

Export-Led Growth and Manufacturing Wage Structure of Production Workers : the Case of South Korea

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I . Introduction

It is well-known that the past 30 years of phenomenal economic growth of South Korea is a consequence of export-promotion of labor-intensive manufactures. The successful performance of Korean manufacturing, however, has been facilitated by the mobilization of an inexpensive yet high quality labor force. An important question revolving around such observation is : How differently has this export-led industrialization benefited workers of diverse backgrounds, belonging to various segments of the economy ? To be specific, do the workers earn more in the export sector than in the nonexport sector ? How much less do women make than men ? And, how do the wages vary across geographical regions and among firms of different size ? Analyzing these wage disparities help identify the sources of income inequality, a pressing issue gripping currently the minds of the Korean populace as revealed by the severity of the recent labor strife.

Past studies of Korean wages tend to be confined to returns to human capital, inadequately encompassing these disparities.

Moreover, their empirical results need updating in order to reflect coming of age in export-led growth of the Korean economy. ¹ This paper measures and analyzes empirically various structural wage differentials prevalent currently among Korean production workers in manufacturing, the backbone industry of the successful export-led economy. Our reason for focusing exclusively on production workers is that their lack of financial resources and, consequently, of market information inhibits job hopping and migration, rendering structural wage differentials most pronounced and persistent among these workers.

The organization of this paper is as follows. Section II describes the background of the Korean economy characterized by a number of disparities in accessibility to economic opportunities. Section III estimates wage equations to measure wage differentials due to these disparities. Finally Section IV concludes the paper.

II. Labor Market Structure in Korean Manufacturing : the Background

According to human capital theory, the wage level of a worker is determined by his/her human capital contents. Hence a worker makes a low wage because his/her productivity is low due to lack of investment in human capital. This human capital-wage nexus explains why different workers make different earnings under seemingly identical circumstances. However, the circumstances or the socio-economic environments, which affect individuals' accessibility to better economic opportunities, are rarely identical across workers. South Korea is no exception, which undergoes rapid transition from an agrarian to an industrial economy. The successful growth of the Korean economy in the last three decades via export promotion of the labor-intensive manufacturing sector has generated a host of socioeconomic dichotomies in the labor market for manufacturing.

Among important ones are export versus domestic sector, rural versus urban regions, small versus large firms, and male versus female labor.

1) Export versus Domestic Sector

Since the mid 1960's, Korean trade policies have been directed increasingly toward export promotion of manufactured goods, deemphasizing import substitution of earlier years. A variety of export incentives such as preferential treatments on credits and taxes and tariff exemptions on imported inputs have been highly effective, generating annual average growth rates in real terms of 26.0% for exports and 6.7% for per capita GNP in the period 1965-1981. Real wages in manufacturing have grown at the rate of 7.9% in the same period, much faster than the per capita GNP. 2

These figures testify that the export-led growth of manufacturing has served as the engine of Korean economic growth. But do they imply that

the manufacturing wage rates are higher in the export sector, which sells its products mostly in the international market keeping abreast of the governmental export promotion policies, than in the sector which serves mainly domestic clients possibly taking advantage of import substitution policies of the government ?

As for the wage effects of exporting, proponents of Lewis type dualism would set aside the exporting sector as the modern sector exhibiting high labor productivity. ³ Hence they would hypothesize that the wage rates should be higher in the export sector than in the nonexport sector. On the other hand, in order for a subsector of manufacturing in a labor-rich, resource-poor developing country to concentrate on foreign sales, it must possess international comparative advantage in the form of lower wage costs relative to other subsectors, if other things are held equal. Furthermore, the disciplinary effects of having to compete with foreign firms in the international market may prevent the wages from rising beyond the internationally competitive level, reinforcing the export-low wage relation.

Thus, the hypothesis based on dualism and that on international competition predict exactly opposite relations between exporting and the wage, necessitating empirical testing for the validity of each hypothesis.

2) Regional Wage Disparities

The autocratic general-turned presidents, Park (1961-78) and Chun (1979-88), both from KyongSang provinces in the southeast, have exploited their geographical political base by porkbarrel politics, ³ developing KyongSang as an industrial powerhouse comparable to Seoul-Inchon-KyongGi Area. But Cholla provinces in the southwest, the stronghold of political dissidents, including a current leader Kim DaeJung, throughout the post Korean warperiod have been left in an economic backwater. ⁴ Since the mid 1970's, Pusan, the political base of another opposition leader, Kim Young-

Sam, has joined the league of the left-out regions.

As a result, a severe regional disparities have surfaced in terms of infrastructure provision and hence in personal income.

This is corroborated by the fact that the ratio of per capita income of KyongSang relative to Seoul has improved vastly from 45% to virtual parity over 1963-1983, while the same ratio for Cholla has budged little, from 45% to 56.5%. Undoubtedly, one would expect similar regional disparities in worker earnings although they have rarely been documented systematically in the past.

3) Wage Differentials among Small and Big firms

Labor market studies of developed countries have witnessed higher wages among larger firms. Several explanations have been offered for the observed positive association between wage and firm size in the U.S. First, their low costs of unionization larger firms make them easier to unionize or more susceptible to the threat of unionization, producing the union wage premium.

Second, their big product market shares and ensuing monopolistic profits provide large firms with high ability to pay, which also tend to increase their wage level.⁶ Third, the high cost of monitoring work effort and worker ability for a large heterogeneous work force makes it more economical for big firms to pay a monitoring wage premium which induces high work efforts among employees or attracts high ability workers to join the firms.⁷

The union effect in Korea is deemed nonexistent prior to the Democratization Proclamations of June 29, 1987 because of the traditional suppression and manipulation of labor movements by the government. But the high ability to pay and monitoring effect seem to apply to large Korean firms, More importantly, the big Korean firms, especially the conglomerates

called Chaebol, enjoy not just monopolistic power in the product markets but also the institutionalized monopsonistic power in the financial markets, in which the government rations mostly to the Chaebol firms the low-cost credits intended for export promotion or import substitution, imposing extra hardships on the unprivileged small firms.⁸ This institutionalized monopsonistic power in financing may reinforce the big firm wage premiums.

4) Wage Differentials Between Sexes

In 1986, an average woman earned only 46.7% of what an average man did in Korea. This sex differential in wages may not be completely explained by the low female labor productivity, the unexplained differential being an indication of sex discrimination. Several past studies report wage discrimination against women in Korea.⁹ Most of these studies specify regression models encompassing all occupations, using occupational dummies for the intercept. Hence, these past estimates of sex discrimination may be biased because of slope differences among occupations. To avoid the bias, we confine our analysis of manufacturing wages to only one occupation, production workers. The high proportion of production workers over the total labor force, comprising 56.4% of all the male workers and 66.2% of all the female workers, and the heavy female representation among production workers in manufacturing amounting to 50.3% makes our selection of the occupation especially appropriate for the study of male-female wage differentials.¹⁰

III. The Model, the Data, and Estimated Results

According to the human capital approach a worker's wage is determined by his/her productivity traits such as education and experience. We extend

the human capital approach, incorporating into the wage equation the structural earnings disparities in terms of international openness of the product market, region, and firm size. We apply the following specification for the logarithm of hourly wages ($\ln w$) of a worker separately to males and females :

$$\begin{aligned} \ln w = & \beta_0 + \beta_1 \text{Ed} + \beta_2 \text{Exp3} + \beta_3 \text{Exp5} + \beta_4 \text{Exp10} \\ & + \beta_5 \text{Exphi} + \beta_6 \text{Ten} + \beta_7 \text{Ten2} + \beta_8 \text{Marry} + \beta_9 \text{Open} \\ & + \beta_{10} \text{Growth} + \beta_{11} \text{Pusan} + \beta_{12} \text{KynugIn} + \beta_{13} \text{Central} \\ & + \beta_{14} \text{Southwest} + \beta_{15} \text{Southeast} + \beta_{16} \text{Size1} + \beta_{17} \text{Size2} \\ & + \beta_{18} \text{Size3} + \beta_{19} \text{Size4} + \beta_{20} \text{Size5} + \beta_{21} \text{Size6} \\ & + \beta_{22} \text{Size7} + \beta_{23} \text{M1} + \beta_{24} \text{M2} + \beta_{25} \text{M3} + \beta_{26} \text{M4} + \beta_{27} \text{M5} \\ & + \beta_{28} \text{M6} + \beta_{29} \text{M7} + \beta_{30} \text{M8}. \quad (1) \end{aligned}$$

Among the right hand side variables of (1), Ed, Exp3 - Exphi, Ten and Ten2 represent worker productivity traits. Marry may affect work efforts or serve as a productivity signal for firms to determine wages. Open stands for the international openness of the product market based on the 3-digit industry classification. Growth measures the sales growth of the product market.¹¹

The dummy variables, Pusan through Southeast represent different regions. Size1 through Size7 are firm size dummies.

Exact variable definitions along with sample statistics are given in Tables 1 and 2. M1 through M8 are the 2-digit industry code dummies, which incorporate into the wage equation the characteristics of the product market as well as the labor market unique to each industry.

The data used for estimation of the above equation come from the 1986 Occupational Wage Survey, Ministry of Labor, the Republic of Korea. As stated earlier, we restrict the sample to full-time production workers in manufacturing who are engaged in production processes, including equip-

ment operators and laborers. The estimated regression results for both males and females are listed in Table 4.

Prior to discussing the nature the structural wage disparities, we examine first the coefficient estimates of the variables typically included in the human capital earnings function. Among those variables, Ed, Exp3 - Exphi, and Ten provide statistically significant coefficient estimates with their wages magnitudes being consistent with human capital theory. Namely wages increase with education, general occupational experience and current job tenure, a measure of firm specific training. The coefficient estimate of the squared tenure term, Ten2, is significant and negative for males, indicating diminishing returns to specific training. It is insignificant for females, though negative. The coefficient estimate of Marry is significant and positive for males, which implies that marriage for males signal high labor productivity and employment stability. This observation, however, does not apply to females, since the estimate is significant but negative for females.

According to our regression results, the four types of structural wage disparities mentioned in Section II operate in Korea as follows, First, the coefficient estimates of Open reveal that the export sector pays lower wages than the domestic sector. Specifically, a 1% increase in the proportion of the output exported of a manufacturing sector proportion of the output exported of a manufacturing sector is associated with a decline in the sectoral wage rate of 0.16% for males and 0.21% for females.¹² This confirms the comparative advantage-cum-competition principle, rejecting the Lewis type dualism.¹³ The principle is supported also by the significantly negative estimates of the coefficient of Growth indicating an inverse relation between the growth rate of the sales volume of an industry and its wage level. The estimates show that a 1% increase in the sales volume is associated with a decrease in the wage of 0.84% for males and 0.43% for females. This implies that the advantage of the low labor cost enables the

industry sales to grow, providing an evidence that the comparative advantage-cum-competition principle works domestically across industries too.

Second, the coefficient estimates of region dummies testify to the presence of regional wage disparities. ¹⁴ But the patterns of the wage differentials match imperfectly the regional distribution of political power mentioned earlier, i. e., power monopoly by the Southeast at the cost of the Southwest and Pusan. The anti-logarithms of the estimates indicate that the male wage is highest in the Southeast with a 2.4% premium over Seoul and lowest in Pusan with a -9.1% premium, both figures being consistent with the power distribution. The second lowest region is Central with -5.3% premium over Seoul. Inconsistent with the expectation is the male wage in the Southwest which is not significantly different from that in Seoul or KyungIn. ¹⁵ Among females, as expected, the Southwest shows the lowest wage, 14.6% less than Seoul. The next lowest region is Pusan, making 11.7% less than Seoul. The female wage in the Southeast is 10% less than in Seoul, 3% less than in KyungIn and around the same level as in Central, but it still exceeds that in Pusan and the Southwest. ¹⁵

Third, the significant and negative coefficient estimates of firm size dummies for males reveal that males earn the most in the biggest firms which hire 500 or more employees. Moreover, the male earnings increase monotonically with the firm size except around Size2. Among females, however, the smallest size, which is Size1, and the sizes larger than Size4 show insignificant coefficient estimates. The coefficients of Size2 through Size4 are significant and negative with that of Size3 being the smallest.

Thus the relation between firm size and female earnings is U-shaped as illustrated in Figure 1. That is, the female wage increases with firm size only when the firms are at least as big as Size3, hiring 100-300 employees. Otherwise, the wage decreases with the firm size. The increasing phase is justified by the monitoring and ability-to-pay hypotheses. An explanation of the puzzling decreasing phase among small sized firms, however, may be

that small size operation provides cozy work atmosphere and close worker-management relation which reduces the cost of monitoring workers. Also, small firms may require the workers to perform more tasks than large firms, which lead to higher marginal labor productivity in small firms. As a result, small firms can afford paying higher wages until these benefits are dominated by the big firm wage premiums as mentioned earlier.

Fourth, wage differentials between sexes are summarized in Table 5, comparing the regression results of the male and female wage equations. According to the table, the hourly wage of 686 won for a female with average female characteristics, \bar{X}_f , is only 54% of the average male wage of 1257 won, the differential being 571 won. But a sizable portion of the differential may be non-discriminatory, stemming from differences in worker characteristics between sexes. A measure of wage discrimination against women adjusting for characteristics differences is A_f , the ratio of the expected wages of females and males both being equally endowed with \bar{X}_f , average female characteristics. An alternative measure, A_m , is the same as A_f except that both sexes are assumed to possess \bar{X}_m , the average male characteristics.¹⁶

Our estimate of A_m in Table 5 shows that women are paid 67.2% of the equally qualified men while our A_f estimate gives the figure at 76.8%. Both figures show the presence of substantial discrimination against women in the Korean labor market. As for the discrimination in other developing countries in Asia, previous studies report an A_f estimate of 76.9% in Taiwan, an almost identical level as in Korea. But the reported discrimination in Malaysia is less, as given by its higher A_m estimate of 73%. The estimates of A_m in the U.S., Canada and Sweden, ranging from 72% to 85%, reveal that discrimination against women in Korea is much larger than in the developed countries.¹⁷

IV. Concluding Remarks

The present research has concerned structural wage disparities in South Korean manufacturing : i) between export and import sectors, ii) among geographical regions, iii) between sexes, and iv) across firm sizes. These wage disparities reflect wage determining forces other than the individual worker's productivity traits. Hence they are structural in nature.

These structural forces have been incorporated into the human capital wage equations to estimate the magnitudes of the structural wage disparities. According to our findings, wage rates are lower in the export than in the domestic sector, confirming that the principle of comparative advantage works. The sex differential in wages in Korea is found to be substantial and much larger than in the developed countries. In the future this may have to be reversed since the continual high growth of the Korean economy necessitates the utilization of female labor with the pool of untapped male labor being exhausted percipitously. The estimated regional wage disparities seem to be in line with the widely held public view that the government initiated development programs have favored the Southeast at the cost of Pusan and the Southwest.

Finally the wage differentials across firm size indicate that larger firms tend to pay higher wages for males, while the firm size-earnings relation is U-shaped for males, while the firm size-earnings relation is U-shaped for females. This contrast between sexes in the firm size-earnings relation bear witness to labor market segregation according to sex, possibly one of the vehicles for discrimination against women.

Table 1. Variable Definitions

Hwage Hourly wage including bonuses in won (Korean monetary unit, 1\$ = 861.40 won as of 12-31-86)

Inw Log of hourly wage

Marry =1 if married ; =0 otherwise.

Ed Years of Schooling

Experience Dummy Variables

Reference Point : Years of Experience in the Current Occupation (ECO) is less than 1

exp3 =1 if $1 \leq ECO < 3$; =0 otherwise.

exp5 =1 if $3 \leq ECO < 5$; =0 otherwise.

exp10 =1 if $3 \leq ECO < 10$; =0 otherwise.

exphi =1 if $10 \leq ECO$; 0 otherwise.

Ten Years of work at the current job

Firm Size Dummies

Reference point : the Number of employees in the establishment.

(Firm Size) greater than or equal to 15000

Size1 =1 if $10 \leq \text{Firm Size} < 30$; =0 otherwise.

Size2 =1 if $30 \leq \text{Firm Size} < 100$; =0 otherwise.

Size3 =1 if $100 \leq \text{Firm Size} < 300$; =0 otherwise.

Size4 =1 if $300 \leq \text{Firm Size} < 500$; =0 otherwise.

Size5 =1 if $500 \leq \text{Firm Size} < 999$; =0 otherwise.

Size6 =1 if $1000 \leq \text{Firm Size} < 5000$; =0 otherwise.

Size7 =1 if $5000 \leq \text{Firm Size} < 15000$; =0 otherwise.

Region Dummies

Reference Point : Seoul

Pusan =1 if Pusan ; =0 otherwise.

KyungIn =1 if Incheon or KyungGiDo ; =0 otherwise.

Central =1 if KangWonDo or ChoongChungDo ; =0 otherwise.

Southwest =1 if ChollaDo ; =0 otherwise.

Southeast =1 if KyungSangDo ; =0 otherwise.

Open Amount Exported as % of the Sub-Sector GNP in 1986

Growth Annual Growth Rate in Growth Domestic Product (GDP) of Manufacturing Sub-Sector in 1986 relative to 1985

1Very few sample observations were from ChejuDo, 1 among 7041 males and 3 among 7125 females. These ChejuDo observations were conveniently included to the Southwest region.

Table 2. Summary Statistics

	Male		Female	
	Mean	Standard Deviation	Mean	Standard Deviation
Hwage	1381.94	635.69	712.44	204.52
Inw	7.1368	0.4328	6.5315	0.2705
Marry	0.6425		0.1558	
Ed	10.37	2.018	9.476	1.923
exp3	0.1879	0.3907	0.3917	0.4882
exp5	0.1936	0.3951	0.2698	0.4439
exp10	0.3217	0.4672	0.1486	0.3557
exphi	0.1998	0.3999	0.01712	0.1297
Ten	4.500	4.148	2.117	2.012
Open	31.27		45.41	
Growth	21.58		24.77	
Pusan	0.0808		0.1354	
KyungIn	0.2710		0.2149	
Central	0.06491		0.08926	
Southwest	0.06135		0.05432	
Southeast	0.3338		0.2293	
Size1	0.01463		0.008281	
Size2	0.06462		0.04561	
Size3	0.1238		0.1552	
Size4	0.1199		0.1245	
Size5	0.2140		0.2036	
Size6	0.2988		0.3451	
Size7	0.07769		0.1033	
M1	0.06704		0.04323	
M2	0.1872		0.5391	
M3	0.03806		0.1260	
M4	0.04076		0.1111	
M5	0.1220		0.2827	
M6	0.06221		0.1473	
M7	0.06675		0.02901	
M8	0.3839		0.4221	
Sample size	7041		7125	

Table 4. Estimated Wage Equations

	Male	Female
Intercept	6.8947 (163.68)	6.5023 (159.07)
Ed	0.0291 (16.28)	0.0221 (14.29)
Exp3	0.1517 (10.86)	0.10902 (13.35)
Exp5	0.1711 (11.55)	0.1698 (16.67)
Exp10	0.2637 (15.94)	0.2206 (16.74)
Exp _{hi}	0.3435 (17.83)	0.2780 (11.43)
Ten	0.0437 (15.34)	0.0329 (9.154)
Ten2	-0.000785 (-5.12)	-0.0002345 (-0.46)
Marry	0.1478 (16.55)	-0.0195 (-2.43)
Open	-0.0016 (-6.44)	-0.00206 (-13.41)
Growth	-0.0084 (-13.90)	-0.0043 (-6.23)
Pusan	-0.0955 (-6.43)	-0.1239 (-14.37)
KyungIn	0.0049 (0.46)	-0.0724 (-9.800)
Central	-0.0545 (-3.37)	-0.1052 (-10.52)
Southwest	-0.0179 (-1.102)	-0.1572 (-13.04)
Southeast	0.0232 (2.129)	-0.1088 (-14.38)
Size1	-0.3117 (-9.68)	-0.0131 (-0.37)
Size2	-0.2791 (-13.88)	-0.0643 (-2.62)
Size3	-0.3011 (-17.33)	-0.0753 (-3.38)
Size4	-0.2492 (-14.47)	-0.0420 (-1.87)
Size5	-0.2441 (-15.72)	-0.0167 (-0.76)
Size6	-0.2066 (-13.93)	0.0226 (1.049)
Size7	-0.1796 (-9.66)	-0.0185 (-0.805)
M1	-0.1385 (-4.64)	-0.1771 (-6.96)
M2	-0.1499 (-6.601)	-0.1179 (-7.04)
M3	-0.3669 (-11.34)	-0.1350 (-4.23)
M4	-0.0283 (-0.93)	-0.1232 (-4.13)
M5	-0.0696 (-2.68)	-0.1207 (-5.77)
M6	-0.1638 (-5.64)	-0.2009 (-7.606)
M7	-0.1113 (-4.01)	0.1246 (1.409)
M8	-0.0093 (-0.42)	0.0599 (4.332)
F-statistic	293.81	115.67
Adjusted R-square	0.5570	0.3970
Sample size	7041	7125

Table 5. Decomposition of Male-Female wage Differentials

Component	Equation	Logatithm	Anti-log (Won)
Men, average wage (InWm)	$\beta_m'X_m$	7.13678	1257
Women, average wage (InWf)	$\beta_f'X_f$	6.53147	686
Women's wage if paid accourding to the men's pay structure	$\beta_m'X_f$	6.79502	893
Overall wage differential	$\ln W_m - \ln W_f$	0.60531	571
Endowment differences	$\beta_m'(X_m - X_f)$	0.34175	364
Discrimination	$(\beta_m - \beta_f)'X_f$	0.26355a	207
$A_f = \exp(\beta_f'\bar{X}_f) / \exp(\beta_m'\bar{X}_f)$			76.8%
Women's wage if endowed with average male characteristics	$\beta_f'\bar{X}_m$	6.73961	
Endowment differences	$\beta_f'(X_m - X_f)$	0.20814	159
Discrimination	$(\beta_m - \beta_f)'X_m$	0.39717	412
$A_m = \exp(\beta_f'X_m) / \exp(\beta_m'X_m)$			67.2%

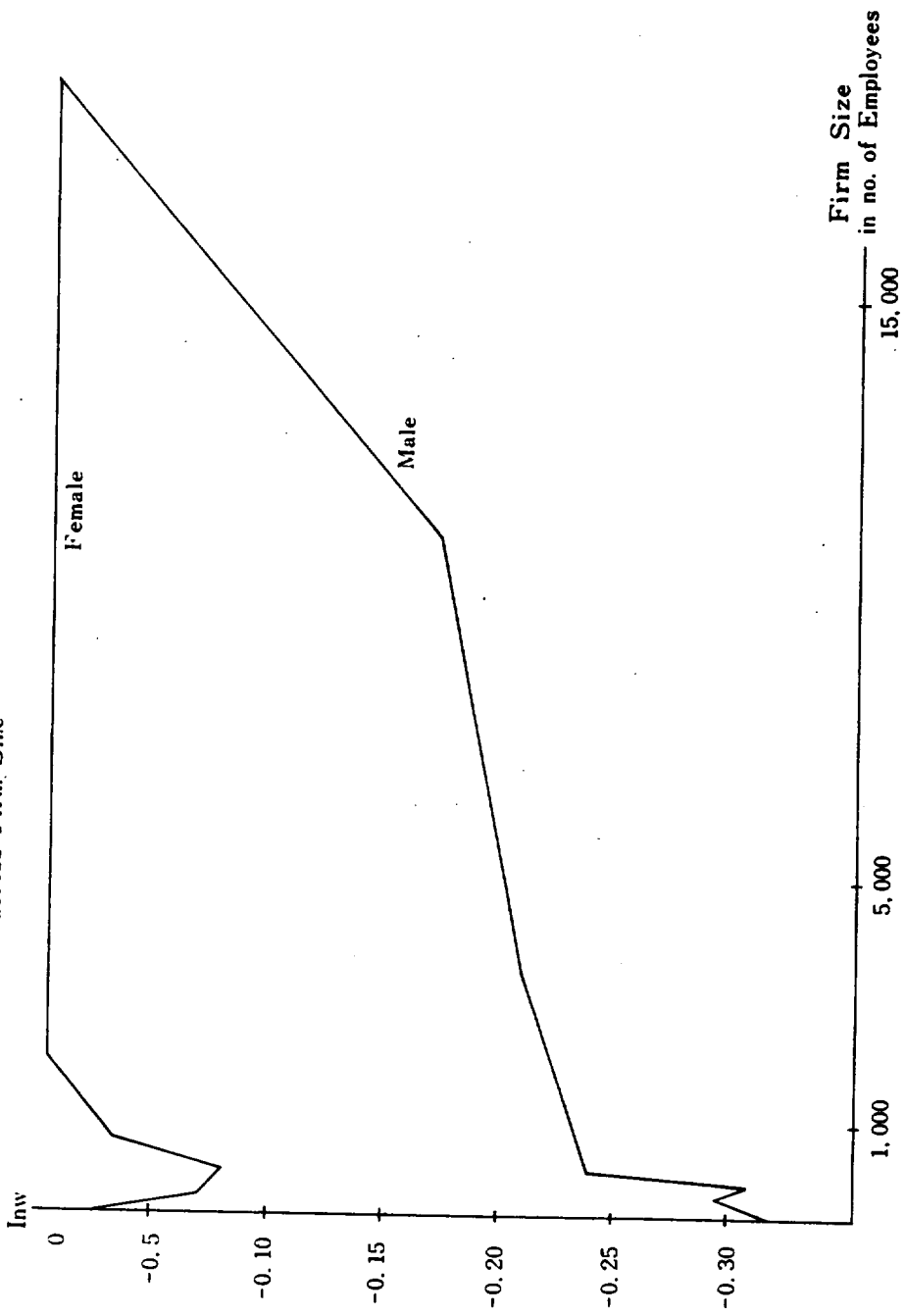
a : For decomposition of discrimination, see Table 6.

Table 6. Sources of Discrimination

Variable	Discrimination Component
Xfj	$\bar{X}f_j' (\beta_{mj} - \beta_{fj})$
Intercept	0.3924
Ed	0.06671
Exp3	0.01674
Exp5	0.0003479
Exp10	0.006416
Exp10	0.001122
Ten	0.022993
Ten2	-0.004697
Marry	0.02609
Open	0.017682
Growth	-0.10076
Pusan	0.003847
KyungIn	0.016633
Central	0.004521
Southwest	0.007566
Southeast	0.030313
Size1	-0.002473
Size2	-0.009801
Size3	-0.035046
Size4	-0.025800
Size5	-0.046326
Size6	-0.079132
Size7	-0.016641
M1	0.001665
M2	-0.017263
M3	-0.003743
M4	0.001186
M5	0.004480
M6	0.0008243
M7	-0.000199
M8	-0.016072

Sum = Discrimination	
$Xf' (\beta_m - \beta_f)$	0.26355

Figure 1. Wage Differentials across Firm Size



Footnotes

1. Pioneering works on wage discrimination in Korea are F. Park (1978), S. Park (1980 ; 1982), and Park and Park (1984).
 2. See Nam(1981) and Scitovsky(1989).
 3. See Todaro(1989) for the Lewis theory of development.
 4. Porkbarrelling during the two regimes also accompanied regional disparities in hiring of government officers, favoring KyungSang over Cholla. The national population shares of KyungSang, inclusive of Pusan, and ChollaDo are 24.83% and 14.71% respectively as of November 1. 1985 according to Economic Planning Board, Bureau of Statistics, 1985 Population and Housing Census Report. But, as of 1987, 28% of executives of public corporations were raised in KyungSangDo and only 5.4% in Cholla.
- As of April 1989, 37.1% of high-ranking bureaucrats at or beyond Guk-Chang (director) level of six ministries and eight bureaus dealing with economic affairs were from KyungSang as their home province and 13.9% from Cholla. And, over 1961-1985, KyungSang produced 35% of all the ministers and vice ministers, 31% of generals, and 31% of legislators handpicked by the government (YuJongHue) or by parties according to their proportional representation in ballot (JonGukKu) while the same percentages were 11.7%, 12.6%, and 14.5% for ChollaDo. (Source : The Dong-AIlbo Daily, June 21, 1989.)
5. See Steinberg(1988).
 6. See Masters(1969) and Mellow(1980).
 7. See Garen (1985) among others.
 8. See Hong (1986).
 9. See Park(1982) among others.
 10. The percentage figures are based on 1986 Occupational Survey of Korea.
 11. One may suspect the presence of the simultaneity bias in single equation estimation of the individual labor supply given in (1) which treats Open and Growth as explanatory variables for the wage rate. If the observational unit is an industry, Open and Growth should be observed endogenous, being explained by the industry wage rate. That is, a lower wage level of an industry increases its export proportion of the output as

well as its sales growth rate. In our empirical model of the individual labor supply, however, the observational unit is not an industry but an individual worker, who is a wage taker. Furthermore, Open and Growth are the factors outside the worker's control. Thus, the endogeneity bias argument does not apply, at least in principle, to the estimate of our individual labor supply equation.

12. Here and below, the percentage interpretation of the coefficient estimate in our log-wage equation is obtained by taking the anti-logarithm, i.e., exponentiating. That is, the reported coefficient of -0.0016 for Open among males means that the effect of Open on the wage rate $1 - \exp(-0.0016) = 1.6\%$.
13. One may be tempted to ascribe the phenomenal export growth to suppression of labor movements to keep the wages low, this seems counter-factual since the real wages in manufacturing has grown at an average annual rate of 7.9% over the same period, much faster than the per capita GNP. (See Nam(1981) and Scitovsky(1989). Furthermore, the anti-union stance of the government has been omnipresent and indiscriminate, not targeting specifically on export sectors.
14. For a more exact analysis of regional wage disparities, one should deflate the wage by the cost of the living index (CLI) of the worker's location. This could not be done here for the lack of selected major cities, the 1986 CLI's are 100 for Seoul, 95.4 for Pusan and 93.8 for Incheon, 90.9 and 93.8 for Taejon and Chongju both in central region, and finally 95.7 in Kwangju in the southwest. (Source : Consumer Price Index, Economic Planning Board, 1986.) These limited observations however suffice to show that our differing cost of the living index. In fact the CLI in Pusan and Kwangju of the southwest are only slightly lower than in Seoul while it is higher than in the other listed cities located elsewhere.
15. Despite the insignificant estimate of the regional wage differential, the males in the Southwest still suffer from disadvantages in the labor market if jobs are scarcer there. This is evidenced by the high level of the net out-of-the-province migration rate of the Southwest, which is 2.7% in 1986 while the rate of the Southwest, which is 2.7% in 1986 while the rate of Southeast ranges from 1.1% in the north KyungSang to 2.1% in the south KyungSang. Source : Economic Planning Board, Regional Statistics Annals, 1988.
16. We follow the tradition of using the unexplained male-female wage

differentials as a measure of sex discrimination in the labor market. This measure may bias the true extent of the discrimination either upward omitting the effects of the unobserved variables such as work efforts and ability or downward ignoring the earlier stage discrimination which results in lower human capital investment by women. Thus the results should be interpreted with caution.

17. Our cross-country comparison may not be exact, since the specification of the wage equation are not the identical across country studies. For references on the discrimination estimates in other countries, see Blau and Ferber(1987), Cain(1986), Chiplin and Sloane(1975), Gannicott (1986), and Gunderson(1970).

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