Internal Labor Markets and the Effects of Structural Change: Job Mobility in Korean Labor Markets from 1998 - 2000*

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ABSTRACT

This study examines job mobility in Korean labor markets since the 1997 economic crisis. The rising job mobility in Korea is analyzed by focusing on structural change in labor markets. Using the Korean Labor and Income Panel Study and discrete-time event history analysis, I estimate the job-stabilizing effects of internal labor markets and the effects of structural change on job mobility. The major findings are as follows: First, I found that internal labor markets were weakening between 1998 and 2000. Second, the job-stabilizing effects of internal labor markets on job mobility diminished between 1998 and 2000. Finally, the magnitude of the effects of internal labor markets on job mobility was contingent on the level of structural change. The effect of internal labor markets on job mobility was stronger in turbulent or contracting industries. This effect, however, also became weaker over time. The implications for Korean labor markets are discussed.

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1. Introduction and Background

This study examines job mobility in Korean labor markets after the severe economic crisis in 1997. This economic crisis resulted in an intervention by the International Monetary Fund (IMF) and had profound effects on Korean labor markets, particularly increased job instability. Under the deteriorating business conditions, many firms implemented lay-offs and internal labor market practices were weakened. The effects of the crisis, however, differed across organizations, depending on the degree of development of internal labor markets. Firms with the strong internal labor markets were able to be more resistant to the adverse circumstances than others (Haveman 1995; Haveman and Cohen 1994). In this study, I explore how strong the effects of structural change on job mobility were after the crisis and how this change interacted with internal labor markets.

Korean labor markets have historically been tightly organized. Korean workers in large firms, in particular, have enjoyed considerable job stability and relatively high salaries until the 1997 crisis. Employees in large firms composed a large portion of the labor force because of the export-driven nature of the Korean economy. During the rapid economic development from the early 1960s to the late 1990s, many large firms developed the strong internal labor markets that provided insiders with high wages, good fringe benefits and job stability. In this system, changing jobs was undesirable or unusual because workers were able to gain promotions and wage raises along with the increase of tenure (Song 1991). I. These tight internal labor markets were common in East Asian economies and contributed to these countries' rapid economic growth (Hamilton and Biggart 1988; Cheng and Kalleberg 1996).

There have been significant changes, however, in Korean labor markets since the early 1990s. The seniority system was weakened as Korean companies began to adopt an American

business model that emphasizes profitability, which is supposed to be accomplished through downsizing, rather than reinvestment or expansion (Davis et al. 1994). Many firms instituted so-called "voluntary early retirement", which forced many senior workers to resign. The severe economic crisis accelerated this trend because the IMF intervention emphasized labor flexibility, which decreased job stability at a faster pace (Lee 2002). Consequently, the unemployment rate, which used to be stable during the early 1990s, increased sharply in 1998. The unemployment rate has decreased since 1999, but remains somewhat higher than the early 1990s (see Figure 1). The higher level of job instability after the crisis implies that drastic and possibly irreversible change may occur in employment practices during the crisis.

<Figure 1> about here

In this study, I examine the increase of job mobility in Korean labor markets by focusing on the effects of structural change. First, based on previous research on job mobility and labor markets, I construct measures of internal labor markets and structural change. Second, using the Korean Labor and Income Panel Study (KLIPS) and discrete-time event history analysis, I estimate the effects of internal labor markets, structural change, and the joint effects of internal labor markets and structural change on job mobility. The main contribution of this study is to show that the job-stabilizing effects of internal labor markets weakened over time and were contingent on the level of structural change.

2. Prior Research and Theoretical Issues

2.1 Internal labor markets and job mobility

According to Althauser and Kalleberg (1981: 130), internal labor markets are clusters of jobs that have three basic structural features: job ladders, entry at the bottom, and internal promotion based on knowledge or skill development. This concept, coined by Doeringer and Piore (1971), assumes that some workers are protected from external competition – a fact not accounted for in human capital theory. Workers in the internal labor markets are better protected than workers outside, independent of their human capital. Many researchers have examined the mechanisms through which internal labor markets are created and maintained.

First, a large body of literature examines why employers develop internal labor markets. If internal labor markets force employers to pay higher wages, why do employers develop such seemingly inefficient employment relations? Training cost, explicit or implicit, is a potential explanation because it is expected to be returned for a long period of time.[1] Therefore, employers whose training costs are high have an interest in preventing experienced workers from leaving. In addition, some skills acquired from on-the-job training might easily be transferable to another firm. Therefore, the employers whose training costs are high and/or whose trainings focus on general skills attempt to retain their workers; these efforts help create the internal labor markets (Marsden 1990: 425 – 426). Previous empirical research used firm-specific tenure as an important indicator of the prevalence of internal labor markets from this perspective.

[1] According to human capital theory, training cost is compensated by below-market wage during the training period as well as by increasing productivity in the long term (See Becker 1962). From this perspective, long-term employment is not necessary to recoup the training cost because it is paid by employees as a form of low wages instead of employers. Transaction costs involved in worker's recruitment may be more important from this perspective.

Researchers have also investigated a firm's capacity to develop internal labor markets. Harrison (1974) argued that the core economy develops primary labor market in which workers enjoy stable employment, high wages, and skill development. In contrast, the peripheral economy develops secondary labor markets that do not these benefits. Oligopolistic positions permit employers to provide workers with such a high level of protection and rewards. Therefore, the positions of product markets are responsible for the demarcation of labor markets to some extent (Harrison 1974: 273 – 281). This consideration suggests that a firm's market position and size capture the development of internal labor markets.

Although many studies focus tenure on the historical development of internal labor markets, "vacancy-driven models" represent another approach in internal labor markets studies (Rosenfeld 1992). This perspective emphasizes the theoretical and mathematical specification of career process. This approach distinguishes the closed employment system from the open employment system, and develops a career mobility model in the closed employment system, an extreme form of internal labor markets. For example, in the "vacancy competition model" (Kalleberg and Sørensen 1979), the vacancy creation rate and the discrepancy between individual resources and rewards jointly determine the upward job mobility rate in the closed employment system (Sørensen and Tuma 1981). Empirical results based on personnel data of a large insurance company indicate that the departure rate of white-collar workers in internal labor markets is dependent on the opportunity for promotions (Petersen et al. 1989; Petersen and Spilerman 1990) and the returns to educational attainment depend on the ranks of individuals within the organizations (Splierman and Lunde 1991). This approach develops well-specified formal models for job mobility research and usefully incorporates survival analysis to job

mobility research. However, the stringent data requirements of this approach make applications challenging (Rosenfeld 1992).

In sum, internal labor markets develop for different reasons (a firm's need and capacity); the prevalence of internal labor markets is dependent on training cost, transferability of on-the-job training, a firm's position in product markets, and/or the combination of these factors. While each approach outlined above emphasizes different aspects of internal labor markets, the consensus is that internal labor markets have a positive effect on job stability.

2.2 Structural Change and Internal Labor Markets

In general, the business cycle affects job mobility because the job growth rate is contingent on the business cycle. At the same time, job mobility is also affected by the job growth rate (i.e., business cycle → job growth rate → job mobility rate); a growing sector employs more workers while a shrinking one loses workers. Therefore, industry-level employment growth rates tend to rise and fall along with the business cycle in a highly coincident manner (Davis et al. 1996: 85), and employment growth (or shrinkage) has an effect on the job mobility rate. Davis et al. (1996: 35) showed that "32 percent to 53 percent of all worker reallocation arises to accommodate shifts in the distribution of employment opportunities across locations". A study in organizational ecology also showed that job shifts caused by organizational founding and failure constitute 25 – 55% of all individual mobility (Carroll et al. 1992).

The job mobility rate fluctuates along with the business cycle, but some changes can be asymmetric. For example, a recession may cause a substantial number of lay-offs and the recovery may only result in a limited number of re-employments. This asymmetric change may involve the large scale of change in employment relation, affecting internal labor markets.

Although workers in the internal labor markets would be protected from external conditions to some degree under these adverse circumstances, the structural change might be too large for the internal labor markets to protect insiders (e.g., bankruptcy). Therefore, whether or not job security can be resilient to structural conditions is dependent on the strength of structural change as well as institutional arrangements. Research in organizational ecology emphasizes the resilience of internal labor markets to drastic structural change. Studies on the long-term effects of change in production mode on employment practices, however, show that structural forces have a strong effect on the prevalence and job-stabilizing internal labor markets in the long run.

First, studies in organizational ecology show that internal labor markets are robust to ecological dynamic to some degree. Haveman and Cohen (1994) estimated the effects of organizational founding, dissolution, and merger on job mobility. In this study, a large-scale organizational dissolution in an industry caused less intraorganizational mobility within the industry and more exits to other industries. However, the magnitude of this effect depended on the degree of the development of internal labor markets. Large organizations, which tend to develop the internal labor markets, can be more resistant to structural change (Haveman 1995: 595). A comparative study shows that societies with the stronger institutional regulations are less likely to be influenced by organizational dynamics such as deaths or births of firms (DiPrete et al. 1997). A study of a multinational bank also showed that the subsidiary in Germany is less sensitive to industrial turbulence than that in the U.S. Stronger internal labor markets in Germany than in the U.S. may explain the differences between the two countries (Tinsley & DiPrete 2001). In general, these studies show robustness of internal labor markets to cyclical or short-term fluctuations.

Second, the effects of long-term structural change on internal labor markets have been studied in the context of the transition from Fordism to post-Fordism or neo-Fordism. Pressure from international competition is posited to weaken internal labor markets. Employers reduce fixed costs to adapt themselves to the rapidly changing markets. Where strong internal labor markets exist, then labor cost is considered as fixed cost, in that it is hard to adjust labor costs to economic fluctuation (Standing 1990: 440; Cappelli 2001: 210 – 212). Under changing circumstances, the effort to weaken internal labor markets was successful in the U.S. American manufacturing sectors coped with the international competition by transferring the burden to the labor (Harrison and Bluestone 1988). Declining rates of union organization, increasing deindustrialization, and long-term economic recession in the 1970s contributed to the retrenchment of internal labor markets in manufacturing sector (Danziger and Gottschalk 1995: 129 – 141). White-collar workers were also affected. Managerial workers experienced increasing job insecurity and a substantial decrease in the likelihood of upward mobility within the organizations (Osterman 1996: 13). In other words, managerial workers suffer from the "broken job ladder". In the whirlpool of long-term restructuring, job instability for both blue- and white-collar workers increased significantly along with the weakening of internal labor markets.

<Figure 2> about here

I summarize hypothetical relationships between internal labor markets, long-term structural change, and economic crisis in Figure 2. The vertical axis in Figure 2 represents the prevalence of internal labor markets or the strength of the effects of internal labor markets on job mobility. This graph shows how structural change yields (a) compositional change in labor markets, (b)

change in the association between internal labor markets and job mobility, (c) or both (a) and (b). If there is no structural effect, then the prevalence of internal labor markets or the effects of internal labor market on job mobility should remain constant over time (path 1). If a gradual structural change exists, internal labor markets should decrease over time. The paths may diverge depending on how economic crisis affects internal labor markets. If crisis has no effect, the prevalence of internal labor market or its effect on job mobility will decline at a constant rate after the crisis (path 2). When only cyclical effects exist, the prevalence or the effects of internal labor markets will be weakened at a faster rate soon after the crisis, but its path will converge to path 2 later on (path 3). However, if drastic or fundamental effects exist, then internal labor markets should decrease at a much faster rate (path 4).

As I noted in the previous section, Korean labor markets experienced both long-term and drastic structural change. First, long-term restructuring in industrial relations was already occurring in the early 1990s. Korean economic development used to be based on rapid growth in capital and labor input rather than increasing productivity (Baily et al. 1998: 250), and this development exhibited its limits in the 1990s. High labor rigidity, usually associated with strong internal labor markets and manageable under rapidly growing circumstances, started to threaten profitability. Large firms began to use outsourcing as to reduce labor cost (Shin 2001)[2]. Introduction of information technology also facilitated downsizing by reducing monitoring cost and making some clerical and managerial workers redundant. The economic crisis accelerated this trend. Many firms were required to lay off workers, and some of them went bankrupt. Consequently, job instability increased regardless of class (Shin and Lee 2000) and employment statuses (Ryu 2001). Given these facts, I expect that Korean labor markets followed the path 4 in

[2] Shin (2001)'s case study focused on outsourcing as a means of labor control not for profitability. However, these two are closely related in the long run.

Figure 2. However, this study cannot distinguish the drastic effects from the gradual effects due to the lack of data on the period before the crisis. The decrease of the prevalence of internal labor market or its effects on job mobility can be attributed to either long-term or drastic change. Given the higher unemployment rate after the crisis (Figure 1), if structural effects on internal labor markets were found, these effects are likely to indicate the existence of the drastic effects.

3. Hypothesis

Based on previous research on internal labor markets and structural change, I develop two kinds of hypotheses: the effects of internal labor markets on job mobility and the effects of structural change on Korean labor markets between 1998 and 2000.

Internal Labor Markets

H1: The prevalence of internal labor markets in Korea was weakened in 1998 – 2000.

As I described in the previous sections, the economic crisis created instability in many firms, which should weaken internal labor markets. Therefore, I expect that the prevalence of internal labor markets was weakened over time.

H2: Although workers in the more internalized labor markets were less likely to change jobs than those outside of internal labor markets, these effects diminished over time.

Numerous studies document that workers in the internal labor markets are less likely to experience job mobility, even accounting for relevant individual and organizational characteristics. I expect that positive effect of internal labor markets on job stability existed in Korean labor markets in 1998 – 2000. The economic crisis, however, weakened internal labor

markets and protection from job instability decreased as a consequence. I expect that the effects of internal labor markets on job mobility diminished between 1998 and 2000.

Effects of Structural Change and Internal Labor Markets

H3: Workers in more turbulent and/or shrinking industries were more likely to experience job mobility.

Following DiPrete and Nonnemaker (1997), I define structural turbulence and structural net change in terms of gross and net labor flow (I describe these concepts in detail in the "measurement" section below). I expect that workers in more turbulent and/or shrinking industries were more likely to experience job mobility. This is because high gross mobility involves many inward/outward movements, and workers in contracting industries are more likely to exit from employment or change their jobs.

H4: The effects of internal labor markets on job mobility were stronger in structurally turbulent or contracting industries.

I expect that the effects of internal labor markets on job mobility depended on the level of structural change. The effects of internal labor markets on job mobility are expected to be the strongest in the most shrinking sectors because internal labor markets shield the insiders from the external competition to some degree. The shielding effects should be stronger under the more challenging conditions.

H5: These effects in H4 are diminishing.

The stabilizing effects of internal labor markets on job mobility in turbulent or shrinking industries are expected to have weakened over time. This expectation is parallel to previous studies (Cappelli 2001; Danziger and Gottschalk 1995; Osterman 1996; Standing 1990) that document the weakening of internal labor markets under a severe economic crisis or long-term structural change.

4. Data and Measurements

Data

I use data from the Korean Labor and Income Panel Study (KLIPS), an annual longitudinal survey representative of Korean individuals and households. The KLIPS sample is an equal probability sample of households from the 7 metropolitan cities and urban areas, and was designed to yield 5,000 households and their members (aged 15 and over) interviewed. In the first wave (1998), 13,321 people were interviewed. I use data from 1998 to 2001. The data contain detailed information on demographic characteristics and work histories.[3] The period of this study is 1998 – 2000, right after the IMF intervened Korean economy. One limitation of this study is that I cannot parcel out the drastic structural effect from the long-term gradual effect because no micro-level data on pre-crisis period are available. I also use Korean National Statistics Office's report (http://www.nso.go.kr). I use this data set for calculating trends in unemployment rates and computing structural turbulence and structural net change at the industry level.

Person-years are used as a unit of analysis in discrete-time event history analysis. My analytic sample includes wage-workers at the time of survey with non-missing values for the

[3] More detailed information on the data is available in Phang et al. (2001) and Phang et al. (2000).

gender, age, education, experience, occupation, industry, firm size[4], and wages. After the list-wise deletion of cases containing missing values, the remaining sample contains 5,345 wage-workers and 12,137 person-years.

Measurements

<Table 1> and <Table 2> about here

Dependent variables

The dependent variable is job mobility. Job mobility is coded as "stayer" if the respondent did not change their employers during the given year, and "mover if the respondent changed employers. "Movers" include both individuals who changed employers and those who lost their jobs. I considered using a multinomial model to distinguish between these two types of "movers." I present the only results based on the dichotomous dependent variable because the estimated effects of covariates on "job change" and "job loss" do not differ substantially. Table 2 shows that about 20 percent of workers experienced job mobility in 1998 – 2000.

Demographic variables

I use four demographic variables (age, gender, education, and work experience) in this study as controls. I provide the definition and summary statistics for these variables in Table 1. I treat education as nominal variable rather than continuous because the effects of education on job mobility should be discrete rather than continuous. I also use age as a categorical variable to capture nonlinear relationship between job mobility and age.

[4] Quite a few cases are missing in firm size. I replaced the missing values by using simple imputation technique (Allison 2002). Measurement section deals with that in more detail.

Job Characteristics

I use three variables to measure job characteristics: tenure, wage, and firm size. Tenure is measured as years of working in the current firm. Wage is measured as Korean thousand won in 2000. A substantial number of respondents did not report information on firm size. Among the 12,137 person-years that have no missing in other variables, 998 cases are missing in firm size. Moreover, the missing cases are concentrated in the first wave (1998), so the simple listwise deleting disproportionately eliminates the first wave cases. I use 'simple random imputation' method (Allison 2002: 28 – 29). This method can be expressed mathematically as follows;

$\hat{Y} = \hat{\alpha} + \hat{\beta}X \cdots (1), \quad \tilde{Y} = \hat{Y} + \hat{\sigma}u \cdots (2)$

(X is a predictive variable, $\tilde{Y}$ is a imputed value, $\hat{Y}$ is a predicted value, $\hat{\sigma}$ is root MSE in equation (1), and u is random number.)

Using predicted values from the regression of *X* on *Y* is the simplest way of imputation (equation 1). However, this method underestimates the variance of *Y* because missing values are completely determined by the relation between *X* and *Y*. Adding a random number to the imputed values would fix this problem to some extent. In this example, *Y* is firm size. Choosing *X* is not easy and there are many possible candidates. I choose average firm size in the occupation and industry matrix as *X*. For example, assume a person has a job in occupation *i* and industry *j*. The *X* value is the average firm size in occupation *i* and industry *j*. I choose the average firm size in occupation-industry matrix as a predictor because this classification results in quite homogenous classification of workers (Freeman 1976). For a random number, I choose standard lognormal distribution [$\log u \sim N(0,1)$] following Greene (2000: 69). Using all 11,135

person-years, I get the following estimates: $\hat{\alpha} = 0,\ \hat{\beta} = 1, \hat{\sigma} = 2.90$. In the logistic regression analysis, I substituted the imputed values for missing values in firm size.

Internal Labor Markets

The key independent variable in this study is internal labor markets. It would be ideal to measure job ladder directly, but most research relies on indirect measures such as firm size (Kalleberg and Mastekaasa 1998; Cheng and Kalleberg 1996) and firm-specific tenure (Bernhardt et al. 2001). Recent development in labor economics provides a more direct way to measure internal labor markets (Ariga, Brunello and Ohkusa 2000). The average difference between occupation specific tenure and firm specific tenure in a given occupation is used as an indicator of degree of internalization. The mathematical expression for the degree of internalization is shown in equation 3 (Ariga, Brunnello and Ohkusa 2000: 71 – 72):

$$I_j = \frac{1}{N_j}\sum_{i=1}^{N_j}(T_{ij} - E_{ij}) \cdots (3)$$

(i: individual, j: occupation, T: firm-specific tenure, E: occupation-specific tenure, N_j: the number of people in occupation j)

When I_j is close to zero, occupation *j* is likely to be internalized. Large negative values of I_j implies weak internalization in this occupation. Three-digit occupation code is used for the classification. While I_j is good at measuring the development of job ladder to some extent, it has some weaknesses in studying change in labor market internalization. In particular, this measure may reflect age-compositional change in labor market, which is not necessarily tied to the change in internal labor markets. For example, an employer may fire older or senior workers

whose training costs were already recouped while keeping the internal labor markets in place for everyone else. This action does not influence the operation of the internal labor market but makes the value of I_j more negative.[5] In particular, given that large scale of layoffs disproportionately targeted older workers after the crisis, this possibility must be taken into account. I address this issue by including the interaction term between age and I_j in the discrete-time event history analysis.

Structural Change

DiPrete and Nonnemaker (1997) provide a useful method for studying structural effects on job mobility. They decompose the concept of structural change into "structural net change" and "structural turbulence." "Structural net change" represents the difference between inflow and outflow in one job category (see equation 5), and "structural turbulence" is an average of inward and outward flows (see equation 4). While these two concepts are closely related with each other, these measures are independent. A highly turbulent industry is not necessarily shrinking one (DiPrete and Nonnemaker 1997: 388). For example, while the turnover rate of part-time clerks in convenient stores may be high, this does not necessarily mean that this job category is shrinking. The pairwise correlation coefficient of these two measures is only -.11 in the KLIPS. Structural net change captures expansion or contraction while structural turbulence captures the volatility. If we incorporate these two measures in job mobility models, we can quantify the effects of structural contraction (or expansion) and volatility, and their joint effects with internal labor markets on job mobility. I use the same measures used in DiPrete and Nonnmaker (1997: 390), which are shown in equation 4 and 5.

[5] I appreciate the reviewer in *Research in Social Stratification and Mobility* for making this point.

$$s_{kt} = \frac{S_{kt}^{+} + S_{kt}^{-}}{2n_{kt}} \cdots (4), \quad r_{kt} = \frac{S_{kt}^{+} - S_{kt}^{-}}{n_{kt}} \cdots (5)$$

(s_{kt} : structural turbulence rate of industry k at time t, r_{kt} : structural net change rate of industry k at time t, n_{kt} : the number of workers working industry k at time t, S_{kt}^{+} : gross flow into industry k between time t and t+1, S_{kt}^{-} : gross flow out of industry k between t and t+1)

Two-digit industry code (55 industries) is used to compute the structural turbulence rate and the structural net change rate because this is the most detailed level available in Korean National Statistics Office's report.

Methods

To estimate the effects of internal labor markets and structural change on job mobility, I use discrete-time event history models (Allison 1984; 1982). The basic model is binary logit model.

$$\ln(\frac{p_{it}}{1-p_{it}}) = \alpha_1 \ln(s_k) + \alpha_2 \ln(1+r_k) + \alpha_3 I_j + X'_{it}\beta \cdots (6)$$

In this model, p_{it} is the probability that a person *i* changes job between time *t* and *t+1*. The s_k is the turbulence rate of industry *k*, and the r_k is the net change rate of industry *k*. The I_j is the degree of internalization of occupation *j*.[6] The α_1 - α_3 represent the effects of structural change and internal labor markets on job mobility. X'_{it} is a row vector of possibly time-varying individual-level and organization-level covariates, and β is a vector of coefficients for the

[6] The s_k, r_k, and I_j are computed over the full sample.

covariates X'_{it}. Coefficients and standard errors are estimated by maximum likelihood (ML) methods.[7]

5. Results

< Table 3 > about here

I present the coefficients and the standard errors in logit models are in Table 3. Model 1 only contains demographic variables. In Model 2, I add job characteristics and in Model 3, I add internal labor markets and structural change. Model 4 adds interaction between age and internal labor markets to Model 3. I include log-likelihood and Bayesian Information Criterion (BIC). Likelihood ratio tests and BIC suggest that Model 3 is the best-fitting model. Better fit of Model 3 relative to Model 4 means the interaction between age and internal labor markets is not statistically significant. This implies the measure of internal labor markets (I_j) is robust to age-compositional change.

The effects of demographic characteristics diminish with the control of the effects of organizational covariates and the structural changes. The effects of gender, age, and education in the Model 1 are highly significant, suggesting that less educated female young workers are highly likely to change the employers in 1998 – 2000. After controlling for organizational

[7] Using ML estimation might be problematic because some respondents experienced job mobility several times within a year and job mobility process is not independent across years. According to Diggle et al. (2002), "generalized estimating equation (GEE)" is more desirable than ML because GEE takes the covariance structure of the dependent variable into account when estimating parameters. In general, GEE tends to provide larger standard errors than ML, so it reduces the chance of falsely rejecting null hypothesis. In other words, GEE estimates allow us to do more conservative hypothesis test. I estimated parameters using GEE methods (STATA Corporation 2005: 136), but standard errors were almost identical with ML estimates. In addition, it is difficult to conduct model comparison using GEE since GEE does not provide log-likelihood statistics (Agresti 2002: 468). For these reasons, I present the ML estimates.

characteristics and structural change, effects of education, gender and experience become insignificant. Only age effects remain significant[8], but the magnitudes of the coefficients decreased. These diminishing effects favor structural and organizational approaches because this suggests that the effects of individual features on job mobility are mostly mediated by organizational and structural factors. Further, firm characteristics have strong effects on the job mobility. These effects in all models are statistically significant ($p<.001$).

The Weakening Prevalence of Internal Labor Market

<Figure 3> about here

Internal labor markets shrank during this period. Figure 3 displays the annual change of the degree of internalization (I_j), and firm-specific tenure. I_j and firm-specific tenure in 2000 are smaller than those in 1998 although I_j slightly went up in 1999. While the magnitude of change over time is not dramatic, this graph provides some support for Hypothesis 1 (weakening prevalence of internal labor markets).

The Effects of Internal Labor Markets on Job Mobility

The effect of I_j is negative and statistically significant in Model 3 (see Table 3). Workers in more internalized labor markets are less likely to experience job mobility than workers in less internalized labor markets. One year change in the mean difference between occupational tenure and firm tenure in an occupation is associated with approximately a 10 percent [100*{1 – exp(-

[8] The age coefficients are consistent with the well-established fact that job stability increases up to a certain age and then falls. For example, according to Model 3, the odds of job mobility for workers aged 45 to 54 are 18 percent [=100*{1 – exp (–.591 + .394)}] lower than those aged over 55.

.095)}] change in the odds of job mobility. This result strongly supports Hypothesis 2 (negative effect of internal labor markets on job mobility). Even though Korean labor markets changed during the given period, the effects of internal labor markets on job mobility were still statistically significant.

One concern for I_j is that it may be affected by the age-compositional change in labor force, as mentioned before. To address this issue, I test for differences in the effect of I_j by age. If the effects of I_j were subject to the compositional change, the interaction between I_j and age would be significant. The effects of I_j, however, do not significantly differ across age (Model 4) except for the workers aged 35 to 44. Including interaction between I_j and age does not improve data fit in terms of log-likeliehood and BIC. This insignificant interaction effect suggests that I_j is robust to the age-compositional change in labor markets.[9]

<Table 4> about here

Then, is there any change in the magnitude of the effects of the internal labor markets on job mobility over time? I estimate the job mobility models using the same covariates in Model 3 for each year[10], and present the coefficients and the standard errors of I_j in the first row of Table 4. The result clearly shows the diminishing effect of I_j. The effect is strongly negative in 1998. This effect was no longer significant, however, in 1999 and 2000. This result strongly suggests that the job-stabilizing role of internal labor markets faded after the economic crisis.

[9] I also checked the interaction between tenure and I_j in the analysis not shown in this paper. There is no significant interaction effect, either.

[10] Here, the s_k, r_k, and I_j are computed for each year.

The Effects of Structural Change and Internal Labor Markets on Job Mobility

Positive effects of structural turbulence and structural contraction are found in Table 3 (Model 3). These results suggest that workers in more turbulent industries and/or shrinking industries are more likely to experience job mobility. Table 4 shows that the effects of internal labor markets on job mobility are contingent on the levels of structural change. The first column shows how the effects of internal labor markets on job mobility vary across the turbulence and structural net change levels. Industries are trichotomized based on the level of turbulence or structural net change rate. I estimated three separate logistic regression models for each structural turbulence and structural net change level, and present the coefficients and standard errors of I_j. The same covariates in Model 3 in Table 3 are controlled. In the first column, it is clear that the negative effect of the internal labor markets on job mobility is the biggest in the most turbulent industries and the most shrinking industries. In other words, the stabilizing effects of the internal labor markets were the most prominent in the most turbulent or contracting sectors. These results clearly support Hypothesis 4 (differential effects of internal labor markets). However, the following three columns in Table 4 show that these effects are growing weaker over time. Except for 1998, the effects are statistically insignificant for all the turbulence and structural net change levels.

<Figure 4> and <Figure 5> about here

These results are depicted graphically in Figure 4 and 5. Figure 4 shows how the effects of internal labor markets on probability of job change for a hypothetical group (male high school graduates) differ by the structural net change level when holding other relevant variables at their

mean.[11] The slope for the most shrinking industries in Figure 4 is much steeper than that for moderately shrinking and expanding industries.

Figure 5 shows the diminishing conditional effects over time. This graph is drawn based upon the same hypothesized sub-population in Figure 4 (male high school graduates, all relevant variables held at the mean). It shows that the effects of internal labor markets on job mobility in the most shrinking sector changed over time. The slopes are growing flatter over time, suggesting that the effects of internal labor markets on job mobility were growing weaker over time.

Combined with the fact that the effects of internal labor markets diminished between 1998 and 2000, the weakening conditional effects of internal labor market on job mobility imply that fundamental change in employment relations occurred during this period.

6. Summary and Implication

I found that the prevalence of internal labor markets weakened in Korea between 1998 and 2000. In addition, workers in internal labor markets were less likely to change their jobs, and this effect of internal labor markets is robust to the age-compositional change in labor force. The magnitude of the effects of internal labor markets on job mobility, however, diminished over time and the effects in 1999 and 2000 were statistically insignificant. These findings imply that internal labor markets were collapsing during this period. I also found that structural change affected job mobility. The workers in more structurally contracting or turbulent industries are more likely to change jobs. Finally, the magnitude of the effects of internal labor markets on job mobility depended on the level of structural turbulence and net change. The effect of internal

[11] One exception is wage. I fixed it at its medium.

labor markets was stronger in more turbulent or contracting industries. However, these effects were also getting weaker over time.

Results from this study should be interpreted in the context of several limitations. First, I study a three-year period after the severe economic crisis, which weakens the generalizability of the findings because the change observed could be transitional or permanent. Further research with the subsequent panel data can shed light on whether these are short or long-term changes. Second, because no micro-level data on the pre-crisis period are available, it is unclear whether this diminishing effect of internal labor markets on job mobility was due to long-term gradual change or the combination of the effects of economic crisis and gradual change. However, given that the unemployment rate remained higher after the crisis than before (Figure 1), it is hard to imagine that no drastic effect exists.

Despite these limitations, this study provides insight into the implications of the changes for labor markets and the lives of working people in Korea. First, more volatility in the Korean labor markets is expected. With internal labor markets weaker and structural effects stronger, the flexibility of labor force will increase. This change requires the development of sophisticated policies to deal with unemployment or emerging "untraditional" labor forces (Kum and Jo 2000). Second, young people in labor markets will develop different career paths than older individuals. Along with the weakening of internal labor markets, long-term employment practices will become less common. Under these conditions, the career choice of young workers will differ from their parents. The changes that I have documented here calls for a new, better understanding of labor market structure.

Table 1 Definition and Descriptive Statistics of Variables

Variables	Description	Mean	S.D
Dependent Variables			
Job mobility	Stay: 9,320 (76.8%) Move: 2,817 (23.2%)	-	-
Demographic Characteristics			
Age	Age at the time of survey	35.46	11.10
Female	Male (3,046, 56.9%) Female (2,308, 43.1%)	-	-
Education	Less than high school graduate (1,325, 24.7%) High school graduate (2,172, 40.6%) Some college (868, 16.2%) 4-year college graduate and more (989, 18.5%)	-	-
Experience	Years past since having the first job	12.20	10.23
Job characteristics			
Tenure	Years of working in the current firms	5.30	6.21
Wage	Inflation adjusted wage in 2000 (unit: Korean thousand won)	1,028.27	610.29
Labor Markets			
Firm size(raw)	Coded 1 (1-5) through 10 (10,000 over)	5.89	3.32
Firm size(imputed)		5.77	3.24
ILMs	Degree of firm-internalization ($I_j = \frac{1}{N_j}\sum_{i=1}^{N_j}(T_{ij} - E_{ij})$)	-1.36	1.06
Structural Change			
Structural Turbulence	Turbulence rate ($s_{kt} = \frac{S_{kt}^+ + S_{kt}^-}{2n_{kt}}$)	.39	.13
Structural Net Change	Net change rate ($r_{kt} = \frac{S_{kt}^+ - S_{kt}^-}{n_{kt}}$)	-.01	.04

- Unit of demographic characteristics is 'person', not 'person-year'.
- Unit of other variables is 'person-year'.
- See the text for the definitions of I_j, $N_{j,}$ T_{ij}, E_{ij} s_{kt}, r_{kt}, S_{kt}^+, S_{kt}^-, and n_{kt}.

Table 2 Job Mobility by Year

Year	1998 – 2000	1998	1999	2000
Stay	76.8%	75.5%	78.9%	75.9%
Move	23.2	24.5	21.1	24.1
N	12,137	3,964	4,168	4,005

Table 3 Logistic Regression Estimates for Job Mobility

Variables	Model 1	Model 2	Model 3	Model 4
Demographic Characteristics				
Female	.258 (.046) ***	.034 (.050)	.014 (.051)	.026 (.051)
Age				
25 – 34	-.419 (.065) ***	-.332 (.066) ***	-.366 (.067) ***	-.300 (.107) **
35 – 44	-.689 (.079) ***	-.500 (.080) ***	-.553 (.081) ***	-.318 (.120) **
45 – 54	-.784 (.100) ***	-.534 (.102) ***	-.591 (.103) ***	-.415 (.148) **
55 – 65	-.493 (.137) ***	-.382 (.138) **	-.394 (.139) **	-.410 (.199) *
Education				
HS graduate	-.272 (.057) ***	-.112 (.059)	-.046 (.060)	-.052 (.060)
Some college	-.342 (.074) ***	-.131 (.077)	.037 (.079)	.038 (.079)
College graduate	-.727 (.077) ***	-.353 (.083) ***	-.109 (.086)	-.115 (.086)
Experience	-.008 (.003) *	-.000 (.003)	.001 (.003)	.001 (.003)
Job Characteristics				
Tenure		-.039 (.005) ***	-.028 (.005) ***	-.028 (.005) ***
ln(wage)		-.447 (.045) ***	-.409 (.045) ***	-.405 (.045) ***
Firm size		-.049 (.006) ***	-.042 (.006) ***	-.042 (.006) ***
Internal Labor Markets				
I_j			-.095 (.020) ***	-.197 (.059) **
I_j*(Age 25 – 34)				.061 (.068)
I_j*(Age 35 – 44)				.174 (.069) *
I_j*(Age 45 – 54)				.135 (.075)
I_j*(Age 55 – 65)				.012 (.104)
Structural Change				
Turbulence			.488 (.069) **	.477 (.069) ***
Net change			-2.078(.674) ***	-1.937(.676) **
LL (df)	– 6,396 (9)	– 6,257 (12)	– 6,212 (15)	– 6,207 (19)
BIC	– 275	– 525	– 586	– 557

Figures in parenthesis are standard errors.
N=12,137
***: p<.001, **: p<.01, *: p<.05

Table 4 Change in Effects of Internal Labor Markets Conditional on the Level of Structural Change (from Model 3)

	Overall	1998	1999	2000
Overall	-.095 (.020) ***	-.164 (.033) ***	-.043 (.035)	-.040 (.034)
Turbulence Level				
Low	-.092 (.036) *	-.139 (.052) **	-.035 (.068)	-.081 (.060)
Medium	-.042 (.039)	-.137 (.066) *	-.055 (.060)	-.014 (.062)
High	-.136 (.039) ***	-.236 (.069) **	-.039 (.065)	-.064 (.064)
Structural Net Change Level				
Contracting much	-.145 (.039) ***	-.181 (.058) **	-.087 (.066)	-.058 (.068)
Contracting slightly	-.069 (.033) *	-.197 (.055) ***	-.092 (.054)	.036 (.053)
Stagnating/Expanding	-.089 (.048)	-.132 (.077)	-.004 (.080)	-.160 (.088)

Figures in parenthesis are standard errors.
***: p<.001, **: p<.01, *: p<.05

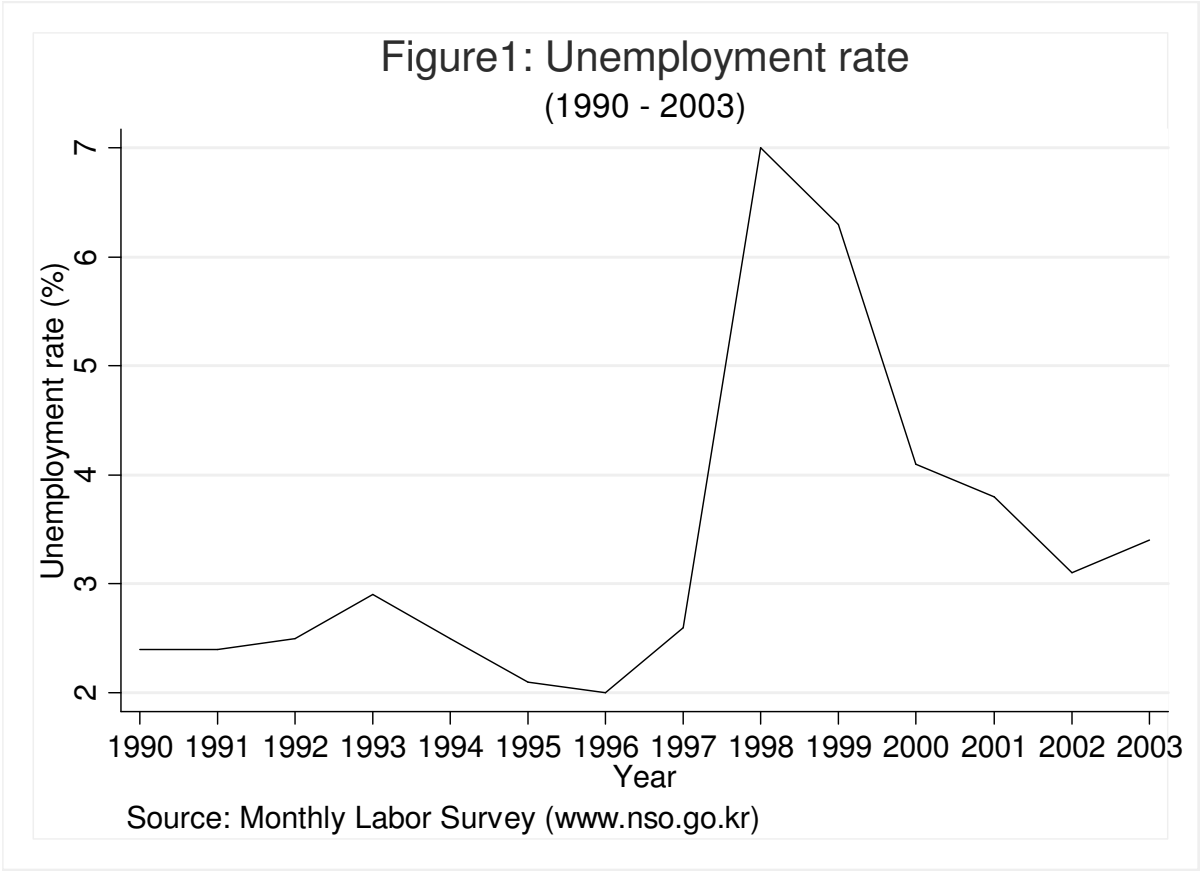
Figure1: Unemployment rate
(1990 - 2003)
Unemployment rate (%)
2
3
4
5
6
7
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003
Year
Source: Monthly Labor Survey (www.nso.go.kr)

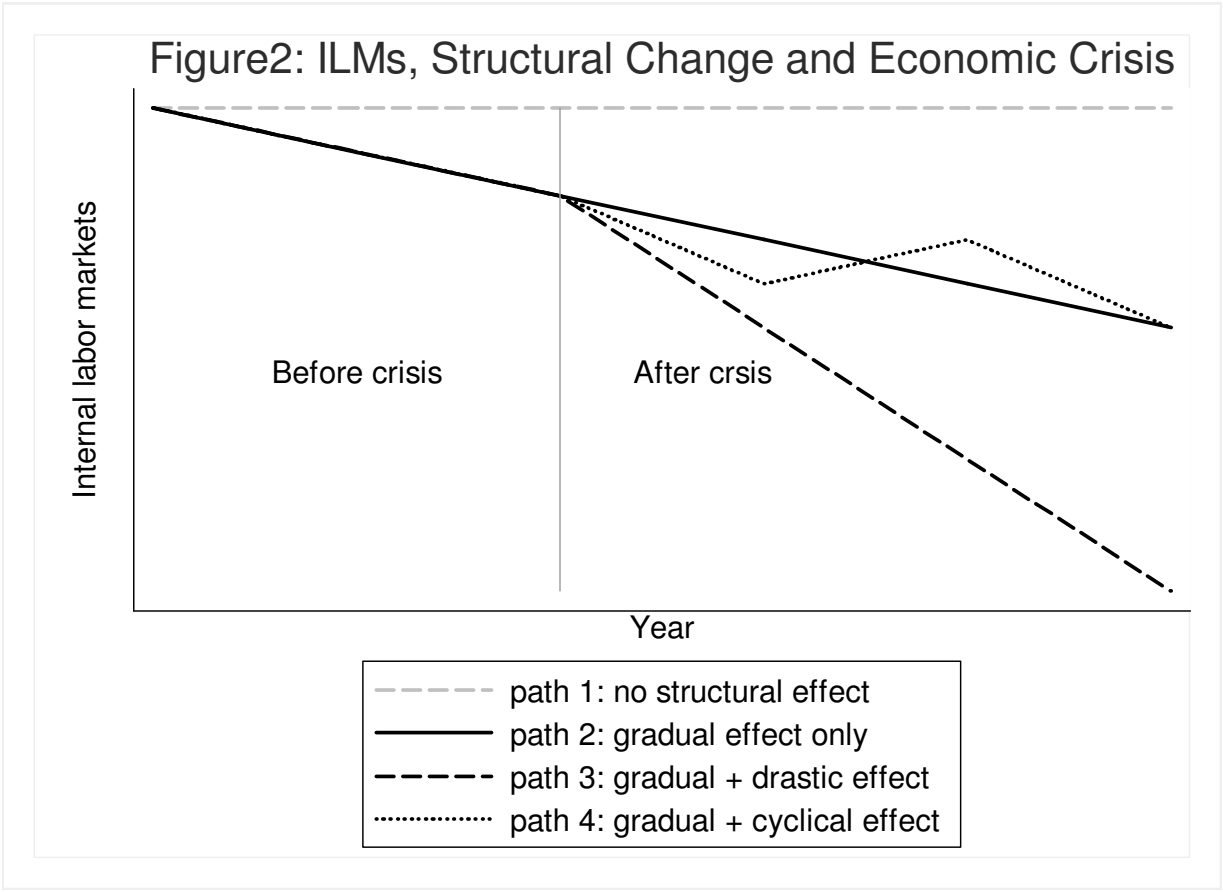
Figure2: ILMs, Structural Change and Economic Crisis
Internal labor markets
Before crisis
After crsis
Year
path 1: no structural effect
path 2: gradual effect only
path 3: gradual + drastic effect
path 4: gradual + cyclical effect

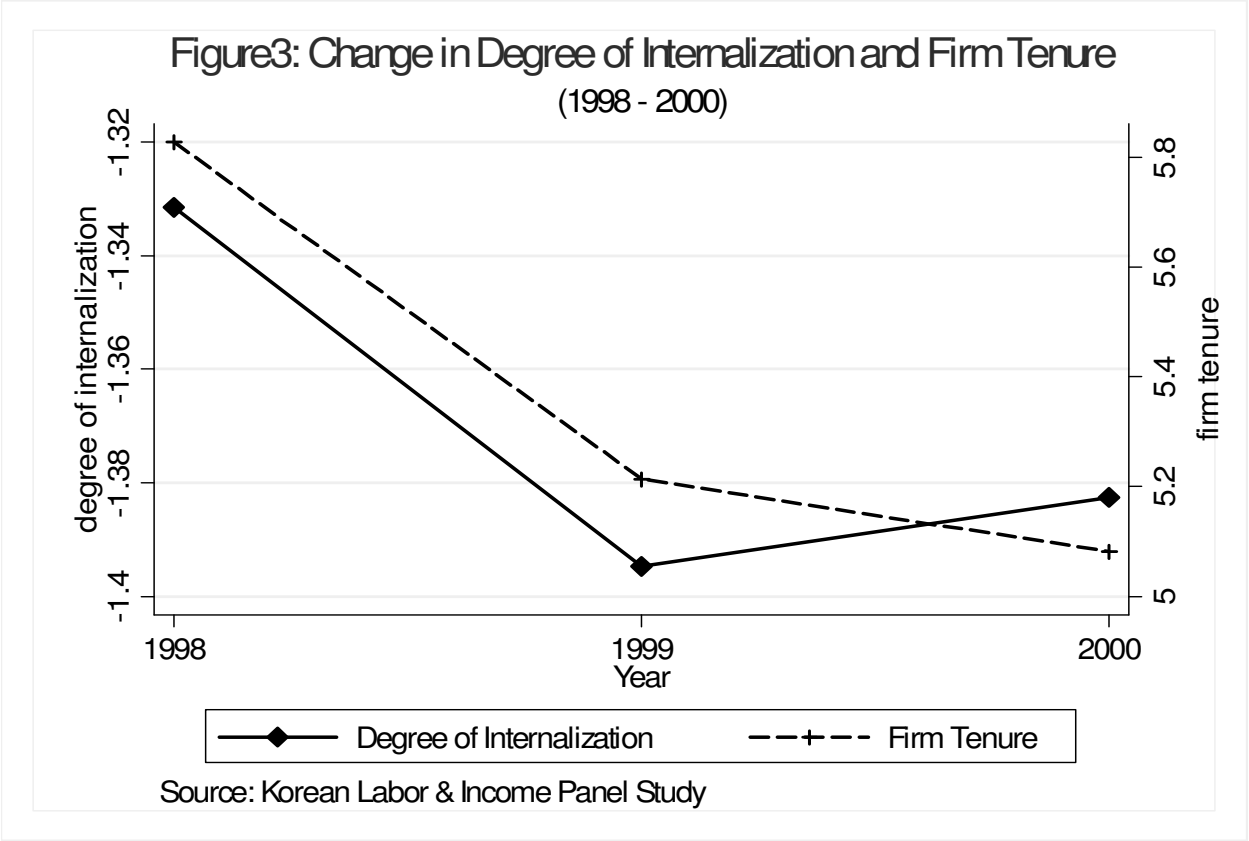
Figure3: Change in Degree of Internalization and Firm Tenure
(1998 - 2000)
degree of internalization
-1.32
-1.34
-1.36
-1.38
-1.4
firm tenure
5.8
5.6
5.4
5.2
5
1998
1999
2000
Year
Degree of Internalization
Firm Tenure
Source: Korean Labor & Income Panel Study

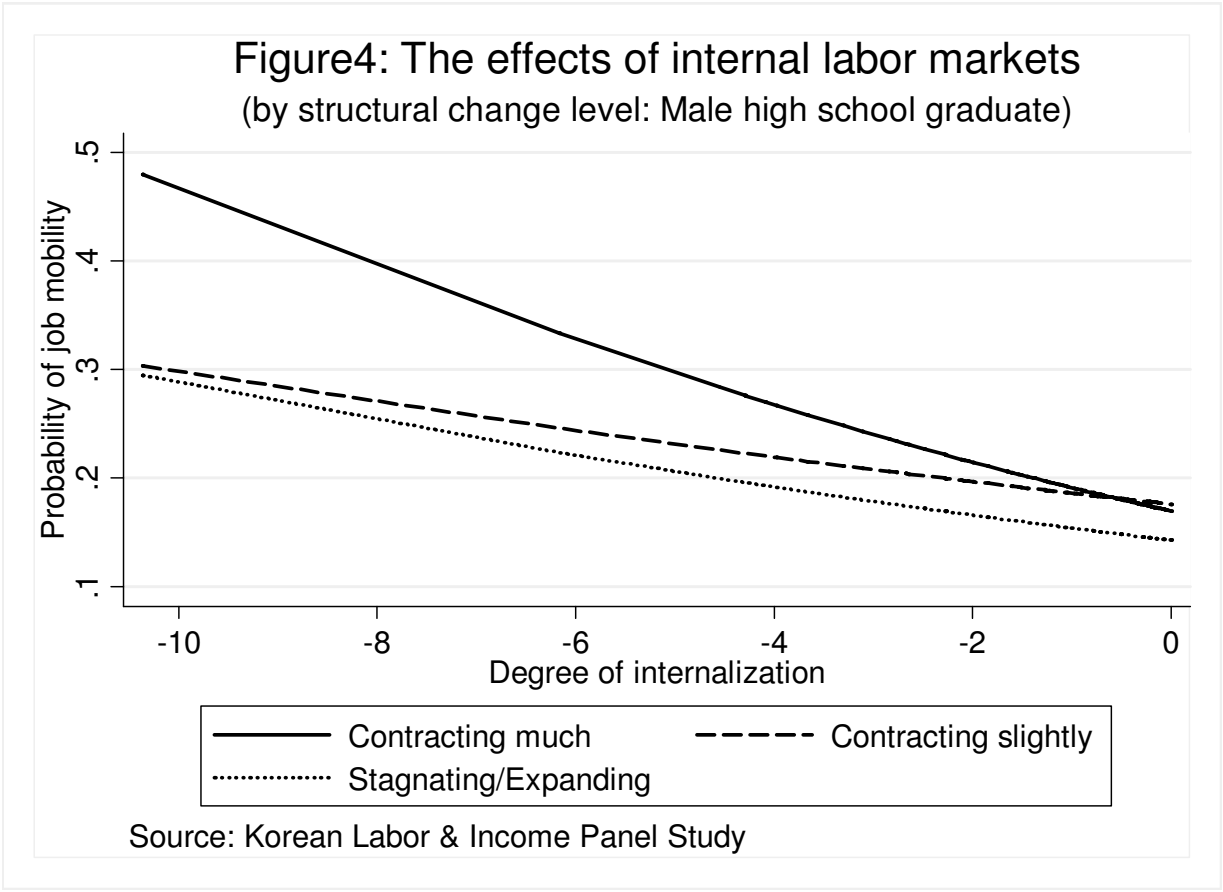
Figure4: The effects of internal labor markets
(by structural change level: Male high school graduate)
Probability of job mobility
.1
.2
.3
.4
.5
-10
-8
-6
-4
-2
0
Degree of internalization
Contracting much
Contracting slightly
Stagnating/Expanding
Source: Korean Labor & Income Panel Study

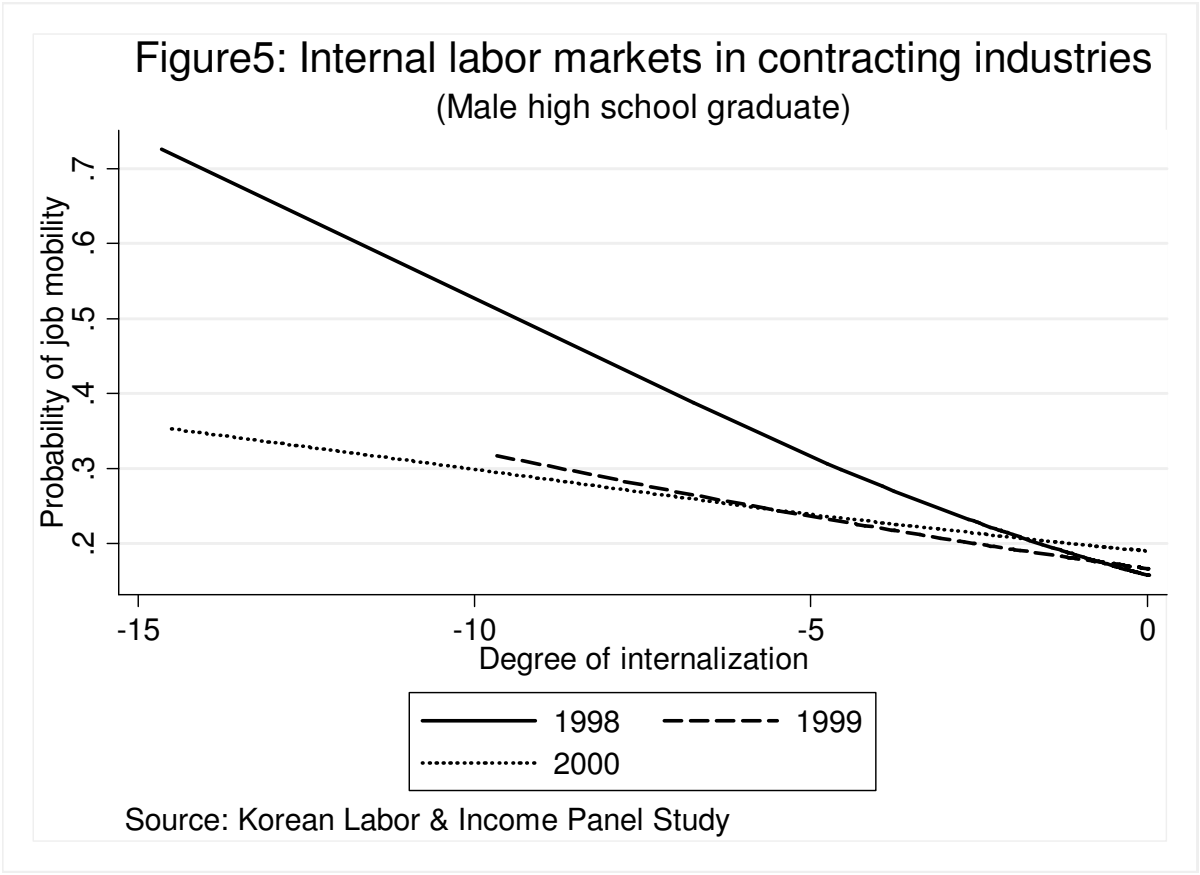
Figure5: Internal labor markets in contracting industries
(Male high school graduate)
Probability of job mobility
.2
.3
.4
.5
.6
.7
-15
-10
-5
0
Degree of internalization
1998
1999
2000
Source: Korean Labor & Income Panel Study

References

Agresti, A. (2002). *Categorical Data Analysis*. Hoboken, NJ: John Wiley & Sons

Allison, P. (2002). *Missing data*. Thousand Oaks, CA: Sage

Allison, P. (1982). "Discrete-time Methods for the Analysis of Event Histories". *Sociological Methodology.* 13: 61 – 98.

Allison, P. (1984). *Event History Analysis*. Beverly Hills, CA: Sage.

Althauser, R. and A. L. Kalleberg. (1981). "Firms, Occupations, and the Structure of Labor Markets: A Conceptual Analysis". I. Berg. ed. *Sociological Perspectives on Labor Markets*. New York: Academic Press. 119 – 149.

Ariga, K., G. Brunello and Y. Ohkusa. (2000). *Internal Labor Markets in Japan*. Cambridge, UK: Cambridge University Press.

Baily, M. N. (1998). "Extending the East Asian Miracle: Microeconomic Evidence from Korea". *Brookings Papers on Economic Activity. Microeconomic*s. Vol. 1998: 249 – 321.

Becker, G. (1962). "Investment in Human Capital: A Theoretical Analysis". *Journal of Political Economy* 70 (supplement) 9 – 49.

Bernhardt, A., M. Morris, M. Handcock, and M. Scott. (2001). *Divergent Paths: Economic Mobility in the New American Labor Market*. New York, NY: Russell Sage Foundation.

Cappelli, P. (2001). "The Decline of Internal Labor Markets". 207 – 246. I. Berg and A. Kalleberg. eds. *Sourcebook of Labor Markets: Evolving Structures and Processes*. New York, NY: Kluwer Academic/Plenum Publishers.

Carroll, C., H. Haveman, and A. Swaminathan. (1992). "Careers and Organizations: An Ecological Perspectives". *Life-Span Development and Behavior* 11: 112 – 44.

Cheng, M and A. L. Kalleberg. (1996). "Labor Market Structures in Japan: An Analysis of Organizational and Occupational Mobility Patterns". *Social Forces.* 74. 1235 – 1260.

Danziger, S. and P. Gottschalk. (1995). *America Unequal*. Cambridge, MA: Harvard University Press.

Davis, G., K. Diekmann and C. Tinsley. (1994). "The Decline and Fall of the Conglomerate Firm in the 1980s: The Deinstitutionalization of an Organizational Form". *American Sociological Review*. 59: 547 – 570.

Diggle, P. et al. (2002). *The Analysis of Longitudinal Data*. Oxford: Oxford University Press.

DiPrete, T. and K. Nonnemaker. (1997). "Structural Change, Labor Market Turbulence, and Labor Market Outcomes". *American Sociological Review*. 62: 386 – 404.

DiPrete, T., P. Graaf, R. Luijkx, M. Tahlin, and H. Blossfeld. (1997). "Collectivist Versus Individual Mobility Regimes? Structural Change and Job Mobility in Four Countries". *American Journal of Sociology* 103: 318 – 358.

Doeringer, P. and M. Piore. (1971). *Internal Labor Markets and Manpower Analysis*. New York, NY: M. E. Sharpe, Inc.

Freeman, M. (1976). *Labor Markets: Segments and Shelters*. New York, NY: Universe Books.

Greene, W. (2000). *Econometric Analysis*. Upper Saddle River, N.J. : Prentice Hall

Hamilton, G. and N. Biggart. (1988). "Market, Culture, and Authority: A Comparative Analysis of Management and Organization in the Far East". *American Journal of Sociology*. 94: 52 – 94.

Harrison, B. (1974). "The Theory of the Dual Economy". B. Silverman and M. Yanowitch. (eds.) *The Worker in "Post-Industrial" Capitalism; Liberal and Radical Responses*. New York, NY: Free Press. 269 – 287.

Haveman, H. (1995). "The Demographic Metabolism of Organizations: Industry Dynamics, Turnover, and Tenure Distribution". *Administrative Science Quarterly* 40: 586 – 618.

Haveman, H. and L. Cohen. (1994). "The Ecological Dynamics of Careers: The Impact of Organizational Founding, Dissolution, and Merge on Job Mobility". *American Journal of Sociology* 100: 104 – 152.

Harrison, B. and B. Bluestone. (1988). *The Great U-Turn: Corporate Restructuring and the Polarizing America*. New York, NY: Basic Books Inc. Publishers.

Kalleberg, A. and A. Mastekaasa. (1998). "Organizational Size, Layoffs, and Quits in Norway". *Social Forces*. 76: 1243 – 1273.

Kalleberg, A. and A. Sørensen. (1979). "The Sociology of Labor Markets". *Annual Review of Sociology*. 5: 351 – 379.

Kum, J. and J. Jo (2000). *Change in Unemployment Structure and Public Policy*. Seoul: Korean Labor Institute (in Korean)

Lee, J. (2002).. "The Neoliberal Economic Restructuring and the Change of Labor Market in South Korea". *Korean Sociology* 36: 25 – 45. (in Korean)

Marsden, D. (1990). "Institutions and Labour Mobility: Occupational and Internal Labour Markets in Britain, France, Italy and West Germany". R. Brunetta and C. Dell'Aringa (eds), *Labour Relations and Economic Performance.* Basingstoke: Macmillan.

Osterman, P. (1996). "Introduction". Osterman. ed. *Broken Ladder: Managerial Careers in the New Economy*. New York, NY: Oxford University Press.

Petersen, T. and S. Spilerman. (1990). "Job Quits from an Internal Labor Market". K. Mayer and N. Tuma (eds*). Event History Analysis in Life Course Research*. Madison: The Univ. of Wisconsin Press. 69 – 95.

Petersen, T., S. Spilerman and S. Dahl. (1989). "The Structure of Employment Terminations among Clerical Employees in a Large Bureaucracy". *Acta Sociologica*. 32: 319 – 338.

Phang, H. et al. (2000). *Economic Activities of Korean Households and Individuals: I*. Seoul: Korea Labor Institute. (in Korean)

Phang, H. et al. (2001). *Economic Activities of Korean Households and Individuals: II*. Seoul: Korea Labor Institute. (in Korean)

Rosenfeld, R. A. (1992). "Job Mobility and Career Processes". *Annual Review of Sociology* 18: 39 – 61.

Ryu, K. (2001). "Research on the Durability of the Employing Forms". *Korean Labor Economics.* 24. 207 – 230. (in Korean)

Shin, K. and S. Lee. (2000). "Class and Unemployment under the Economic Crisis". *Korean Labor Economics*. 23: 155 – 172. (in Korean)

Shin, W. C. (2001). "The Formation and Evolution of Firm Internal Labor Markets: A Case Study of the Shipbuilding Industry in South Korea". Unpublished dissertation manuscript. Seoul National University, Department of Sociology. (in Korean)

Song, H. (1991). *Labor Politics and Market in Korea*. Seoul: Nanam (in Korean)

Sørensen, A. and N. Tuma. (1981). "Labor Market Structures and Job Mobility". *Research in Social Stratification and Mobility*. 1: 67 – 94.

Spilerman S. and T. Lunde. (1991). "Features of Educational Attainment and Job Promotion". *American Journal of Sociology*. 97: 689 – 720.

STATA Corporation. (2005). *Survival Analysis and Epidemiological Tables Reference Manual*. Austin, TX: Stata Press

Standing, G. (1990). "Labour Flexibility and Insecurity: Towards an Alternative Strategy". 439 – 468. R. Brunetta and C. Dell'Aringa. eds. *Labour Relations and Economic Performanc*e. Hong Kong: The Macmillan Press.

Tinsley, V. and T. DiPrete. (2001). "Corporate and Environmental Influences on Personnel Outcomes in Organizational Labor Markets: A Cross-National Comparison of US and German Branch Offices of a Multinational Bank". *Sociological Forum* 16: 31 – 53.