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BONUSES, OVERTIME, AND EMPLOYMENT: KOREA VS. JAPAN

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ABSTRACT

This paper examined the bonus and wage behavior in Korea. We found that both bonuses and wages in Korea respond to economic conditions much more than their counterparts in Japan. This finding may reflect the fact that the Korean labor market is much closer to a spot market rather than a long-term contract (lifetime employment) market. Hence the bonus/wage ratio is apparently insensitive to economic conditions in Korea, unlike in Japan (Freemand and Weitzman). When "overtime" component of the wage is separately examined, it responds to economic conditions less than bonuses but more than base wages.

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1. Introduction

This paper establishes stylized facts on the degree of bonuses and overtime payments in total compensations, and their sensitivities with respect to economic conditions in Korea. Results are compared, when possible, to those in Japan.

Motivation for this paper is three-fold. First, a bonus system in Japan has been studied in the context of a "share economy" in a series of papers by Weitzman. Among other findings, movements of the bonus-wage ratio in Japan are positively correlated with profits, and other economic performance variables, which is taken to be an evidence for profit-sharing. Korea, too, has a bonus system, although bonuses are paid four times a year in Korea as opposed to twice a year in Japan. The bonus portion of total compensation in Korea is still low compared to Japan, but rising very quickly.

Weitzman (1986) and Freeman and Weitzman (1987) examined a hypothesis that bonuses in Japan play a role of profit sharing proposed by Weitzman (1984). Freeman and Weitzman showed, among others, that the Japanese bonus is much more sensitive to economic conditions, such as profits and value added, than the base wage. Thus, some of unexpected profits are distributed as bonuses to workers, that is the idea of profit sharing. We will examine the same hypothesis for Korea.

Second, overtime wages are examined as an alternative flexible part of workers' compensation. Some remain skeptical about the flexibility of bonuses with respect to economic conditions, despite the work by Freeman and Weitzman, in which overtime payments are not separated from base wage payments. A major portion of bonuses are negotiated in annual labor negotiation [Shunto]. Thus, a source of flexible wages responding to

economic conditions is not bonuses but flexible overtime hours and payments. The overtime pay may automatically adjust workers' compensation depending on firms' profitability.

Third, a comparative study of Korea and Japan may be cast in a much larger framework of search for an East Asian model for economic growth. In the 1960s and 1970s, the Japanese miracle of rapid economic growth prompted a scrutiny on the Japanese economy, emphasizing its difference from a western, neoclassical model.[1] Recently, a miracle of rapid economic growth has been repeated by other Asian neighbors, such as Korea and Taiwan. A search for common ingredients, such as bonuses, for rapid economic growth leads to a comparative study of Japan and Korea.[2]

Recently, a comparison of the Korean and Japanese labor market have become popular; Ono (1989) compares the aspect of seniority wage and Ahn (1982) examines the aspect of lifetime employment. Ono (1989) finds that "age" is a better explanatory variable than the length of experiences, internal and external to the current employer, both in Japan and Korea. Ono's analysis using microdata of the both countries is a valuable contribution. He tries to measure major determinants of wages by regressing the wage on schooling, internal and external experiences, age, size-of-employer dummy variables. The finding supports the idea of a seniority wage structure in both countries. Ono gives an interpretation, beyond just a confirmation of "seniority structure." He concludes that the wage is determined for "life security needs" (subsistence) of the household, that varies with age. However, finding a high $\bar{R}^2$ for a model including age does not necessarily discriminate the subsistence wage hypothesis from other explanations.[3]

There is one seminal work toward a test of the profit sharing hypothesis in Korea. Joon W. Kim (1988) attempted to apply the Freeman and Weitzman model to the Korean data. He concludes from his studies with manufacturing sectoral data that bonuses are more responsive to profits (and other economic performance variables) than wages. We have improved over Kim's results. First, his data set unfortunately had missing observations in 1973 and 1982, which we have filled. Second, we have applied various tests related to the hypothesis other than the one attempted by Kim. Third, we explicitly test both in Japan and Korea that the flexibility of bonuses relative to overtime pay which is known to play a role of slack adjustment.

The rest of this paper is organized as follows. Next section will be an overview of the Korean labor market. In Section 3, econometric tests developed by Freeman and Weitzman will be applied to the comparable Korean data. Section 4 will examine the flexibility of overtime compensations, as opposed to bonuses, using both Korean and Japanese data. The last section will summarize the findings of this paper.

2. Korean Labor Market: An Overview

(i) Mobility.

The workers' mobility in Korea is currently much higher than that of Japan. However, the average length of the service, the quit rate (by age and by size of the firm) and other indicators in the present Korea are quite comparable to the situation in Japan of the 1920s and 1930s, when lifetime employment system started to become popular among skilled workers in the booming industries, according to Ahn (1982). For example, the five-year average separation rate in Korea between 1975 and 1979 was 5.2%, while that in Japan between 1924 and 1928 was 4.7%. From this evidence and others, Ahn

suggests that Korea may be ready to adopt a lifetime employment system. High mobility of Korean workers is also documented by Soonkon Kim (1983). During the 1970s, the separation rate in Korea was on average at 5%, while it was 1.5% in Japan and a little over 4% in the United States (Kim (1983; p.3)). In 1979, 68.4 percent of workers had a tenure less than 10 years; 31.4 percent between 10 and 20 years; and only 0.2 percent had a tenure more than 20 years (Kim (1983; p.6)). Kim (1983; p.13) concludes that "Korean employers have not yet developed seniority-related welfare benefit programs designed to prevent high turnover."

(ii) Bonuses

Next, let us establish how prevalent bonuses are in Korea. The significance of bonuses in total compensations can be measured in the bonus/(monthly wage) ratio. Figure 1 shows the time-series of the amount of bonuses (for a year) in equivalent of (monthly) wages.[4] It shows that the bonus-wage ratio in Korea has increased rapidly and it is about the same level with that of Japan in late 1950s. The Japanese experiences show that the bonus-wage ratio had increased during its "rapid growth period," but has declined since the first oil crisis of 1973-74. The casual reading of trends shown in this graph suggests that the bonus-wage ratio increases while the economy enjoys rapid, and probably more than expected, growth. However, how bonus responds to temporal economic fluctuations around the trend should be examined carefully.

Table 1 shows the sectoral decomposition of the bonus/wage ratio in Korea. It is clearly observed that bonus ratios of different sectors move together, presumably in a procyclical fashion. However, the range of sectoral numbers is quite wide.

Insert **Figure 1** about here

Next, in order to establish that not only top managers but also blue-collar workers have received bonuses, we have to look at how many of the workers receive them. In 1977, more than 90 percent of all workers in manufacturing sectors received some types of bonuses. Moreover, 70.5% of production workers and 72.3 percent of office workers received bonuses at scheduled months, while about 7 percent received occasional bunuses and about 13 percent receive both scheduled and occasional bonuses. (See Ahn (1982; section 9.4) This implies that bonus payment is a wide-spread institution.

(iii) Reasons for bonuses -- a survey

Next, let us examine whether there is an established view on why bonuses are paid in Korea. In a survey of reasons for giving bonuses, cited in Ahn (1982; p.250), a supplement to workers' life (needs in living condition) is a majority.[5] Profit sharing is not at all (except for 6.3% for the medium-size firms) recognized as a reason for bonuses. A decision for giving bonuses is mainly made unilaterally by the employer (62%), while some of them (26%) are negotiated at the time of annual labor negotiations (Ahn (1982; p.251).

If these results are taken at the face value, bonuses are a result of unilateral benevolence by employers in order to give a supplemental income to workers who suffer from poor living conditions. In particular, "profit sharing" is not at all credited in the literature as a reason of handing out bonuses. This description seems to be far from a profit sharing hypothesis envisioned by Weitzman.

However, a bonues-as-benevolence hypothesis, indicated by the above-mentioned survey (and also Ono (1979)), may contradict with other facts in the survey. Regularly-paid bonuses must be expected by employees. If

workers expect bonuses to be paid four times a year, it would be hard to unilaterally skip one, unless employees receive a good explanation, such as an operating deficit or a negative profit. Moreover, paternalistic employers may afford benevolence only when they earn more than enough. In sum, findings in survey results may provide no definite answer with respect to the nature of bonuses. Only a careful empirical analysis answering a following question can give a more informed reasoning. Are bonuses (or the bonus/wage ratio) sensitive to corporate profits, even if it may not consciously recognized by employers?

(iv) Historical Origin.

About the historical origin of bonuses in Korea, there are only speculations. While some sustpect that the Japanese firms brought the practice of bonuses during the occupation era (1910-1945), some think that bonuses are a traditional idea in Korea: "If [bonuses] were a result of the Japanese influence, it would be difficult to explain how quickly the [bonus] system spread after the independence." (Ahn (1982, p. 247)) Moreover, bonuses are paid twice a year in Japan and four times a year in Korea; and it was only after the Second World War that the Japanese firms (in Japan) broadened bonus payments to blue-collar workers, and sharply increased the wage-bonus ratio as the economy enjoyed the sustained high-speed growth as shown in Figure 1. Therefore, we tend to think that the Korean bonus system has developed independently from the Japanese influence. We could not find, at present, any other writings, as to how wide spread bonuses were among Korean firms prior to the Japanese occupation.

3. **Analysis of Bonuses in Korea**

(i) Definitions

First of all, some terminologies are defined. First, annual payments (total compensations) are divided into two parts, bonuses and monthly wages. "Monthly wages" are defined as contractual payments that are regularly paid every month [that is, "Kimatte Shikyu Sareru Kyuyo" in Japanese] used in Freeman and Weitzman. Note that this definition includes overtime pay. "Bonuses" are special payments that are not included in monthly wages.[6] Second, monthly wages can be divided into "wage base," [Shotei nai] and "overtime pay" [Shotei gai]. An overtime premium in Korea and Japan is about 25%, as opposed to 50% in the United States. Definitions and data concerning bonuses, wages and employment in Korea and in Japan are quite comparable. In the rest of this section, "wages" means "monthly wages," including "overtime pay."

(ii) Economic Fluctuations and Bonuses

Weitzman (1986) and Freeman and Weitzman (1987) found that in Japan bonuses respond to profits more than wages, suggesting that bonuses play a mechanism of profit sharing. We now take the profit-sharing hypothesis as a working hypothesis for Korea. First, a specification by Freeman and Weitzman is used, so that coefficients of our Korean equation are directly comparable to those of the Japanese equation by Freeman and Weitzman.

$$\text{Ln}(B(t)/W(t)) = a_0 + a_1 t + b*x(t) + c*\text{LnB}(t-1) + d*\text{LnW}(t-1) + e(t)$$

where x(t) is an economic condition, that is, one of the following: Corporate operating profits (PROF), Corporate value added (VA), Gross domestic products (GDP), or Corporate net sales (NS). A constant and a time trend is also included in the regression. A positively significant b implies that the bonus/wage ratio increases when the economic condition

improves. Put differently, bonus is a contingent pay so that it is more responsive to economic conditions than the wage. All variables are deflated by relevant components of Wholesale Price Index.

Table 3-1 shows how the bonus-wage ratio responds to various economic conditions. (Coefficients of a constant, a time trend and lagged bonus and wage variables are not reported in this table.) Although magnitudes of the bonus/wage elasticities with respect to various economic conditions in Korea are quite comparable to the Japanese counterparts, but they are not always statistically significant at the 5% level. For all industries, no economic condition has a significant coefficient. For the manufacturing sector, the result is more favorable to the hypothesis that bonus is not just a disguised wage. Both corporate value added and corporate net sales show positive estimates which are statistically significant. In particular, profits do not appear to have a statistically significant impact on the bonus/wage ratio. These evidences appear to cast some doubts on the profit-sharing hypothesis.

Among the 2-digit manufacturing industries (shown in panel C) textiles, apparells and leather show positive, significant coefficients for any economic conditions. VA and NS are often found significant in the investigation of the 2-digit manufacturing sectors.

Insert Table 3-1 about here

In sum, the evidence for the profit-sharing hypothesis from investigating the bonus/wage ratio appears to be weaker in Korea than in Japan. In particular, corporate operating profits do not influence the bonus/wage ratio in any aggregation level. However, corporate value added,

and net sales in manufacturing secor, has a significant influence on the bonus/wage ratio.

The next test, that is also adopted from Freeman and Weitzman is to estimate the bonus and wage equations separately. In each equation, an economic condition variable and the lagged dependent variable are included. In Table 3-2, estimated coefficients of economic conditions are shown. (Again, coefficients of a constant term, a time trend and the lagged dependent variable are not reported in the table.)

Insert Table 3-2 about here

Two observations from Table 3-2 are obvious. First, when responses of bonuses and ages are compared within Korea, bonuses respond to economic conditions more than wages, as Freeman and Weitzman found in Japan. Second, when an international comparison can be conducted, both bonuses and wages in Korea are found more sensitive to economic conditions than their counterparts in Japan.

The first observation is not inconsistent with findings in Table 3-1, in which the bonus/wage ratio was found not particularly sensitive to economic conditions in Korea. What is implied by both findings is that the difference in elasticities of bonuses and wages with respect to economic conditions is not statistically significant. This is most evident in the case of profits. The bonus elasticity to profits is very large in Korea: 0.54 for all industries (0.09 in Japan) and 0.73 for manufacturing sectors (0.14 in Japan). This is a strong evidence for a profit sharing hypothesis in Korea. However, the wage also responds to profits in Korea: 0.27 for all industries (-0.05 in Japan) and 0.56 for manufacturing industries (-0.05 in Japan). These evidences for a profit sharing hypothesis are not incon-

sistent with weak evidences in Table 3-1, which use the bonus/wage ratio as the left-hand side variable, because both a numerator and a denominator the bonus/wage ratio changed strongly with economic conditions, leaving the ratio rather unstable.

Table 3-2 (panel C) shows a summary result concerning all 2-digit manufacturing industries and with respect to all candidates of economic conditions, the bonus elasticities are greater than the wage elasticities. However, elasticities with respect to value added and net sales are greater than those with respect to profits.

In sum, both bonuses and wages respond positively to favorable economic conditions in Korea, and those elasticities in Korea are larger than their counterparts in Japan. Is there any good explanation for these findings from institutional arrangements in Korea? As explained, there are some evidences that the lifetime employment system is not (yet) instituted in the Korean labor market. Hence, the market is more or less a "spot" market rather than a long-term contract market in Korea.[7] Higher profits or sales increase labor demand, which in turn increases bonuses and wages. Then, it is natural that wages, as well as bonuses, respond to economic conditions through changes in labor demand.

The third test of bonus behavior is to examine bonuses as a function of wages and economic conditions. Since bonuses are determined months after wage negotiations, wages may be regarded as "predetermined" when a bonus month comes. If bonuses are simply a disguised wage, coefficients of economic conditions are not significant in a regression of bonuses with wages on the right-hand side. On the other hand, if bonuses are determined solely by profit sharing, then the wage coefficient would be insignificant.

Hence, the following equations are estimated:

$$Ln(B(t)) = a_0 + a_1 t + b*x(t) + c*LnB(t-1) + d*LnW(t) + e(t)$$

where b = 0, if bonuses are disguised (fixed markup of) wages; and d = 0 if bonuses are solely "sharing." Table 3-3 shows the regression results.

Insert **Table 3-3** about here

The estimation for the manufacturing sector with value added produced reasonable estimates for the profit-sharing hypothesis: $b \neq 0$ and insignificant d. That equation also implies that the base line for (log) bonus in year t is determined by 47 percent of bonus in year t-1 and 66 percent of wage in year t. If value added increased by 10 percent, then bonuses increase by 2 percent above the base line.

Using profits, neither b nor d is significant, not implying one hypothesis or the other. Estimates involving other economic variables show that the negative coefficients on wage, though insignificant, contradicting with expected signs.

Results among 2-digit manufacturing sectors are mixed. For example, estimates for the paper and printing sector support the wage-markup (disguised wage) hypothesis; while a result for the fabricated metal and products sector suggests the profit sharing hypothesis.

(iii) Bonuses and Employment

Although results in the preceding subsection are suggestive of a scenario in which bonuses responding to economic conditions, and much more so than Japan, some suspicions still remain as to whether bonuses determined in a market (like wages), or a part of profit-sharing. One way to further differentiate these two hypotheses is to estimate an employment equation (a

reduced form of the labor demand and supply functions), and see whether bonuses and wages have different coefficients on employment.

In order to differentiate the effect of bonuses and wages on employment behavior, EMP, the following two specifications have been adopted:

$$Ln(EMP(t)) = a + b_{b1}*Ln(W+B) + b_2LnB(t) + b_{b4}x(t) + b_{b5}EMP(t-1) + e_bx(t)$$

$$Ln(EMP(t)) = a + b_{w1}*Ln(W+B) + b_3LnW(t) + b_{w4}x(t) + b_{w5}EMP(t-1) + e_wx(t)$$

If bonuses are just disguised wage, then coefficients of b_2 and b_3 should be insignificant. We hasten to add that these equations, at the present specifications, suffer from the possible simultaneity bias, which should be corrected.

Results are shown in Table 3-4 (which should be compared with Freeman-Weitzman Table V). As in the case of Japan, coefficients of bonuses have positive signs and those of wages have negative signs, a surprisingly consistent result. However, standard errors seem to be larger in the Korean case. In sum, a hypothesis of bonus being a profit-sharing instrument receives a mild support, if not a strong one, from a correct sign pattern in the employment equation, with somewhat weaker significance levels, in Korea.

Insert Table 3-4 about here

In order to check the simultaneity noted above, a simple vector autoregression model with employment, wages, and bonuses is examined. An economic condition, i.e., PROF, VA, GDP, or NS, is used as an exogenous variable. Only one lag is allowed due to the degree of freedom problem. (Results are not reported in this version of the paper.) There is no reason to reject interdependence between the three variables. However, there is a

weakly, at about the ten to twenty percent significance level in all industries, from bonuses to employment. (A similar conclusion was obtained by Freeman and Weitzman for Japan.) Hence, there is no statistical support for running regressions among the three variables, and results in Table 3-4 should be taken with this caveat.

4. **Overtime Payments in Korea**

In the preceding section, we have established that bonuses are contingent on economic fluctuations in Korea. Elasticities of bonuses with respect to economic conditions in Korea are even greater than in Japan. However, it is also found that monthly wages strongly respond to economic fluctuations in Korea in contrast to Japan. One might suspect that much of the monthly wage fluctuations comes from overtime payments, which, as explained in subsection 3.(i), is part of "monthly wage." In this section, the behavior of overtime payments are separated from the monthly wage and examined carefully.

When there is a demand shock, the first thing that the firm would do is to ask employees to work overtime. Since a boom may be temporary, employment may not be adjusted when the hiring and firing costs are large. In addition, bonuses could be paid if profits exceeded its anticipation. Only when an increase in the product demand sustains, the employment level will be adjusted.

An adjustment in overtime pay almost automatically follows an adjustment in hours, while bonuses carry a discretionary portion of the compensation adjustment. There is no a priori reason to believe that whether bonuses become more sensitive to economic conditions than overtime payments. However, if bonuses as a profit sharing mechanism are to be emphasized, it should be established that bonuses are more flexible than overtime payments.

Otherwise, the pay flexibilities may be regarded as a reflection of hours adjustment.

First, the behavior of the (overtime)/(base wage) ratio, depending on various economic conditions, is examined. Table 4-1 for the overtime ratio parallels Table 3-1 for bonuses. In order to compare the overtime and bonus sensitivities, the (bonus)/(base wage) and the (overtime)/(base wage) terms, using the same denominator, are regressed on the same independent variables.

Insert Table 4-1 about here

The table shows that the sensitivities of overtime pay with respect to economic conditions are, most of the time, smaller than that of bonuses. Although coefficients on economic conditions are insignificant for the all-industries level, they are significant at the manufacturing level. Among the 2-digit manufacturing industries, results using overtime are in general not much different from those using bonuses. This shows that overtime pays in manufacturing sectors behave procyclically with economic conditions.

Next we examine how the change in an economic condition affects various components of compensations. Table 4-2, which is in parallel with Table 3-2, compares changes in each of bonuses, overtime payments, and the base wage responding to profits, value added, GDP or net sales.

Insert Table 4-2 about here

In Korea, for both the all-industries and aggregate-manufacturing levels, all types of compensations have large and statistically significant coefficients on most of the economic conditions. The sensitivity of bonus is much greater than that of overtime, and the overtime sensitivity in turn

is greater than the base wage sensitivity. Even for 2-digit manufacturing sectors, the order of magnitudes in sensitivities is mostly confirmed. That is, denoting by e(x) the elasticity of x with respect to an economic condition, the following is true in Korea:

e(bonus) > e(overtime) > e(wage base).

However, this nice relationship is not confirmed in Japan. Sometimes the bonus sensitivity is much smaller than the overtime sensitivities, although it is typically larger than the base wage sensitivity.

From these findings, we may conclude that bonuses are more responsive to economic fluctuations than overtime pay, at least in Korea. Hence, a suspicion that overtime pay is more flexible than bonuses is now refuted by the data in Japan. The conclusion would be much weaker in Japan.

Table 4-3 examines an alternative specification for overtime pay, in parallel with Table 3-3 for bonuses. In this specification, economic conditions have significant coefficients less often than Table 4-2 at the all-industries and the aggregate manufacturing sector. In general, this specification does not give us much insights on the determinant of overtime pays, except that in manufacturing sector, overtime pay does respond to an economic conditions.

Insert **Table 4-3** about here

Table 4-4, in parallel with Table 3-4, examines whether the overtime pay and the wage base have different impacts on employment. No significant coefficient was obtained for overtime pay or the wage base at the all-industries level. This is the same pattern of signs that was found in Table 3-4 contrasting bonuses and monthly wages. Hence, we may apply an interpretation similar to one given to Table 3-4. Overtime payments have a

role quite different from wage base. Overtime payments are clearly procyclical (to employment), while the wage base is negatively correlated with employment. This is quite consistent with any prediction from labor demand theory with temporal fluctuations. Typically, overtime payments behave much like bonuses in increasing employment.

Insert Table 4-4 about here

In sum, an investigation into overtime payments reveals that bonuses and overtime payments play similar roles. Both respond to economic conditions, with the elasticity of bonuses being greater than that of overtime payments. Both have an effect to increase an employment level, with the marginal contribution of overtime pay being greater than bonuses. However, a further work is needed on roles of bonuses and overtime payments in adjustments in hours, compensations, and employment.

5. Further Investigations

(i) Labor Market Conditions

One of the often-heard criticism of the profit-sharing hypothesis, in particular when the hypothesis is empirically applied, is that the hypothesis ignores labor market conditions, which are usually considered to be central in the wage determination. In the case of wage negotiation, an influence of the unemployment rate, for example, is important, because it signals the excess supply condition and changes relative strength in negotiation. However, an answer to the following criticism is not obvious: Would the amount of bonuses differ if the unemployment rate is different given the level of net profits? In this sub-section, effects of the unemployment rate on the bonuses and overtime will be examined. To this

end, the following specification is used:

$\ln(y(t)) = a_0 + a_1 t + b\ln(x(t)) + c\ln(y(t-1)) + d(UE(t))$

where y = (B, OT, WB) and x is one of the economic condition variables used in the preceding section, namely (PROF, VA, GDP, NS). Results are summarized in Table 5-1.

Insert Table 5-1 about here

There are two observations on this table. First, even if the unemployment rate is added to the equation, one of the salient features of the elasticities with respect to economic conditions still holds, namely, e(B)>e(OT)>e(WB). Therefore, it seems that adding the unemployment rate does not change results obtained in the preceding section.

Second, although the unemployment rate negatively influences bonuses, overtime pay, and wage bases, as theory would expect, it is most significant for the wage base equation. Certainly, the unemployment rate is important in wage (rate) negotiations, but may not be so in the bonus determination.

This finding is a further evidence against a bonus-as-disguised-wage hypothesis, in that bonuses and base wages are two different things in how each responds to an economic condition and a labor market condition.

(ii) Pooled Regression

Since we have used annual data, as Freeman and Weitzman did, the number of observations is not so large in Korea. One trick to overcome the problem of small samples is to use both time-series and cross-section data. Table 5-2 (A) shows a result of a pooled regression with sectoral and year dummy variables. Its panel (A-1) shows a familiar result, that the elasticity of bonus with respect to an economic condition is greater than that of the monthly wages. Therefore, we may conclude that this result is a robust one.

Insert Table 5-2 about here

A null hypothesis that sectoral dummy variables are collectively zero is tested in Table 5-2, panel (A-2). The hypothesis is not rejected in the wage equation and rejected in the bonus equation, for each of the three types of economic conditions: Bonuses are very sector-specific, while the wage is non-sector specific. In other words, the wage is determined in an entire economy, due to high cross-sector mobilities.

A different specification is attempted in Table 5-2 (B), where a trend term is used instead of year dummy variables, while sector-specific elasticities are introduced. In this specification, the null hypothesis of common intercepts and common elasticities is tested. The hypothesis is rejected, implying that the ways bonuses and wages respond to an economic condition are quite different from one sector to another.

6. Concluding Remarks

This paper examined the bonus system of Korea in contrast to that of Japan. The bonus-wage ratio in Korea has been increasing rapidly and, currently, the ratio is about the same as that of Japan in late 1950s.

In Korea, not only bonuses but also monthly wages move procyclically with economic conditions, so that the bonus-wage ratio does not necessarily appear to be sensitive to economic conditions. This contrasts to the movements of the Japanese bonus/wage ratio and the monthly wage.

One might suspect that the flexible wage in Korea is due to overtime payments that are included in "monthly wages." When the overtime pay and the wage base are separated, it is revealed that not only overtime but also wage base fluctuate with economic conditions. In Korea, the elasticities

with respect to economic conditions are ordered as the bonus elasticity being the greatest, the overtime next, and the wage base the smallest. This tendency is not so clear-cut in Japan.

Both bonuses and overtime payments have a positive effect on the employment level in Korea. However, a futher investigation is needed to uncover a mechanism of hours, employment, and payment adjustments in response to economic fluctuations in Korea and in Japan.

When the unemployment rate is added to a list of independent variable, the wage base is found to be most sensitive to this labor market indicator. Bonuses and overtime pay tend to be influenced more by economic conditions, such as net sales and profits, more than the unemployment rate.

Lastly, pooled regressions were conducted to check whether we might have been misled using small-sample regressions. The bonus elasticity was found to be greater than the wage elasticity, a familiar result, even in the pooled regressions. Sectoral dummy variables are found to be not common for all sectors.

Although we investigated the Korean bonus system in various manners, more questions came up as soon as we solved one question. The following topics are left for future research. Is there any tendency that mobility of workers has declined due to a development of the bonus system in Korea? How does the firm adjust overtime, bonuses, and employment? Does the bonus/wage ratio in Korea change systematically and significantly with respect to the length of service and with the size of establishments, as in Japan? If so, does the sectoral disparity in the size of the bonus/wage ratio and in the bonus elasticities reflect any institutional, demographic differences amond the sectors? In any case, we hope that this paper stimulates more research on the Korean labor market with comparative perspectives.

Footnotes

1. Widespread bonuses, including those to blue-collar workers, have been identified as one of the distinctive features of the Japanese labor market. Other prominent features include lifetime employment and seniority wages and promotions. These Japanese features have been examined for example by Hashimoto (1979) and Hashimoto and Raisian (1985). In these papers, workers in Japan are found to stay in the same firm longer than those in the U.S., and wages in Japan depend on age as well as the length of service in the same firm. Moreover, the earning-age profile in Japan is shown to be steeper than that in the United States.

2. Susan Collins (1988) compared the investment-saving balances of Japan and Korea, since both countries achieved a rapid economic growth supported by high investment. She found that Japan slowed investment when the balance of payments worsened, avoiding borrowing from abroad, while Korea borrowed from abroad when the domestic saving dropped below an investment target.

3. However, a question arises with this interpretation. If subsistency is the reason, why is there a significant differential between large and small firms? Why does the aggregate wage payment increase over time? I think that the finding does not contradict with other possible explanations, for example a long-term contracting model.

4. The share of bonuses in an annual compensation can be easily calculated by (share in annual compensation) = (bonus ratio)/(12+bonus ratio)

5. 73.6 % on overall average; 68% for small (200-499 employee) firms, 75% for medium-size (500-999) firms, and 83.3% for large (1000+) firms.

6. To be exact, special payments include not only bonuses but also other special payments. However, the portion of "other payments" is very small, so that we regard special payments as bonuses.

7. It has been established that wages in Japan are much more flexible than wages in the United States; and employment in Japan is much more stable than that in the United States. These findings are explained in that Japan needs wage flexibility in order to keep lifetime employment. If this logic can be extended to Korea, then the Korean wage flexibility that is higher than the Japanese flexibility should imply the super stability of employment in Korea. As will be shown in below, employment in Korea is not more stable than in Japan. However, workers in Japan and the United States tend to stay a long time in the same firm, while workers in Korea seem to change jobs much more often. In the spot market both wages and employment respond to economic conditions.

Data Appendix

Definitions

Compensation for workers are classified as follows.

Yearly compensation = Bonus + 12*(Monthly Wage)

Monthly Wage = Wage Base + Overtime Pay

"Monthly Wage" corresponds to "Kimatte Shikyu Sareru Kyuyo" in Japan. This is the variable used as "wage" by Freeman and Weitzman.

Sources of the Korean Data

Variable	Definition and Source
Bonus	Special cash payments not included in any regular wage contract. Annual won paid, regularly and/or irregularly, to the regular workers in firms with 10 or more regular workers. Annual payments over calendar year, except from 1973-75 when it measures the sum given out from May 1 (of previous year) to April 30, and 1976-77 when it measures the sum given out from April 1 (of previous year) to March 31. Source, Korean Ministry of Labor, "Report on Occupational Wage Survey."
Wage Base	Cash earnings including base payment and other allowances, but excluding special payments or overtime payments. These payments are paid to the regular workers in firms with 10 or more regular workers per month as predetermined by labor contract, labor union contract or the firms' pay rule. It measures the payment in March of the year, except from 1971 to 1975 during which it represents monthly wage given out during April of the year. Source: Korean Ministry of Labor "Report on Occupational Wage Survey."
Overtime Wage	Same as Wage Base.
Employment	Total number of regular workers employed indefinitely or under contract for a period longer than one month, in establishments with at least 10 regular workers. Data for March 1 of the year, except from 1971 to 1975 during which the data represent the number of regular workers on April 1 of the year. Source: Korean Ministry of Labor, "Report on Occupational Wage Survey."

Profit Total corporate operating profits for firms with 5 or more regular workers for each calendar year. Source: The Bank of Korea "Analysis of Financial Statements."

Net Sales Total corporate net sales for firms with 5 or more regular workers for each calendar year.

Value Added Total corporate value added for firms with 5 or more regular workers for each calendar year. Source: The Bank of Korea, "Analysis of Financial Statements."

Gross Domestic Products. Gross output by industrial origin at market prices over the calendar year. Source: The Bank of Korea, "Analysis of Financial Statements."

Wholesale Price Index. Calendar year average of the wholesale price index by groups of commodities. 1985=100. Indices for "Mining," "Manufacturing 1 and 2 digits" and "Industrial power, Water" indices were used to derive the real variables in those inductries. However, the indices for other industries are not available. Therefore, the average wholesale price index was used for those industries. Agriculture is excluded in the whole analysis. Source: The Bank of Korea, "Analysis of Financial Statements."

Sources of the Japanese Data

Bonuses	Freeman and Weitzman (1987)
monthly wages	Freeman and Weitzman (1987)

Overtime pay series was constructed from Labor Statistics Monthly, Department of Labor, Japanese Government.

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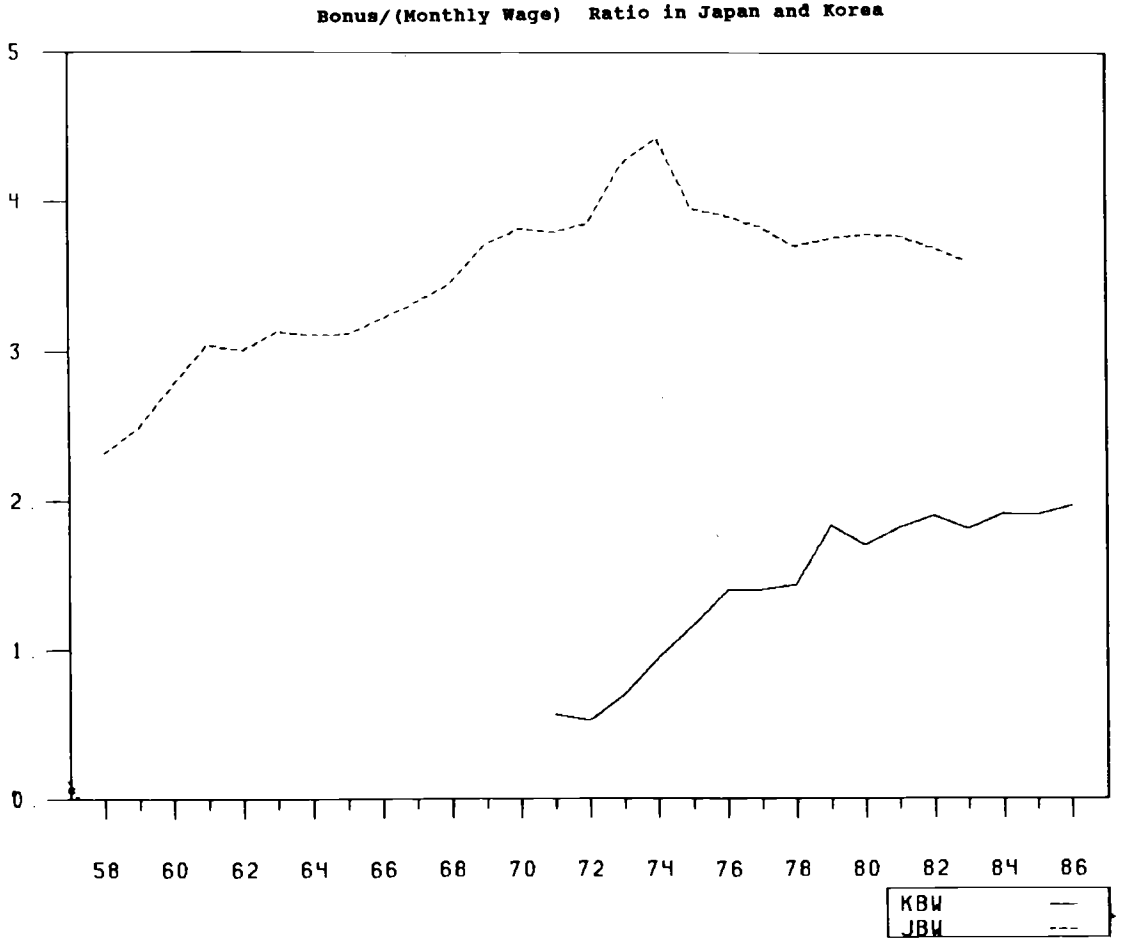
Bonus/(Monthly Wage) Ratio in Japan and Korea
5
4
3
2
1
0
58
60
62
64
66
68
70
72
74
76
78
80
82
84
86
KBW
JBW

Table 2-1: Bonus/Wage Ratio in Korean Manufacturing Sectors

Year	31	32	33	34	35	36	37	38	39
1971	0.77	0.42	0.35	0.72	1.28	0.66	0.62	0.36	0.44
1972	0.40	0.35	0.25	1.02	0.89	0.62	0.60	0.44	0.76
1973	0.59	0.63	0.34	0.72	0.94	0.69	0.97	0.34	0.10
1974	1.02	0.55	0.52	0.70	1.07	2.02	1.23	0.52	0.39
1975	1.14	0.78	0.64	1.29	1.56	1.31	1.40	1.00	0.45
1976	1.72	1.18	0.81	1.31	1.67	1.46	1.38	1.32	0.39
1977	1.35	0.97	0.91	1.56	1.67	1.45	1.37	1.43	0.69
1978	1.64	0.99	1.15	1.64	1.63	1.57	1.50	1.50	0.83
1979	2.20	1.33	1.44	2.13	2.13	1.48	1.96	1.71	1.16
1980	2.00	1.18	1.05	1.88	2.21	1.74	1.76	1.71	0.92
1981	2.13	1.26	0.98	1.54	2.09	1.79	1.82	1.67	1.10
1982	2.30	1.34	1.14	1.83	2.24	1.75	1.99	1.92	1.24
1983	2.38	1.20	0.77	1.98	1.97	2.02	1.71	1.72	0.94
1984	2.30	1.12	0.81	1.97	2.26	2.00	2.05	1.86	1.06
1985	2.23	1.15	0.77	2.05	2.14	2.20	2.32	1.91	1.10
1986	2.21	1.22	1.13	2.00	2.14	2.26	2.47	1.98	1.14

Manufacturing sector codes:

31	FB	Food and Beverages
32	TL	Textiles, Apparels, and Leather
33	WF	Wood and Furniture
34	PP	Paper, Printing and Publishing
35	CP	Chemicals, Petroleum, Coal, Rubber and Plastics
36	NM	Non-Metallic Mineral Products
37	BM	Basic Metal
38	FM	Fabricated Metal Products, Machinery, and Equipment
39	OM	Other manufacturing

Table 3-1, Korea-Japan Comparison of Elasticities

$$\ln(B(t)/W(t)) = a_0 + a_1 t + b*x(t) + c*\ln B(t-1) + d*\ln W(t-1) + e(t)$$

where x(t) is an economic condition.

Estimates and Standard Errors of b

A. All industries

Economic condition	Korea	Japan
Corporate operating profit (PROF)	0.05 (0.20)	0.15 (0.02)**
Corporate value added (VA)	0.21 (0.11)	0.29 (0.06)**
Gross (or Net) domestic product (GDP)	0.12 (0.28)	0.20 (0.11)
Corporate net sales (NS)	0.14 (0.24)	na
B. Manufacturing sectors		
PROF	0.21 (0.35)	0.18 (0.03)**
VA	0.18 (0.05)**	0.37 (0.07)**
GDP (or NDP for Japan)	0.50 (0.34)	0.19 (0.12)
NS	0.71 (0.32)*	na

Notes: ** significance at the 1% level.
* significance at the 5% level.

C. Number of Cases among 2-digit Industry, Korea

economic condition	Significance of b: 1%	1 - 5%	not at 5%
PROF	0	1(TL)	8
VA	1(TL)	1(BM)	7
NS	2(TL,FB)	0	0

Korea: See Appendix. Samples, 1971-1986. Japan: Freeman-Weitzman (Table 1, p.174) estimated in the same specification, except (i) NDP instead of GDP is used; (ii) samples are 1960-83.

Table 3-2: Responses of Bonuses and Wages to Economic Conditions

$Ln(y(t)) = a_0 + a_1 + b*x(t) + c*LnB(t-1) + e(t)$
where x(t) is an economic condition, y(t) is either B(t) or W(t)
B(t) is Bonus payments; and W(t) is Monthly Wage.

Estimates and (Standard Errors) of b.

		Korea		Japan	
A. All industries,					
LHS	econ. condition	Bonus	Wage	Bonus	Wage
B	Corporate profit (PR)	0.54 (0.28)*		0.09 (0.05)	
W	Corporate profit (PR)		0.27 (0.10)*		-0.05 (0.07)
B	Value added (VA)	0.51 (0.11)**		0.28 (0.10)*	
W	Value added (VA)		0.15 (0.07)		0.12 (0.12)
B	GDP (NDP for J)	0.67 (0.42)		0.44 (0.14)**	
W	GDP (NDP for J)		0.55 (0.13)**		0.34 (0.13)**
B	Net Sales (NS)	0.81 (0.30)*		na	
W	Net Sales (NS)		0.21 (0.11)**		na
B. Manufacturing sectors					
B	Corporate profit (PR)	0.73 (0.38)		0.14 (0.04)**	
W	Corporate profit (PR)		0.56 (0.13)**		-0.05 (0.05)
B	Value added (VA)	0.22 (0.05)**		0.37 (0.08)**	
W	Value added (VA)		0.04 (0.04)		0.05 (0.11)
B	GDP (NDP for J)	1.17 (0.30)**		0.38 (0.11)**	
W	GDP (NDP for J)		0.54 (0.13)**		0.05 (0.11)
B	Net Sales (NS)	1.33 (0.24)**		na	
W	Net Sales (NS)		0.37 (0.14)*		na

. Number of Cases among 2-digit manufacturing sectors

y	x	1%	1-5%	not at 5% (significance)
B	PROF	1 (CP)	1 (TL)	7
W	PROF	1 (FM)	1 (CP)	7
B	VA	4	3	2
W	VA	6	0	3
B	NS	5	2	2
W	NS	5	0	4

Table 2-3, Bonus as a Disguised Wage?

$Ln(B(t)) = a_0 + a_1 t + b*x(t) + c*LnB(t-1) + d*LnW(t) + e(t)$
where x is Economic Condition.

Estimates and (Standard Errors) of b, c, d

A. all industries

economic condition	Korea b	Korea c	Korea d	Japan b	Japan c	Japan d
Corporate profit	0.59 (0.39)	0.31 (0.30)	-0.13 (0.70)	0.11 (0.03)**	0.43 (0.09)**	0.75 (0.11)**
Corporate value added	0.51 (0.12)**	0.27 (0.17)	0.02 (0.37)	0.26 (0.06)**	0.33 (0.09)**	0.66 (0.10)**
GDP	0.82 (0.72)	0.47 (0.27)	-0.23 (0.89)	n.a.		
Corporate net sales	0.93 (0.40)*	-0.04 (0.35)	-0.29 (0.59)	n.a.		

B. Manufacturing sectors

economic condition	Korea b	Korea c	Korea d	Japan b	Japan c	Japan d
Corporate profit	0.61 (0.65)	0.44 (0.25)	0.19 (0.84)	0.14 (0.03)**	0.52 (0.09)**	0.61 (0.13)**
Corporate value added	0.21 (0.05)**	0.47 (0.15)*	0.66 (0.32)	0.32 (0.06)**	0.40 (0.09)**	0.58 (0.12)**
GDP	1.58 (0.46)**	0.23 (0.19)	-0.65 (0.56)	n.a.		
Corporate net sales	1.41 (0.30)**	-0.02 (0.17)	-0.17 (0.37)	n.a.		

C. Number of cases among 2-digit manufacturing sectors, Korea

	1%	1-5%	not at 5%	1%	1-5%	not at 5%
PROF	1(PP)	1(FM)	7	1(PP)	2	6
VA	1(FM)	4	4	1(PP)	0	8
NS	2	2	5	0	3	6

Notes: see Table 2-1.

Table 3-4: **Labor Demand Equation**

$$Ln(EMP(t)) = a_0 + a_1 t + b_1 * Ln(W+B) + b_2 LnB(t) + b_4 x(t) + b_5 ln(EMP(t-1)) + e_e x(t)$$

$$Ln(EMP(t)) = a_0 + a_1 t + b_1 * Ln(W+B) + b_3 LnW(t) + b_4 x(t) + b_5 ln(EMP(t-1)) + e_e x(t)$$

Estimates and significance values of b

KOREA					JAPAN				
W+B	B	W	x	b_4	W+B	B	W	x	b_4
A. All Industries									
0.43	0.33				-0.33	0.28			
(0.24)	(0.14)*				(0.10)**	(0.07)**			
0.20	0.29		PROF	0.25					
(0.29)	(0.14)			(0.18)					
0.39	0.23		VA	0.12					
(0.25)	(0.19)			(0.15)					
-0.31	0.27		GDP	0.82	-0.37	0.21		NDP	0.15
(0.28)	(0.10)*			(0.17)*	(0.06)**	(0.05)**			(0.03)**
0.23	0.22		NS	0.36					
(0.25)	(0.14)			(0.20)					
4.52		-3.85			0.83		-0.83		
(1.89)*		(1.84)			(0.23)**		(0.25)**		
3.56		-3.17	PROF	0.25					
(1.99)		(1.87)		(0.20)					
3.02		-2.51	VA	0.16					
(2.17)		(2.07)		(0.13)					
3.46		-3.64	GDP	0.89	0.49		-0.65	NDP	0.16
(0.95)**		(0.91)		(0.16)**	(0.15)**		(0.14)**		(0.03)**
2.52		-2.16	NS	0.38					
(2.08)		(1.95)		(0.22)					

B. Manufacturing

0.33	0.39				-0.20	0.18		
(0.21)	(0.15)				(0.20)	(0.16)		
0.10	0.41		PROF	0.24				
(0.33)	(0.15)*			(0.26)				
0.34	0.38		VA	0.005				
(0.22)	(0.18)			(0.004)				
-0.07	0.29		GDP	0.51	-0.39	0.14	NDP	0.32
(0.29)	(0.15)			(0.32)	(0.16)*	(0.13)		(0.09)**
0.10	0.16		NS	0.72				
(0.19)	(0.15)			(0.30)				
5.06		-4.46			0.39		-0.41	
(2.24)		(2.21)			(0.50)		(0.51)	
5.25		-4.84	PROF	0.22				
(2.31)*		(2.32)		(0.29)				
4.76		-4.14	VA	0.03				
(2.35)		(2.33)		(0.04)				
3.70		-3.61	GDP	0.64	0.14		-0.40	NDP 0.33
(2.01)		(1.93)		(0.29)	(0.38)		(0.39)	(0.09)
1.62		-1.45	NS	0.79				
(2.12)		(2.01)		(0.28)*				

Source: Korea, see Data appendix
Japan, Freeman-Weitzman (1987; p.183)

Table 4-1

$Ln(B(t)/WB(t)) = a_0+a_1t+b*x(t)+c*LnB(t-1)+d*LnWB(t-1)+e_2(t)$

$Ln(OT(t)/WB(t)) = a_0+a_1t+b*x(t)+c*LnOT(t-1)+d*LnWB(t-1)+e_1(t)$

Estimates and significance value of b, Korea and Japan

A. all industries

econ	Korea		Japan	
cond	ln(B(t)/WB(t)	ln(OT(t)/WB(t))	ln(B(t)/WB(t)	ln(OT(t)/WB(t))
PROF	0.11	0.09	0.15	0.29
	(0.23)	(0.11)	(0.04)*	(0.11)**
VA	0.27	0.11	0.17	0.11
	(0.12)	(0.06)	(0.08)*	(0.17)
GDP	0.19	0.18	0.03	-0.04
(NDP)	(0.33)	(0.19)	(0.09)	(0.16)
NS	0.23	0.12	na	na
	(0.28)	(0.10)		

B. Manufacturing sectors

PROF	0.27	0.37	0.19	0.45
	(0.36)	(0.18)	(0.03)**	(0.14)*
VA	0.19	0.10	0.25	0.30
	(0.05)**	(0.04)*	(0.06)**	(0.28)
GDP	0.56	0.62	0.04	-0.17
(NDP)	(0.35)	(0.16)**	(0.09)	(0.23)
NS	0.78	0.64	na	na
	(0.33)*	(0.17)**		

C. Number of Cases among 2-digit industris, Korea

	Bonus			Overtime		
	1%	1-5%	not at 5%	1%	1-5%	not at 5%
PROF	0	1(TL)	8	0	1(FM)	8
VA	1(TL)	1(FB)	7	1(FB)	3	5
NS	2(FB,TL)	0	7	1(FB)	2	6

Table 4-2: Sensitivities of Bonus, Overtime, and Wage Base

$Ln(y(t)) = a_0 + a_1 t + b*x(t) + c*Ln(y(t-1)) + e(t)$

where y = (B, OT, WB); x = one of (PROF, VA, GDP, NS).

Estimates and Standard Errors of **b**

A. all industries

econ. cond.	Korea Bonus	Korea Overtime	Korea Wage Base	Japan Bonus	Japan Overtime	Japan Wage Base
PROF	0.54	0.34	0.25	0.14	0.38	0.01
	(0.28)	(0.14)*	(0.09)*	(0.05)*	(0.11)**	(0.07)
VA	0.51	0.22	0.13	0.36	0.41	0.24
	(0.11)**	(0.09)*	(0.07)	(0.07)**	(0.12)**	(0.09)*
GDP	0.67	0.71	0.51	0.37	0.39	0.40
	(0.42)	(0.19)**	(0.13)**	(0.08)**	(0.12)**	(0.08)**
NS	0.81	0.31	0.19	na	na	na
	(0.31)*	(0.14)	(0.10)			

B. Manufacturing sectors

PROF	0.73	0.90	0.48	0.18	0.34	-0.00
	(0.38)	(0.21)**	(0.12)**	(0.03)**	(0.10)**	(0.05)
VA	0.22	0.11	0.02	0.37	0.28	0.16
	(0.05)**	(0.06)	(0.04)	(0.04)**	(0.13)*	(0.09)
GDP	1.17	1.14	0.45	0.29	0.17	0.27
	(0.30)**	(0.12)**	(0.13)**	(0.07)**	(0.13)	(0.06)
NS	1.33	0.89	0.30	na	na	na
	(0.24)*	(0.19)**	(0.14)			

C. Number of significant cases 5% among 2-digit manuf. sectors

cond.	Korea Bonus 1%	Bonus 1-5%	Bonus no	Overtime 1%	Overtime 1-5%	Overtime no	Wage Base 1%	Wage Base 1-5%	Wage Base no	e(B)>e(OT)>e(WB) yes	no
PROF	0	2	7	1	2	6	1	2	6	3	6
VA	5	0	4	6	0	3	6	0	3	6	3
NS	2	3	4	4	1	4	4	1	4	8	1

Table 4-3: **Alternative specification: Determinants of Overtime Pay**

$$Ln(OT(t)) = a + b*x(t) + c*LnOT(t-1) + d*LnWB(t) + e(t)$$

where x is Economic Condition.

Estimates and (Standard Errors) of b, d

A. All industries,

economic condition	Korea b	Korea d	Japan b	Japan d
Corporate profits	0.12 (0.13)	0.87 (0.29)*	0.31 (0.11)*	-0.01 (0.22)
Corporate value added	0.13 (0.07)	0.87 (0.22)**	0.40 (0.21)	-0.21 (0.21)
GDP	0.33 (0.25)	0.69 (0.33)	-0.42 (0.26)	0.36 (0.17)*
Corporate net sales	0.15 (0.11)	0.89 (0.25)**	na	na

B. Manufacturing sectors

condition	b	d	b	d
Corporate profits	0.72 (0.29)*	0.38 (0.43)	0.42 (0.12)**	0.04 (0.21)
Corporate value added	0.12 (0.03)**	1.15 (0.26)**	0.76 (0.26)**	0.11 (0.22)
GDP	1.00 (0.12)**	0.35 (0.17)	0.36 (0.30)	0.37 (0.23)
Corporate net sales	0.74 (0.13)**	0.78 (0.20)**	na	na

C. Number of cases among 2-digit sectors, Korea

	b			d		
significance:	1%	1-5%	no	1%	1-5%	no
PROF	0	0	9	4	2	3
VA	3	1	5	3	0	6
NS	1	2	6	3	0	6

Table 4-4: Labor Demand Equation, overtime wage

$$Ln(EMP(t))=a_0+a_1t+b_1*Ln(W(t)+OT(t))+b_2LnOT(t)+b_4x(t)+b_5EMP(t-1)+e(t)$$

Estimates and significance values of b

KOREA					JAPAN				
b_1	b_2	b_3	x	b_4	b_1	b_2	b_3	x	b_4
A. All Industries									
-0.06	0.55				-0.12	0.10			
(0.53)	(0.45)				(0.08)	(0.06)			
-0.45	0.58		PROF	0.39	-0.05	0.04		PROF	0.05
(0.50)	(0.39)			(0.19)	(0.09)	(0.10)			(0.05)
-0.21	0.16		VA	0.23	-0.15	-0.001		VA	0.21
(0.50)	(0.46)			(0.13)	(0.08)	(0.08)			(0.09)
-0.78	0.41		GDP	0.96	-0.25	-0.03		NDP	0.39
(0.35)	(0.27)			(0.22)**	(0.09)*	(0.07)			(0.13)**
-0.30	0.49		NS	0.52		na			
(0.41)	(0.34)			(0.18)*					
2.68		-2.20			0.91		-0.93		
(1.97)		(1.95)			(0.61)		(0.60)		
2.57		-2.45	PROF	0.40	0.41		-0.41	PROF	0.05
(1.71)		(1.70)		(0.19)*	(0.99)		(0.96)		(0.05)
0.87		-0.50	VA	0.24	-0.21		0.06	VA	0.21
(2.05)		(2.00)		(0.13)	(0.84)		(0.77)		(0.10)*
1.29		-1.67	GDP	0.97	-0.45		0.19	NDP	0.37
(1.22)		(1.17)		(0.22)	(0.68)		(0.61)		(0.12)**
2.31		-2.12	NS	0.53		na			
(1.50)		(1.48)		(0.18)					

Table 4-4: Labor Demand Equation, overtime wage

KOREA					JAPAN				
b_1	b_2	b_3	x	b_4	b_1	b_2	b_3	x	b_4
				B. Manufacturing					
-0.46	0.83				-0.09	0.10			
(0.30)	(0.23)**				(0.04)*	(0.02)**			
-0.39	0.84		PROF	-0.02	-0.05	0.01		PROF	0.06
(0.35)	(0.25)**			(0.24)	(0.05)	(0.04)			(0.02)*
-0.66	1.03		VA	-0.04	-0.15	-0.01		VA	0.19
(0.22)	(0.22)**			(0.04)	(0.05)**	(0.04)			(0.05)**
-0.40	0.82		GDP	0.02	-0.10	0.08		NDP	0.06
(0.31)	(0.43)			(0.50)	(0.06)	(0.04)			(0.10)
-0.24	0.43		NS	0.59		na			
(0.28)	(0.30)			(0.31)					
3.91		-3.51			1.02		-1.01		
(0.89)**		(0.91)**			(0.22)**		(0.20)**		
3.92		-3.51	PROF	-0.01	0.30		-0.32	PROF	0.05
(1.00)**		(0.97)**		(0.23)	(0.40)		(0.37)		(0.03)
4.46		-4.10	VA	-0.04	-0.07		-0.07	VA	0.17
(1.07)		(1.11)**		(0.04)	(0.42)		(0.36)		(0.06)*
3.94		-3.53	GDP	-0.01	0.94		-0.93	NDP	0.02
(1.94)		(1.68)		(0.47)	(0.43)*		(0.37)		(0.09)
2.13		-1.93	NS	0.56		na			
(1.24)		(1.16)		(0.30)					

Source: Korea, see Data appendix

Table 5-1 Labor Market Condition, Korea

$\ln(y(t)) = a_0 + a_1 t + b\ln(x(t)) + c\ln(y(t-1)) + d(UE(t))$

y = (B, W); x = one of (PROF, VA, GDP, NS)

y	x	b	c	d
B	PROF	0.32	0.65	-0.21
		(0.26)	(0.27)*	(0.09)*
OT	PROF	0.30	0.32	-0.16
		(0.11)*	(0.21)	(0.06)*
WB	PROF	0.23	0.65	-0.12
		(0.05)**	(0.10)**	(0.02)**
B	VA	0.41	0.45	-0.11
		(0.12)**	(0.20)*	(0.07)
OT	VA	0.19	0.46	-0.16
		(0.07)*	(0.21)	(0.06)*
WB	VA	0.10	0.74	-0.12
		(0.05)	(0.15)**	(0.03)**
B	GDP	0.14	0.83	-0.23
		(0.44)	(0.27)*	(0.11)
OT	GDP	0.57	0.11	-0.07
		(0.23)*	(0.24)	(0.07)
WB	GDP	0.37	0.52	-0.08
		(0.12)*	(0.14)**	(0.03)*
B	NS	0.52	0.42	-0.17
		(0.32)	(0.34)	(0.10)
OT	NS	0.27	0.31	-0.16
		(0.12)*	(0.22)	(0.06)*
WB	NS	0.19	0.68	-0.13
		(0.06)*	(0.13)**	(0.03)**

Table 5-2 Pooling Regressions,

(A) Use of Sector and Year Dummy Variables

$\ln(y(t,j)) = a_0 + \mathbf{d}*\mathbf{s} + \mathbf{n}*\mathbf{v} + b\ln(x(t,j)) + c\ln(y(t-1)) + e(t,j)$

y(t,j) = compensation variable of year t, sector j: B or W.
x(t,j) = PROF, VA, or NS of year t, sector j.

d = sector coefficient; **n** = year coefficient.

s = $(s_1, s_2, \ldots, s_8)$, sector dummy variables.

v = $(v_1, v_2, \ldots, v_{14})$, year dummy variables.

Hypothesis, no sectoral shift in B (or W) determination.

(A-1) Estimates and Standard Errors of b for various dummy restrictions.

No restrictions			No year dummy, **n=0**			No section dummy, **d=0**		
y	x	b	y	x	b	y	x	b
B	VA	0.23	B	VA	0.48	B	VA	0.03
		(0.09)*			(0.08)**			(0.03)
W	VA	0.08	W	VA	0.23	W	VA	0.00
		(0.03)*			(0.03)**			(0.01)

(A-2) Test of the sectoral dummies = 0. H_0: **s** = **0**
F-statistics, F(8, 109)

y	x = PROF	VA	NS
B	2.932**	3.847**	3.581**
W	1.842	2.596	2.849

(B) Sector-specific Intercepts and Elasticities

$\ln(y(t,j)) = a_0 + a_1*t + \mathbf{d}*\mathbf{s} + b_j*\ln(x(t,j)) + c\ln(y(t-1)) + e(t,j)$

b_j = sector-specific elasticities.

Tests of common intercepts and elasticities.

Null Hypothesis: Common intercepts and elasticities.
H_0: $d_1 = d_2 = \ldots = d_8$; $b_1 = b_2 = \ldots = b_8$
F(16,115)

y	x = PROF	VA	NS
B	1.64	3.69**	4.85**
W	2.63**	3.21**	4.34**