.041
			(0.095)		(1.168)		(0.113)
	obstacle for employment reduction (reputation)		0.035		-0.384		0.009
			(0.082)		(1.064)		(0.095)
P	quality competition	-0.032	-0.049	0.238	1.233	-0.010	-0.024
		(0.218)	(0.154)	(1.428)	(2.264)	(0.218)	(0.160)
	no aoutonomous dummy	-0.110	0.043	-2.616	1.590	-0.070	0.123
		(0.191)	(0.199)	(1.390)*	(2.741)	(0.189)	(0.210)
	follower dummy	-0.353	0.097	-3.210	-0.131	-0.316	0.195
		(0.160)**	(0.184)	(1.324)**	(2.514)	(0.161)**	(0.187)
	degree of price competition	0.042	-0.176	-0.477	-2.252	0.051	-0.286
		(0.142)	(0.131)	(0.979)	(1.633)	(0.144)	(0.146)*
	behavior for price reduction	-0.274	0.192	-2.270	0.759	-0.244	0.282
		(0.143)*	(0.144)	(1.034)**	(1.700)	(0.143)*	(0.155)*
	demandcurve	0.008	-0.013	0.063	-0.156	0.008	-0.017
		(0.006)	(0.005)**	(0.034)*	(0.070)**	(0.006)	(0.006)***
L	margin	-0.145	-0.022	-0.902	-0.201	-0.126	-0.012
		(0.086)*	(0.040)	(0.495)*	(0.568)	(0.085)	(0.038)
	degree of ageing	0.004	-0.003	0.049	-0.050	0.004	-0.001
		(0.005)	(0.005)	(0.040)	(0.075)	(0.005)	(0.005)
	ratio of long tenured worker	0.002	0.002	0.031	0.036	0.003	0.003
		(0.004)	(0.004)	(0.028)	(0.048)	(0.004)	(0.005)
	wage per capita	-0.015	-0.003	-0.060	0.260	-0.017	-0.005
		(0.057)	(0.053)	(0.408)	(0.646)	(0.057)	(0.057)
	sales per capita	0.003	-0.002	0.009	0.009	0.003	-0.002
		(0.002)	(0.002)	(0.016)	(0.031)	(0.002)	(0.003)
	separate rate	-0.359	0.932	-4.096	23.846	-0.337	1.536
		(0.694)	(0.786)	(4.972)	(10.900)**	(0.673)	(0.913)*
	Constant	2.293	-0.992	13.515	-10.397	2.077	-1.146
		(0.909)**	(0.690)	(6.466)**	(8.378)	(0.886)**	(0.750)
	Observations	317	330	317	330	310	
	Wald chi2	93.44	70.05				
	Sigma			8.241	15.667		
				(0.446)***	(1.619)***		
	F value			3.23	9.17		
	athrho					-0.022	
						(0.087)	

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Other explanatory variables: industry dummies and employment size dummies.

Table 10 Instrumental Variable Regressions

independent variable	(6a) % of base wage adjustment	(6b)	(7a) base wage adjustment	(7b)	(8a) % of employment adjustment	(8b)	(9a) employment adjustment	(9b)
	IV tobit		IV probit		IV tobit		IV probit	
instrumented variable (first stage independent variable)		planned amount of cost reduction (%)		planned amount of cost reduction (%)		planned amount of cost reduction (%)		planned amount of cost reduction (%)
planned amount of cost reduction (%)	0.578		0.034		-0.427		-0.010	
	(0.406)		(0.031)		(1.557)		(0.035)	
demandcurve	0.017	0.031		0.047		0.061		0.056
	(0.060)	(0.062)		(0.054)		(0.045)		(0.068)
margin	-0.907	-0.086	-0.118	-0.076	-0.194	-0.015	-0.031	0.034
	(0.688)	(0.238)	(0.085)	(0.238)	(0.671)	(0.326)	(0.036)	(0.332)
cost of base wage reduction (1)	-3.107	1.442	-0.329	0.666				
	(1.904)	(1.466)	(0.169)*	(1.475)				
cost of base wage reduction (2)	-1.015	-0.660	-0.141	-0.707				
	(0.892)	(0.640)	(0.100)	(0.624)				
cost of base wage reduction (3)	-0.029	0.023	-0.001	0.022				
	(0.040)	(0.034)	(0.003)	(0.034)				
cost of base wage reduction (4)	0.181	-1.062	0.046	-0.765				
	(1.042)	(0.732)	(0.091)	(0.728)				
obstacle for base wage reduction (adverse selection)	-1.389	0.163	-0.106	0.051				
	(0.684)**	(0.618)	(0.073)	(0.624)				
obstacle for base wage reduction (reputation)	0.313	-0.365	-0.011	-0.365				
	(0.900)	(0.799)	(0.080)	(0.784)				
cost of employment reduction (2)					-2.625	-3.873	-0.101	-4.095
					(7.758)	(1.658)**	(0.245)	(1.614)**
cost of employment reduction (3)					2.709	-1.372	0.180	-1.338
					(3.950)	(2.658)	(0.224)	(2.708)
cost of employment reduction (4)					1.036	-3.654	0.103	-3.965
					(6.681)	(1.431)**	(0.252)	(1.414)***
obstacle for employment reduction (adverse selection)					-0.273	1.039	-0.050	1.184
					(1.737)	(1.273)	(0.091)	(1.148)
obstacle for employment reduction (reputation)					-0.673	-0.292	0.042	-0.350
					(1.395)	(0.715)	(0.082)	(0.737)
degree of ageing	0.050	-0.004	0.002	0.005	0.004	0.035	0.000	0.033
	(0.046)	(0.038)	(0.004)	(0.037)	(0.062)	(0.043)	(0.004)	(0.042)
ratio of long tenured worker	0.029	0.019	0.002	0.013	0.034	0.023	0.001	0.027
	(0.041)	(0.043)	(0.004)	(0.043)	(0.069)	(0.044)	(0.004)	(0.040)
wage per capita	0.093	-0.515	-0.013	-0.424	-0.319	-0.511	-0.022	-0.483
	(0.452)	(0.441)	(0.048)	(0.442)	(1.095)	(0.395)	(0.049)	(0.401)
sales per capita	0.003	0.000	0.002	-0.003	0.033	0.011	-0.001	0.007
	(0.023)	(0.024)	(0.002)	(0.023)	(0.049)	(0.024)	(0.002)	(0.024)
separate rate	-7.285	9.054	-0.299	8.568	28.706	4.727	1.066	4.728
	(7.854)	(7.513)	(0.754)	(7.412)	(14.407)**	(5.992)	(0.775)	(6.160)
quality competition		1.599		1.393		2.112		3.417
		(1.730)		(1.999)		(3.516)		(2.006)*
no autonomous dummy		-1.727		-1.277		-2.257		-2.679
		(1.089)		(1.178)		(2.231)		(1.678)
follower dummy		-1.011		-0.962		-0.334		-0.771
		(1.439)		(1.600)		(1.563)		(1.803)
degree of price competition		-1.042		-0.692		-0.570		-1.392
		(0.902)		(1.045)		(1.857)		(1.115)
behavior for price reduction		-1.675		-1.158		-0.375		-0.769
		(0.969)*		(0.995)		(0.823)		(1.162)
sales change (%)		-0.064		-0.066		0.001		-0.041
		(0.022)***		(0.022)***		(0.054)		(0.026)
bonus change (%)		0.004		0.005		-0.016		-0.011
		(0.008)		(0.007)		(0.010)		(0.013)
new graduate hiring change (%)		-0.009		-0.011		-0.012		-0.011
		(0.007)		(0.008)		(0.010)		(0.010)
overtime change (%)		0.023		0.022		-0.034		-0.029
		(0.014)		(0.014)		(0.032)		(0.034)
Constant	2.085	22.937	0.871	21.451	5.254	14.078	0.102	15.644
	(9.082)	(5.086)***	(1.107)	(4.846)***	(23.185)	(5.017)***	(0.616)	(5.264)***
Observations	317		317		330		334	
alpha	.	-0.671	.	-0.734	.	1.099	.	0.371
		(0.398)*		(0.425)*		(1.623)		(0.458)

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Other explanatory variables: industry dummies and employment size dummies.

Appendix: Variable Definition

planned amount of cost reduction (%)	planned amount of cost reduction (%)
squared planned amount of cost reduction	squared planned amount of cost reduction
sales change (%)	% of sales change pior to adjustment
bonus change (%)	% change of average bonus pior to adjustment
new graduate hiring change (%)	% change of number of newly graduates hiring pior to adjustment
overtime change (%)	% change of average overtime pior to adjustment
cost of base wage reduction (1)	number of meeting with individualworker needed to negotiate 10% base wage cut individually
cost of base wage reduction (2)	incease percentage of quit if base wage is cut by 10% collectively
cost of base wage reduction (3)	expected increase in time length to fill vacant position after 10% base wage cut
cost of base wage reduction (4)	effect of quality of mid career hiring after 10% base wage cut; 1:no effect to 4: severe
obstacle for base wage reduction (adverse selection)	Base wage cut induces quits of the most productive workers; 1: totally irrelevant to 5: highly important
obstacle for base wage reduction (reputation)	Base wage cut damages firm reputation, future recruitment made difficult; 1: totally irrelevant to 5: highly important
cost of employment reduction (2)	the time period to recover usual productivity when 10% employment is layoffed is more than 30 days and less than 60 days.
cost of employment reduction (3)	the time period to recover usual productivity when 10% employment is layoffed is more than 60 days and less than 90 days.
cost of employment reduction (4)	the time period to recover usual productivity when 10% employment is layoffed is 90 days and more.
obstacle for employment reduction (adverse selection)	Layoff induces quits of the most productive workers; 1: totally irrelevant to 5: highly important
obstacle for employment reduction (reputation)	Layoff damages firm reputation, future recruitment made difficult; 1: totally irrelevant to 5: highly important
quality competition	dummy for quality competition (Base is price competition)
no autonomous dummy	dummy for no autonomous about pricing (Base is mark up pricing)
follower dummy	dummy for following the price of competitors (Base is mark up pricing)
degree of price competition	degree of price competition; 1:severe to 4: never
behavior for price reduction	When the competitors reduce their price, what do you do?; 1:Always reduce my own price to 4: Always stay on
demandcurve	If the price of your main products rises 10%, what percentage of sales do you lose?
margin	diviation from industry average of (total amount of wage cost) / (sales cost)
degree of ageing	ratio of workers whose age is 55 year old and over
ratio of long tenured worker	ratio of workers whose tenure is 15 year and over
wage per capita	annual total wage bill per employee
sales per capita	annual total sales per employee
separate rate	ratio of number of separated workers and total stock of workers