Earning, Size of Employer, and Labor Turnover in Korea

Young-bum Park*

I. Introduction

It is well known that the power of big firms (empolyers) has grown for the last two decades in Korea. This is one of the consequences of the economic growth strategy adopted by the Korean government, which is to stimulate the domestic economy by encouraging exports led by big firms.

My paper aims to increase our understanding of the impacts of the size of an employer on the Korean labor market by conducting a series of econometric investigations. We observe that there exists a positive size-earning relationship, and that the quit ratio decreases as the size of an establishment increases. In order to explain the wage premium associated with the size of an employer, various hypotheses have been offered. However, there have been no attempts to discriminate empirically between various hypotheses in Korea. Nor have any attempts been made to investigate whether or not various explanations of the positive size-wage effect can be reconciled with the apparently lower quit rates among workers of large employers.

Based on micro data sets, the principal areas of empirical concerns are the effects of the size of an employer on earnings and worker quit behavior as well as the determinants of earnings and worker quit behavior.

The analytic structure employed in this study for the earning and the quit rate equations is the recursive model illustrated in the following.

$$E = a_{01} + a_1 SIZE + c_1 PCHA_1 + d_1 JCHA_1 + e_1, \quad (1)$$

$$PRO = a_{02} + a_2 SIZE + b_2 E + c_2 PCHA_2 + d_2 JCHA_2 + e_2, \quad (2)$$

where

E = earnings of an individual worker,
SIZE = number of employees in an establishment,
PCHA = vector of personal characteristics (e.g., education, experience, sex, marriage status),
JCHA = vector of job characteristics (e.g., occupation, industry),
PRO = quit probability of individual worker,
and e_i = error term in the ith equation.

* Research Fellow, Korea Institute for Economics and Technology.

e_1 and e_2 are assumed to be mutually independent. The recursive model with the mutually independent error terms between two equations, enables us to estimate two equations, separately. The principal justification for the recursive formation of the quit equation is that the exogeneous variables including earnings at the present employer are determined prior to the quit decision.

The details of data sets on which the main analyses are based, are explained in section 2. Section 3 is a brief literature review of the empirical evidence.

The main focus of section 4 is to see whether or not the size-wage effect is explained in terms of the observable differences in the quality of workers and/or working conditions. The labor turnover behavior due to the size of the employer is disclosed in section 5. Given the positive size-wage effect, whether or not the negative size-quit effect is due to the wage premiums associated with larger employers is tested.

Finally, in section 6, the major findings are drawn.

II. Data

The basic data sets used are the 1982 Occupational Wage Survey (OWS) and the 1982 Survey on Circulation Conditions on Labor Force (SCCLF) conducted by the Ministry of Labor in Korea.[1] Since the sizes of both surveys were too big for this study, two sub-data sets were created by the random sampling method in the SAS.

8,121 male workers in the 1,579 manufacturing establishments are included in the data set QUALITY, on which the main analysis of section 4 will be based. This QUALITY was obtained from the 1982 OWS. The data set QUIT was obtained from the 1982 SCCLF. Then, the QUALITY and QUIT sets were merged in order to analyze the labor turnover behavior in Korea, which is the main focus of section 5. QUIT has 234 male regular wokers who quit in the manufacturing sector.

---

1) Both surveys covered about 3,865 establishment, which were selected by a stratified random sampling method from all establishments which employed 10 and over regular workers. Not included, however, were government and local administrative agencies, the army and police, as well as national and public educational agencies. Also, most establishments in agriculture, forestry. hunting, and fishing were excluded. According to the 1982 Mining and Manufacturing Suvey by the Economic Planning Board in South Korea, which covered all establishments with 5 and over regular workers in the mining and manufacturing sectors, the proportion of the workers belonging to establishment with 5 to 9 regular workers in the manufacturing sector was only 4 percent of all workers.

III. Related Literature

Even though there have been many general discussions about the pay differentials by the size of the employer in Korea, comprehensive studies are few. Among them, two studies deserve some comments: Se-il Park (1981) and Foon Koo Park (1981).

S. Park's paper used data collected by Seoul National University and the International Labor Organization. He found that among the manufacturing workers in the Seoul metropolitan area:

1. earning differentials by education were greater in the large sector than in the small sector,
2. substantial earning differentials existed between the large sector and the small sector among workers with the same educational background, and
3. starting wages as well as overtime wages were generally higher in workers in the large sector than in those in the small sector.

The scope of S. Park's data was only the blue-collar workers in Seoul area.

F. Park's work revealed that:

1. the pay differentials by the size of firms were not explained by the human capital variables such as education and experience,
2. the South Korean labor market was segmented multidimensionally rather than dually, and
3. the pay differentials due to the size of the firm had diminished over-time in the 1970s at the aggregate level.

F. Park used the 1980 Occupational Wage Survey as his data base.

No empirical study exists which shows the relationship between the earning of the worker and the labor turnover.[2)]

IV. Earnings and Size of Employer

1. Conceptual Framework

Various theories have been proposed to explain the pay differentials by the size of employer. Many of them have cited the differences in the quality of workers and/or compensating factors as the explanation of the positive size-wage effect. The main focus of this section is to see whether

2) A survey of the empirical studies in other countries are available on request.

or not the size-wage effect is explained in terms of the observable differences in the quality of workers and/or working conditions.

The first explanation for the positive size-wage relationship is that large employers pay higher wages because they employ a higher quality of workers. Various factors have been suggested to explain why large employers need a higher quality of workers.

It has been suggested that differences in the nature of monitoring in large and small establishments influence the quality of labor hired (Lester (1967) and Oi (1983)). Foremen or managers of small establishments would be able to provide closer monitoring of their first-line employees than those of large establishments. Then large establishments are likely to need more responsible and higher quality workers, who can function well without close supervision.[3)]

Brown and Medoff (1983, p.3) supported the high quality-high pay strategy of large employers based on Medoff and Abraham's observation that a large employer's reputation could be better known due to its visibility.

More capital-intensive production is observed in a large employer, which will lead the large employer to purchase high quality workers, since a failure by one worker at a large establishment may jeopardize the performance of many others and damage more expensive capital equipment.[4)]

It has been observed that the more highly skilled labor force is complementary with capital and is jointly substitutable with capital for less-skilled labor. Given a heavier use of capital per capita in a large establishment, workers in a large firm would be more skilled.

It is well known that the government development strategy favors bigger firms. Because larger firms pay higher wages, more skilled workers tend to prefer larger employers rather than smaller ones in Korea. If this is the case, workers in larger employers are paid higher than comparable workers in smaller ones because they are more skilled.

Differences in working conditions have been offered as an explanation

---

3) Oi (1983) argued that large employers need high quality workers in order to reduce the cost of monitoring a given quality of workers. Under the assumption that large firms are larger than small firms because large firms are guided by more capable entrepreneurs, the reduction of monitoring cost by employing high quality workers results in the increment of the quantity of decision-making of the able enterpreneur. However, his assumption that the capability of the entrepreneur does not influence the number of workers to be monitored is dubious, since a more capable entrepreneur should be able to monitor workers more efficiently.

4) This can lead to working condition argument since it will require more formal rules and more regimentation. Also see Duncan and Stafford (1980) for the reference of conditions.

of the pay differentials by the size of the employer. Greater interdependence among workers due to a greater division of labor at a larger establishment would require more formal rules and more regimentation. The larger size of the workplace would also induce a more impresonal atmosphere, if a few of the working conditions associated with the unattractiveness of larger workplaces are cited. If other things are equal, this will lead to higher wages in larger firms.

Given heavier use of capital and greater interdependence among workers in large establishments, it is reasonable to assume that larger employers try to reduce the turnover cost by offering higher wages to comparable workers. As a matter of fact, the quit rate declines and the tenure in years increases. It will be tested in section 5.

The literature describes other factors which explain the positive size-wage effect. These are not tested in this study, however, due to either lack of available data or inappropriateness of the arguments.

Another theory is that larger employers are more likely to have more profits, due to their market powers in the output markets, and that they share exceptional profits with their workers.

Where larger firms are given more support than small ones by the Korean government, it is plausible to assume that larger employers share the benefits with their employees because of public opinion. With the favors offered by the government, if big firms pay meager wages, they would face harsh criticism from the public.

Monitoring difficulty can be cited as a factor to explain why larger employers pay higher wages for a given quality of workers.

The segmented larbor market theory claims that workers of small employers are under-paid, rather than that workers of large employers are over-paid.

2. Model Specification

In order to explain the pay differentials due to the size of the employer in terms of labor quality and/or working conditions, the standard method for analyzing the determinants of wages from cross-section data, using an earning function, will be employed. The earnings of each worker are assumed to depend mainly on four sets of variables: (1) skill, (2) compensating, (3) rent, and (4) discrimination variables. The specification of the model is the following.

$$\begin{aligned} \ln W = {} & a_0 + a_1 S + a_2 EXP + a_3 EXP^2 + a_4 TYPE \\ & + a_5 HOUR + a_6^j \ln SIZE + \Sigma_{i=1}^{12} b_i AREA_i \\ & + \Sigma_{j=1}^{9} c_j IND_j + \Sigma_{k=1}^{10} d_k OCU_k + e \end{aligned} \tag{3}$$

where

W = monthly nomial earnings (regular monthly earnings + premium monthly earnings + (bonus in year/12)) of an individual,
S = years of schooling completed,
EXP = years of potential labor market experience (= AGE - 6 - S),
TYPE = one/zero dummy variable for type of worker (production/nonproduction),
HOUR = total working hours in a month,
SIZE = number of workers in an establishment,
$AREA_i$ = set of dummy variables for geographic location of establishment.
IND_j = set of dummy variables for industry,
OCU_h = set of dummy variables for occupation.
and e = error term.

The skill variables in the model above includes S (= years of schooling completed), EXP (= years of potential labor market experience) and its square. The human capital theory, developed primarily by Becker (1964) and Mincer (1974), states that the skill variables are proxies for the individual stocks of human capital and that earnings in the labor market depend on the human capital stock accumulated by the individual.

The human capital theory developed above tells us that a_1 (= coefficient of the years of schooling completed) in equation (3) can be (approximately) interpreted as the rate of return to schooling. Previous earning function estimations have always revealed that a_2 in equation (3) (= coefficient of the potential labor market experience) >0, and a_3 in equation (3) (= coefficient of the square of the potential labor market experience) <0 reflecting a diminishing rate of return of human capital investment over the life cycle.

All jobs are not the same. Some jobs are more dangerous or arduous than others. Some jobs are in clean and safe working conditions, while others are in dirty and noisy factories. Workers in bad jobs should be given a compensating differential, which can be interpreted as the price at which working conditions can be interpreted as the price at which working conditions can be sold to (or good ones purchased by) workers. Some industries give more secure employement than others; therefore, workers in less secure employment should receive a compensating wage.

This set of factors may be controlled (although somewhat crudely) by the industry and occupation dummies to the extent that the compensating differentials are given due to the variation in working conditions and/or secure employment between industries and/or occupations. However, these industry and occupation dummies are, to some degree, proxies for

skill, luck, social customs (especially occupation), or demand conditions at the survey period. Therefore, the estimates of the major coefficients based on a basic model (without IND and OCU) and a full model (with IND and OCU) will be presented and compared.[5]

The whole manufacturing industry is divided into nine subindustries according to a two-digit Korean Standard Industrial Classification. On the other hand, ten one-digit occupations according to a Korean Standard Occupational Classification represent the occupational dummies in the models.

Second, since W is measured in nominal terms, wage differences across regions in Korea represent a compensating difference for the cost of living differences in the price level to some extent. Workers in the region with the higher cost of living should receive higher wages. The real area wage levels, however, can vary even after adjusting for the cost of living differences. Individuals might receive different degrees of utility from the nonpecuniary aspects of different areas: climate, educational environment for their children, public services, and so on. Individuals might accept low paying jobs in an area of the country that is developing faster, due to the government growth strategy, but would not accept similar low paying jobs in an area without the prospect of development. The rationale for this is that their long-term prospect of income would be better if they live in a fast growing area with a greater probability of enventual attainment of high paying jobs. AREA variables control these factors relevant to the location of establishment.[6]

The rent variable is the size of an establishment, which is the focus variable in this section. Between a worker in the establishment of size S and a comparable worker in the establishment of size S and a comparable worker in the establishment of size S′ is $(W-W')/W' = (\text{exponential of } a_5 (\ln S = \ln S'))-1$.

---

5) The treatment of industry and occupation dummies as exogeneous may cause a simultaneous equation bias. Industry and occupation dummies can be endogeneous. If given the choice, for example, workers would prefer a capital-intensive industry, which pay higher wages. However, when industry and/or occupation dummies are used as endogeneous, it also has problems. Industry and occupation dummies would then enter into the wage equation as predicted values, which are obtained by 2 (or 3) stage least square, or maximum likelihood estimation. Using these predicted values would provide consistent estimates with substantial measurement errors. By treating these variables as exogeneous, these variables come into the wage equation as true variables, lessening measurement errors.

6) In our model, the whole south Korea is divided into thirteen parts: Seoul (the capital city, where 20% of the total population lives), Busan (the second largest city and largest port), urban Kyoungki, rural Kyoungki, urban Chungcheong, rural Chungcheong, urban Jeonra, rural Jeonra, urban Kyoungsang, rural Kyoungsang, urban Kangwon, rural Kangwon, and Jeju.

The discrimination variable in Korea is represented by sex. The standard method to correct this factor is to estimate the wage equation separately for both sexes, which has been done in this study. Note that our concern is pay differential among the male workers in Korea due to the size of employer.

Since the dependent variable is the monthly wage, total working hours in the survey month are included as a variable. Also the production/nonproduction worker dummy variable is included in order to control the different wage structure.[7]

3. Empirical Evidence

Table 1 presents the estimates of the coefficients by the Ordinary Least Square of the basic model (without IND and OCU) and the full model (with IND and OCU) based on the OWS data of the male workers in the manufacturing industry in Korea. Without controlling the worker quality and the compensating factors, the size coefficient is 0.055.

As the basic model shows, this size coefficient decreases (size coefficient is 0.035) in the presence of the controls to be expected to capture much of the quality differentials among workers, which implies that large employers do hire higher quality workers. If the industry and occupation dummies are considered as the proxies for the compensating variables between industries and/or occupations, the increase in the size coefficeient (size coefficient is 0.046) tells that workers in large firms accept lower wages than comparable workers in smaller firsm in exchange for the more secure employment and/or better working condition.

Table 2 presents the expected monthly earning in different sizes of establishments of a nonproduction worker with the mean values of S (=10.826), EX (=14.688), and HOUR (=241.315) in the Seoul area using the estimated coefficients of the basic model in Table 1. This table also shows the expected monthly earnings in different sizes of establishments of a nonproduction worker with the mean value of S, EX, and HOUR in the Seoul area in the industry of food, beverage, and tobacco and the occupation of Professional A using the estimated coefficients of the full model in Table 1. For example, with the basic (full) model, a

7) When a Chow test is done to see a structural break between nonproduction workers and production workers, the null hypothesis between the equality of the coefficients of the separate equations for nonproduction workers and production workers is rejected.

[Table 1] Estimates of the Coefficients with QUALITY

	Simple Model	Basic Model	Full Model
Intercept	12.063***	10.321***	10.622***
	(0.027)	(0.041)	(0.046)
ln Size	0.055***	0.035***	0.046***
	(0.004)	(0.003)	(0.003)
S		0.092***	0.075***
		(0.002)	(0.002)
EX		0.077***	0.072***
		(0.002)	(0.001)
EX^2		-0.001***	-0.001***
		(0.000)	(0.000)
TYPE		-0.214***	-0.179***
		(0.010)	(0.014)
HOUR		0.001***	0.001***
		(0.000)	(0.000)
Busan		-0.134***	-0.126***
		(0.014)	(0.013)
Urban Kyoungki		-0.070***	-0.051***
		(0.013)	(0.013)
Rural Kyoungki		-0.035	-0.033*
		(0.018)	(0.017)
Urban Chungcheong		-0.160***	-0.161***
		(0.025)	(0.024)
Rural Chungcheong		0.048*	0.017*
		(0.029)	(0.029)
Urban Jeonra		-0.079***	-0.072***
		(0.025)	(0.024)
Rural Jeonra		-0.074**	0.067***
		(0.030)	(0.029)
Urban Kyoungsang		0.065***	0.066***
		(0.013)	(0.013)
Rural Kyoungsang		-0.021	-0.022
		(0.017)	(0.017)
Urban Kangwon		0.276***	0.188***
		(0.058)	(0.057)
Rural Kangwon		0.259***	0.180**
		(0.090)	(0.087)
Jeju		-0.107**	-0.317**
		(0.0268)	(0.103)
IND1			-0.124***
			(0.017)
IND2			-0.274***
			(0.026)

IND3			-0.028
			(0.022)
IND4			-0.007*
			(0.018)
IND5			-0.024
			(0.022)
IND6			-0.122***
			(0.022)
IND7			-0.101***
			(0.016)
IND8			-0.212***
			(0.028)
Professional B			0.093
			(0.066)
Administrative			0.304***
			(0.028)
Clerical			-0.070***
			(0.020)
Sales			-0.158***
			(0.052)
Service			-0.481***
			(0.030)
OCU7			-0.202
			(0.147)
Craftsman			-0.160***
			(0.024)
Operative			-0.154***
			(0.023)
Unclassified			-0.147***
			(0.023)
R^2	0.195	0.5418	0.5861
F	162.926	538.321	330.785

*** indicates the coefficient significant at 1 percent.

** indicates the coefficient significant at 5 percent.

* indicates the coefficient significant at 10 percent.

The standard errors are in parentheses.

[Table 2] Expected Wages as a Function of Size of Employer

SIZE	Basic Model	Full Model
30	294,368	319,183
150	311,426	343,710
750	329,473	370,122
1500	337,563	382,133

The Unit is won.

[Table 3] Coefficient of Size Variable with More Disaggregate IND and/or OCU dummies

	No IND Dummies	2-digit IND Dummies (9)	3-digit IND Dummies (26)
No OCU	0.035	0.042	0.034
Dummies	(0.003)	(0.003)	(0.003)
1-digit OCU	0.046	0.046	0.043
Dummies (10)	(0.003)	(0.003)	(0.003)
2-digit OCU	0.048	0.052	0.052
Dummies (49)	(0.003)	(0.003)	(0.003)

The standard errors are in parentheses.

worker in the SIZE of 750 is expected to have a 12 percent (16 percent) wage premium over a comparable worker in the SIZE of 30.[8]

Table 3 shows the estimated coefficients of size variable, all of which are significant at 1 percent, when more disaggregated industry and/or

8) The whole sector is divided into five subsectors by the criterion used in the Labor Statistics of the Korean government publications. Sector 1 covers establishments with 10 to 29 employees. Sector 2 covers establishments with 30 to 99 employees. Sector 3 covers establishment with 100 to 299 employees. Sector 4 covers establishments with 300 to 499 employees. Sector 5 covers establishments with 500 and more employees. With Sector 1 excluded arbitrarily, the basic model (R^2 is 0.5466) and the full model (R^2 is 0.5903) are estimated. The size variables are found as significant at the 1 percent shown in the following table. This is consistent with the previous findings which included the discrete size variables (S. Park (1981) and F. Park (1981)).

Variable	Basic Model	Full Model
Sector 2	0.128	0.150
	(0.026)	(0.028)
Sector 3	0.133	0.185
	(0.029)	(0.028)
Sector 4	0.210	0.254
	(0.029)	(0.028)
Sector 5	0.254	0.314
	(0.028)	(0.027)

The standard errors are in parentheses.

occupation dummies are included. It also implies that the wage differentials due to the size of the employer are not explained by the compensating factors. When 3-digit occupation dummies are employed, the coefficients of most occupation dummies are biased and the size coefficients become insignificant.

Another way to measure a wage premium due to the size of the employer is to look at wages within very-narrowly defined occupational groups, which are supposed to show little skill differentials within the workers of each group. From the whole OWS data set, 16 5-digit occupational subgroups, which have sufficient observations for regression, are selected. All of them are blue-collar workers.

With the discrete size variables, since the continuous size variable is not available for the whole OWS, the basic and full (without OCU) model are regressed by the Ordinary Least Square for each 16 5-digit occupational subgroup.[9] Most of the size coefficients turn out to be positively significant, which supports the idea that a worker of a larger employer is paid more than a comparable worker of a smaller employer within narrowly-defined occupations.[10]

The rate of return to schooling is 9.2 percent in the basic model, and, on the other hand, 7.5 percent in the full model. The signs of a_2 and a_3 in equation (3) turn out as expected, reflecting the diminishing rate of return to post schooling investment in human capital.

Most AREA variables turn out to be significant in both models. The largest nominal wage differential among the areas across the nation is found between urban Kangwon and urban Chungcheong (55 percent with the basic model, 43 percent with the basic model). While most areas show a small wage gap between their urban area and their rural area, in Chungcheong, a worker in the rural area would receive a 23 percent (19 percent) wage premium over a comparable worker in the urban area (with the full model).

The whole sample is stratified by the various exogenous variables in the model. In turn, each stratified subsample is estimated with both models. The estimated size coefficients are shown in Table 4.

---

9) Results are available on request.

10) A better (or supplementary) method to control the unmeasured labor quality is to measure the size-wage relationship using before-and-after data, which is not possible because the before-and-after data are not available in Korea. Before-and-after comparisons contrast the same person over time to correct the bias due to unmeasured dimensions of labor quality which remain fixed over time. Brown and Medoff (1984) found the positive size-wage effect by the longitudinal data of the United State. Also see Freeman and Medoff (1984) for the problems with the longitudinal data in terms of union/non-union wage differentials.

[Table 4] Coefficients of Size Variables in Subgroups

Subgroup	Basic	Full
By Years of Schooling Completed		
Elementary	0.048***	0.056***
(955; 1.4)	(0.009)	(0.009)
Middle	0.027***	0.031***
(2710; 1.4)	(0.005)	(0.005)
High	0.038***	0.050***
(3358; 1.4)	(0.005)	(0.005)
Junior College	0.039***	0.076***
(265; 2.6)	(0.016)	(0.017)
University	0.043***	0.063***
(927; 1.7)	(0.010)	(0.010)
By Experience (Age-6-S) in Years		
$\geqq 10$	0.034***	0.050***
(5512; 1.4)	(0.004)	(0.004)
< 10	0.035***	0.036***
(2700; 1.4)	(0.005)	(0.005)
By Tenure in Years		
$\geqq 5$	0.018***	0.039***
(2518; 1.4)	(0.005)	(0.005)
< 5	0.030***	0.035***
(5694; 1.4)	(0.004)	(0.004)
By Type of Worker		
Production	0.040***	0.046***
(5170; 1.4)	(0.004)	(0.004)
Nonproduction	0.033***	0.053***
(3042; 1.4)	(0.005)	(0.005)
By Area		
Seoul	0.016**	0.024***
(2286; 1.3)	(0.007)	(0.007)
Busan	0.006	0.009
(1037; 1.3)	(0.008)	(0.008)
Urban Kyoungki	0.083	0.019**
(1085; 1.2)	(0.009)	(0.009)
Rural Kyoungki	-0.014	0.027

(489; 1.0)	(0.017)	(0.017)
Urban Chungcheong	0.046**	0.097***
(241; 1.3)	(0.018)	(0.022)
Rural Chungcheong	0.057**	0.055**
(174; 1.2)	(0.03)	(0.032)
Urban Jeonra	0.098***	0.0145**
(246; 1.2)	(0.025)	(0.028)
Rural Jeonra	0.009***	0.037
(163; 0.9)	(0.033)	(0.037)
Urban Kvoungsang	0.068***	0.074***
(1302; 1.7)	(0.006)	(0.006)
Rural Kyoungsang	0.37***	0.041
(559; 1.2)	(0.011)	(0.012)
Urban Kangwon	0.215***	0.073***
(41; 0.9)	(0.048)	(0.207)
Rural Kangwon	0.089	Biased
(17; 0.9)	(0.080)	
Jeju	0.217	0.030
(12; 0.9)	(0.129)	(0.157)
Urban Area (except Seoul and Busan)	0.068***	0.075***
(2915; 1.5)	(0.005)	(0.005)
Rural Area	0.036***	0.043**
(1414; 1.2)	(0.009)	(0.0)
By Industry		
IND0	0.052***	0.063***
(691; 1.2)	(0.014)	(0.013)
IND1	0.010	0.029***
(1615; 1.4)	(0.007)	(0.007)
IND2	-0.001	-0.025
(275; 1.3)	(0.000)	(0.000)
IND3	0.083***	0.084***
(449; 1.1)	(0.018)	(0.018)
IND4	-0.001	0.016*
(1104; 1.3)	(0.009)	(0.009)
IND5	0.080***	0.083***
(525; 1.0)	(0.019)	(0.019)
IND6	0.028***	0.034***
(494; 1.7)	(0.010)	(0.007)
IND7	0.053***	0.052***
(2846; 1.5)	(0.005)	(0.005)

IND8	0.034***	0.049***
(223; 1.0)	(0.028)	(0.027)
By Occupation		
Professional A	0.045***	0.049***
(408; 1.5)	(0.011)	(0.011)
Professional B	0.057*	0.066
(32; 1.2)	(0.029)	(0.040)
Administrative	0.084***	0.084***
(312; 1.4)	(0.017)	(0.017)
Clerical	0.035***	0.039***
(1526; 1.3)	(0.008)	(0.008)
Sales	-0.001	0.0263***
(54; 1.5)	(0.001)	(0.080)
Service	0.076***	0.075***
(252; 2.5)	(0.020)	(0.019)
Craftsman	0.038***	0.051***
(1865; 1.4)	(0.006)	(0.006)
Operative	0.044***	0.045***
(2410; 1.4)	(0.005)	(0.005)
Unclassified	0.040***	0.041***
(1347; 1.3)	(0.008)	(0.008)

*** indicates the coefficient significant at 1 percent.

** indicates the coefficient significant at 5 percent.

* indicates the coefficient significant at 10 percent.

The number of observations in the subsample is the first number in the parentheses in the first column. The standard deviation of the size variables is the second number in the parentheses in the first column. The numbers in the parentheses in the second and the third column are the standard errors of the coefficients

Table 4. reveals that:

1. the wage differentials due to the size of the employer exist and these differentials are larger with the full model than with the basic model,
2. among the subgroups divided by the education level, the junior college graduates would receive the highest wage premium due to the size of the establishment with the full model,
3. when the whole sample is stratified by experience in years (10 years or more versus less than 10 years), with the full model, workers with experience of 10 years or more have higher premiums than those with experience of less than 10 years. On the other hand, with the basic model, virtually no difference exists between the two subgroups,
4. workers with the tenure of less than 5 years receive a higher wage premium

due to the size of the employer than workers with a tenure of 5 years and more with the basic model,

5. in Busan, the size coefficient is insignificant in both models, which comes from the fact that 80 percent of the workers belong to an establishment with 500 employees and more,
6. the wage differentials within each industry or occupation due to the size of the employer are bigger than with the whole occupation and industry,
7. the wage differentials within each occupation, for the classes of the professionals and administrative workers, appear larger than for the other.

V. Voluntary Labor Turnover and Size of Employer

1. Model Specification

Various explanations have been offered to explain the negative size-quit relationship. First of all, since section 4 shows that larger employers pay higher wages to comparable workers than samller employers, workes in larger establishments are less likely to quit. If this is the case, with the other determinants of quit behavior including the wages of the present employer, the negative size-quit relationship should be lower than without those determinants.

Alternatively, Stoikov and Raimon (1968) and Burton and Parker (1969) noted that the negative size-wage relationship can be interpreted as reflecting that the larger establishment the greater the chance of moving from one assignment to another without quitting. This implies that the size of the employer plays a role independent of higher wages in larger establishments.

In this paper, voluntary labor turnover means termination of employment initiated by employees for any reason except retirement, military service, or higher formal education.

In order to isolate the influence of the size of the employer on the quit propensities of individual workers, it is assumed that individual workers maximize their lifetime returns net of cost, so that workers will move out of one employment into another if the latter offers them higher discounted net returns. Returns in a particular establishment consist of the sum of pecuniary benefits adjusted for the compensating factors. On the other hand, costs associated with a particular establishment are composed of the returns that could be earned in an alternative establishment less the cost of moving into that alternative establishment. Note that the empirical work of this study uses the cross-section individual data.

Hence, the theoretical development here is in terms of individual choosing employment between establishments at one point in time.

More formally, an individual worker is assumed to maximize the following utility function,

$$U\left[\int_{t=o}^{T} E\left(R_{it}-C_{it}\right) e^{-rt}\, dt\right], \tag{4}$$

where i = employed establishment of worker,
R_i = returns of employment i,
C_i = costs of employment i,
r = individual discount rates,
T = working life span,
E = mathematical expectation operator,
and t = time.

If (R_i-C_i) is independent of time t,[11] the $\int_{t=o}^{T} E\left(R_{it}-C_{it}\right) e^{-rt}\, dt$ becomes

$$\left(1-e^{-rT/r}\right) E\left(R_i-C_i\right) \tag{5}$$

If r and T are assumed to be fixed across individuals, the utility for individuals mainly depends on $E(R_i)$ and $E(C_i)$. An employee will quit his job when this maximizing process indicates that net returns are higher in other employment. Therefore the propensity for quitting depends on the expected discounted lifetime earnings negatively and the expected costs positively, respectively. The next step would be to identify these factors with the observable variables.

Individual workers are assumed to form their expectation of discounted lifetime earnings in a given establishment based on the current earnings (= WAGE in equation (6)).[12]

For the current nominal earnings to serve as a better indicator of long-term net desirability of a given job, they should also be adjusted for compensating factors.

This set of factors may be controlled (although somewhat crudely) by the industry and occupation dummies (IND and OCU in equation (6)) to

11) This implicitly assumes that workers take on a job without intending to leave after a given period of time.

12) Whether current earnings are a useful indicator of the discounted lifetime earnings in a given establishment is an untested empirical question. The higher the correlation of wage rates over time, the better the current wage is as an indicator.

the extent that the compensating differentials are given due to the variation in working conditions and/or secure employment between industries and/or occupations. The whole manufacturing industry is divided into nine sub-industries according to a two-digit Korean Standard industrial Classification. On the other hand, eight occupational dummy variables are inluded in the model.

Second, since WAGE is measured in nominal terms, wage differences across regions in Korea represent a compensating difference for the cost of living differences in the price level to some extent. Area dummy variables (= AREA in equiation (6)) seek to capture these factors. In our model, Korea is divided into ten parts.

Costs associated with a particular industry are composed of the returns that could be earned in an alternative establishment less the cost of moving into that alternative employment.

Since the returns that could be earned in an alternative employment are not observable, it is assumed that the returns are positively related to the skill of individual workers. The number of years of schooling completed (= S in equation (6)) and the dummy variables for the potential labor market experience (= EXP 1 and EXP 2 in equation (6)) are included as skill variables, which are expected to show positive signs according to this interpretation.

However, S EXP 1, and EXP 2 can stand for other factors, too. Higher levels of education might stand for the unmeasured stability and motivational characteristics of workers. On the other hand, the longer the working life of an individual is, the higher the rate of return on an investment in changing a job. This implies that more experienced workers show lower quit tendencies since more experienced workers mean older workers in the model. Therefore, the signs of these variables can not be predicted a prior.

Human capital theory by Oi (1962) and Becker (1964) provides important insights into the analysis of voluntary labor turnover. The theory recognizes that workers may be of specific value to the establishment where they are currently employed, due to skills and knowledge peculiar to that establishment. This often causes the differences between the attractiveness of one's current job and alternative ones. Therefore, the larger the volume of specific human capital, the higher the cost of moving into another employment.

Tenure (= TEN 1 and TEN 2 in equation (6)) is highly correlated with the quantity of specific human capital acquired, and is expected to be inversely related to quitting. Dummy variables are used because a continuous tenure variable is not available in the SCCLF.

In general, workers are more attached to their geographical location rather than to an industry or an occupation and primarily search for employment within their own community. The larger the labor market, the smaller the costs of search and the less likely that expenses will be incurred in moving into a different area. The better the local labor market conditions are the easier alternative employment are found. Area dummy variables (= AREA) also seek to capture these factors.[13]

In this framework, the specification of the model is the following,

$$\begin{aligned} PRO = {} & a_0 + a_1 \ln WAGE + a_2 S + a_3 EXP1 \\ & + a_4 EXP2 + a_5 MAR + a_6 \ln SIZE \\ & + a_7 TEN1 + a_8 TEN2 + \Sigma_{i=1}^{10} b_i AREA_i \\ & + \Sigma_{j=1}^{8} c_j IND_j + \Sigma_{k=1}^{9} d_k OCU_k + e , \end{aligned} \tag{6}$$

where

PRO = probability of quitting,
WAGE = sum of regular monthly earnings, premium monthly earnings, and (bonus in year/12) for non-quitter, on the other hand, total earnings in the previous month for quiter,
S = years of schooling completed,
EXP1 = dummy variable with the value of one, if the number of years of potential labor market experience (= AGE - 6 - S) is equal to or greater than 5, and less than 10, otherwise, the value of zero,
EXP2 = dummy variable with the value of one, if the number of years of potential labor market experience is equal to or greater than 10, otherwise, the value of zero,
MAR = one/zero dummy variable for marital status,
SIZE = number of workers in an establishment,
TEN1 = dummy variable with the value of one, if the number of years in tenure is equal to or greater than 5, and less than 10, otherwise, the value of zero,
TEN2 = dummy variable with the value of one, if the number of years in tenure is equal to or greater than 10, otherwise, the value of zero,
$AREA_i$ = set of dummy variables for geographic location of establishment,
IND_j = set of dummy variables for industry,
OCU_h = set of dummy variables for occupation,
and e = error term.

13) Local unemployment rates and/or size of local labor markets would be preferable to the area dummy variables, if available.

2. Empirical Evidence

Since only quitting and non-quitting are observable and PROs (=probabilities to quit) are unobservable, the logitic analysis provides an appropriate functional form. Quit is a binary choice variable with the value of one, if an individual quits; othersiwe, it has a value of zero. Equation (6) can be converted into

$$PRO = 1/(1+\exp(-\Sigma_{i=1}^{35} B_i X_i)), \quad (7)$$

where X_is = explanatory variables in equation (6). Notice that the derivatives of the explanatory variables depend on the values of the explanatory variables themselves since $\partial PRO/\partial X_i = B_i PRO(1-PRO)$.

Table 5 shows the estimates of the coefficients based on the OWS and the SCLLF data of the male workers in the manufacturing industry in Korea. Without controlling the other factors of quit behavior (Model A) the size coefficient is -0.189, significant at the 1 percent level.

However, with the other factors included (Model B), the estimate of the size coefficient becomes insignificant, also shown in Table 5. This implies that the negative size-quit relationship comes from the fact that large employers pay higher wages adjusted for compensating factors. Also note that the coefficient of SIZE becomes insignificant at the 10 percent of significance level even with only WAGE included.

Turning to determinants of quit behavior other than firm size, the coefficients of most variables turn out to be expected. First of all, the coefficient of ln WAGE turns out to be negative and significant, as expected.

The number of years in schooling completed (=S) and the dummy variables for the potential labor market experience (=EXP1 and EXP1) show insignificant signs.[14] it can be interpreted as revealing that workers with more schooling may have greater alternative employment, thus have higher quit probabilities, yet higher education might also act as a proxy for unmeasured stability or motivational characteristics. For EXP1 and EXP2, as the proxies for general human capital, these variables would induce greater alternative employment. At the same time, more experience means older workers, who have lower quit tendencies due to lower expected earnings in finite lifetimes.

---

14) It is not too surprising to find the insignificant estimates of EXP1 and EXP2 with the tenure variables (=TEN1 and TEN2) included. However, when the model is estimated without TEN1 and TNE2, the coefficients of EXP1 and EXP2 remain insignificant at the significance level of 10 percent.

TEN1 and TEN2, which are the proxies for the volumes of specific human capital, appear to be negative and significant. This strong tenure variable can be interpreted in that workers with long tenure have personal characteristics that make for more stable workers, since they have revealed themselves as non-quitters.

Some of AREA dummy variables with the whole sample turn out to be significant. All of the IND dummy variables turn out to be insignificant; on the other hand, most OCU variables appear significant.

[Table 5] Determinants of Quit Behavior: Multivariate Logit Results

	Model A	Model B	MOdel C
Intercept	-2.415***	13.963***	14.012***
	(0.286)	(2.414)	(2.427)
ln SIZE	-0.189***	0.014	—
	(0.047)	(0.055)	
Sector 2	—	—	0.145
			(0.419)
Sector 3	—	—	0.081
			(0.407)
Sector 4	—	—	-0.163
			(0.428)
Sector 5	—	—	0.095
			(0.402)
TEN1		-0.989***	-0.985***
		(0.162)	(0.162)
TEN2		-0.230***	-1.217***
		(0.281)	(0.281)
S		-0.029	-0.026
		(0.037)	(0.037)
EXP1		0.225	0.217
		(0.206)	(0.207)
EXP2		0.378	0.369
		(0.259)	(0.260)
MAR		0.268	0.259
		(0.203)	(0.204)
ln WAGE		-1.313***	-1.317***
		(0.200)	(0.202)
Busan		-0.500**	-0.485**
		(0.230)	(0.230)
Urban Kyoungki		0.296*	0.298*
		(0.178)	(0.178)

Rural Kyoungki	0.150	0.179
	(0.242)	(0.243)
Urban Chungcheong	-0.754	-0.751
	(0.477)	(0.478)
Rural Chungcheong	-0.702	-0.735
	(0.612)	(0.614)
Urban Jeonra	-0.146	-0.165
	(0.392)	(0.395)
Rural Jeonra & Jeju	-0.702	-0.709
	(0.614)	(0.615)
Kyoungsang	-2.744***	-2.739**
	(0.516)	(0.516)
Kangwon	-0.680	-0.653
	(1.049)	(1.049)
IND1	-0.455	-0.452
	(0.320)	(0.322)
IND2	0.010	-0.014
	(0.410)	(0.411)
IND3	0.268	0.248
	(0.394)	(0.395)
IND4	0.129	0.118
	(0.338)	(0.339)
IND5	0.503	0.531
	(0.386)	(0.388)
IND6	-0.168	-0.166
	(0.443)	(0.445)
IND7	-0.059	-0.075
	(0.317)	(0.318)
IND8	-0.357	-0.358
	(0.449)	(0.452)
Administrative	-0.132	-0.166
	(0.065)	(0.066)
Clerical	-0.704**	0.702**
	(0.381)	(0.381)
Sales	-7.081	-7.088
	(21.009)	(20.755)
Service	-2.691**	-2.699**
	(1.070)	(1.070)
Craftsman	-0.607	-0.604
	(0.384)	(0.384)

Operative		-0.873**	-0.860**
		(0.372)	(0.372)
Unclassified		-0.894**	-0.895**
		(0.394)	(0.394)
Log L	-1061.93	-885.53	-884.61

*** indicates the coefficient significant at 1 percent.

** indicates the coefficient significant at 5 percent.

* indicates the coefficient significant at 10 percent.

The standard errors are in parentheses.

VI. Conslusion

My dissertation aimed to increase our understanding of size factors in the Korean labor market by conduting a series of econometric investigations with the micro data sets of male workers in the manufacturing industry. We showed that workers in the larger establishments were more skilled than workers in the smaller establishments. However, these skill differentials did not explain the pay differentials which were due to the size of employer.

Within each subgroup of the narrowly defined occupational groups assumed to show little skill differentials within itself, it was seen that the size of the employer also mattered. This confirmed the positive earning-size relationship based on the whole sample of workers.

The negative size-quit relationship became insignificant when the other determinants affecting quit probabilities of individuals were included. Even only with earnings from the present employer included, the coefficient of size variable became insignificant. One interpretation would be that the negative size-quit relationship was due to the fact that the larger employers paid higher wages to comparable workers.

Because this study is micro-scopic in approach, it does not form the basis for any argument that economic development in Korea should or should not favor larger firms since, on average, they pay higher wages. However, from the view point of the management of individual firms, this study, especially the quit rate equation, which is new, suggests that firms can reduce the turnover cost by offering higher wages to employees. Furthermore, it permits managers to estimate by how much the quit rate is reduced for a particular wage differential. Thus, the managers who

have estimates of the costs that labor turnover imposes on their operations should be able to compute an estimate of the cost-effectiveness of reducing turnover by paying higher wages.

References

1. Branes, William F. and E.B. Jones, "Differences in Male and Female Quitting," *The Journal of Human Resources*, Fall, 1974, pp. 448-65.
2. Becker, G.S., *Human Capital*, New York: NBER, 1964.
3. Bellante, Don, "North-South Differentials and the Migration of Heterogeneous Labor," *The American Economic Review*, March, 1979, pp. 166-75.
4. Blau, Francine D. and L.M. Kahn, "Causes and Consequences of Layoffs," *Economic Inquiry*, April, 1981, pp. 270-96.
5. Birch, David L., "Who Creates Jobs?," *The Public Interests*, Fall, 1981, pp. 1-14.
6. Brown, Charles C. and J. Medoff, "Large Employers and Small Employers in the Labor Market," Mimeograph, 1983.
7. Burton, John F. and J.E. Parker, "Interindustry Variations in Voluntary Labor Mobility," *Industrial and Labor Relation Review*, January, 1969, pp. 199-216.
8. Duncan, Greg J. and F.P. Stafford, "Do Union Members Receive Compensating Wage Differentials?," *The American Economic Review*, June, 1980, pp. 353-71.
9. Freeman, Richard B., "The Exit-voice Tradeoff in the Labor Market: Unionisms, Job Tenure, Quits, and Separations," *The Quarterly Journal of Economics*, June, 1980, pp. 643-71.
10. _____ and J.L. Medoff, "Impact of Collective Bargaining: Illusion or Reality," *U.S. Industrieal Relations, 1950-1980: A Critical Assessment*, ed. by J. Stieber, R.B. Mekersie, and D.Q. Mills, Industrial relations Research Association, 1981.
11. _____ and _____, *What Do Unions Do?*, New York: Basic Book, 1984.
12. Griliches, Zvi, "Capital-Skill Complementary," *The Review of Economics and Statistics*, November, 1969, pp. 465-68.
13. _____ and W. Mason, "Education, Income and Ability," *The Journal of Political Economy*, May, 1972, pp. s74-s103.
14. Hashimoto, Masanori and J. Raisian, "Employment Tenure and Earning Profiles in Japan and the United States," Mimeograph, 1984.
15. Ho Sam, "Small-Scale Enterprises in Korea and Taiwan," *World Bank Staff Working Paper No. 384*, April, 1980.
16. Johnson G.E., "Intermetropolitan Wage Differentials in the United States," *The Measurement of Labor Cost*, ed. by J.E. Triplett, Chicago: National Bureau of Economic Research, 1983.
17. Jovanovic, Boyan, "Job Matching and the Theory of Turnover," *Journal of Political Economy*, October, 1979, pp. 972-90.
18. Kwoka, Joh, "Monopoly, Plant, and Union Effects on Worker Wages," *Industrial and Labor Relations Review*, January, 1983, pp. 251-57.
19. Lester, Richard, "Pay Differentials by the Size of Establishment," *Industrial Relations*, October, 1967, pp. 57-67.
20. Lindauer, David, "Labor Market Behavior in the Republic of Korea," *World Bank Staff Working Paper No. 641*, July 1984.
21. Maddala, G.S., *Limited-Dependent and Quantitive Variables in Econometrics*, Cambridge, Cambridge University Press, 1983.

22. Masters, Stanley H., "Wages and Plant Size: An Interindustry Analysis," *The Review of Economics and Statistics*, February, 1969, pp. 341-435.
23. Mellow, Wesley, "Employer Size and Wages", *The Reveiw of Economics and Statistics*, August, 1982, pp. 495-501.
24. Mincer, Jacxob, *Schooling, Experience, and Earnings*, New York: NBER, 1974.
25. _____ and B. Jovanovic, "Labor Mobility and Wages," *Studies in Labor Market.*" ed. by Sherwin Rosen, Chicago: National Bureau of Economic Research, 1981.
26. Ministry of Labor, *Report on First-Quarter 1982 Monthly Labor Survey*, Seoul: Korea, 1982.
27. _____, *Report on 1982 Occupational Wage Survey*. Seoul: Korea, 1983.
28. _____, *Survery Report on 1982 Circulation Conditions of Labor Force*, Seoul: Korea, 1983.
29. _____, *Yearbook of Labor Statistics*, Seoul: Korea, 1983.
30. National Bureau of Statistics, Economic Planning Board, *Korea Statisticsl Yearbook* for each year, Seoul: Korea, 1980, 1981, 1982, 1983.
31. _____, *1980 Population and Housing Census Report Vol. 1 and Vol. 2*, Seoul: Korea, 1982.
32. Oi, Walter Y, "Fixed Employment Costs of Specialized Labor," *The Measurement of Labor Cost*, ed. by J.E. Triplett, Chicago: National Bureau of Economic Research, 1983.
33. Park, Foon Koo, "Kiupgyumobyul Yimgumkyugckabunsuk (An Analysis of Wage Differentials According to Firm Size)," *Korea Development Review*, December, 1981, pp. 44-63.
34. Park, Se-il, "Determinant of Individual Earnings in Korea: An Estimation of Earnings Function in A Dualistic Labor Market," *Korea Development Institute Monograph, 1981.*
35. _____, "Nodongjohapy Ymgummha Sangsansungye Michin Younghang Bunsuk (Analysis of Impact of Labor Union on Wage and Productivity)", *Korea Development Review*, Summer, 1983, pp. 2-29.
36. Parsons, Donald O., "Specific Human Capital: An Approach to Quit Rates and Layoff Rates," *The Journal of Political Economy*, November, 1972, pp. 1120-43.
37. _____, "Models of Labor Market Turnover: A Theoretical and Empirical Survey," *Research in Labor Economics*, ed. by Ronald Ehrenberg, Greenwich, Connecticut: Jaipress Inc., 1977.
38. Pencavel, John H., *An Analysis of the Quit Rates in American Manufacturing Industry*, Princeton: Princeton University Press, 1970.
39. _____, "Wages, Specific Training, and Labor Turnover in U.S. Manufacturing Industries," *International Economic Review*, February, 1972, pp. 53-64.
40. Stoikov, Vladimir and R.L. Raimon, "Determinants of Differences in the Quit Rate Among Industries,: *The American Economic Review*, December, 1968, pp. 1283-1898.
41. Viscusi, W. Kip, "Sex Differences in Worker Quitting", *The Review of Economics and Statistics*, August, 1980, pp. 388-97.