

Education in Korea: Efficiency vs. Equity^{*}

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I. Introduction

This paper attempts to analyse the effects of education on income distribution in Korea. The human capital theory¹⁾ suggests that an unequal distribution can be reduced by improving the distribution of education because variations in labor income are due to the differences in labor quality in terms of the amount of human capital, especially education, acquired by the workers.

On the other hand, a general skepticism about the role of education also can be observed. Thurow, for instance, has shown that in the United States, a country which is a prominent example of educational expansion, schooling has had only a negligible effect in reducing income inequality, although education constitutes one of the key elements in economic growth.²⁾ Critics of human capital theory, one example is the labor market segmentation theory,³⁾ asserts that education cannot improve earnings inequality unless other institutional factors, such as occupational earnings structure, are changed. By investigating those two approaches, we can assess whether education can be used as a policy tool to improve the earnings distribution.

II. Public Educational Expenditures in Korea.

The importance of education is seen clearly in the growth of public expenditures on schooling in Korea. Central government spending on education has increased many fold since 1970, as is shown in Table 1, although the ratio of education to total central government expenditures has remained almost constant around 19-20%. Similarly, central government expenditures on education as a proportion of GNP have remained fairly constant at more or less 3 percent.

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<Table. 1> Central Government Expenditures on Education, 1970-90.

Central Government Expenditures on Education			
	Amount (100 Million Won)	as % of total Gov't Expenditures	as % of GNP
1970	785	17.6	2.9
1975	2,279	14.4	2.3
1980	11,509	17.8	3.4
1985	24,931	20.1	3.4
1987	31,257	19.8	3.0
1988	36,929	20.1	2.9
1989	43,446	19.7	3.2
1990 ¹⁾	50,624	22.3	3.3

Note : 1) estimated budget

Source: Economic Planning Board, *Summary of Budget*, various issues.

<Table. 2> Sources of educational Finance (1988)

(Unit: %)

	Gov't	Students & Families	Private Foundations	Others	Total
Public Schools	75.4	24.6	—	—	100.0
Private Schools	7.4	78.8	6.4	7.4	100.0
Total	49.8	45.0	2.4	2.8	100.0

Source: Korea Educational Development Institute, *Educational Indicator in Korea*, 1988.

Table 2 summarizes all sources of educational finance. Public educational expenditures are the expenses incurred formally in the construction and operation of schools. They may be called in-school expenditures. They may be financed by central and local governments, by students and their family, or by private foundations. Table 2 shows that Korean government spends about 50% of public educational expenditures and students and their families take a burden of educational costs as much as 45% of total public expenditures on education in 1988. The proportion of students and their families' share has gradually decreased since

1970, reflecting the increase in government investment in education. Given the rapid improvement of the Korean economy, however, the per-student cost of education as a proportion of real disposable income has actually declined in recent years.

On the other hand, private educational expenditures (or out-of-school expenditures) include expenses incurred mainly by students in the forms of books, supplies, transportations, room and board, and extracurricular activities. In Korea, these private educational expenditures are quite large, even though there is no way to estimate it precisely. It is generally assumed that total public and private expenditures for education would be about 6-7% of GNP in recent years.

III. Application of the Human Capital Theory in Korea.

Most of empirical research done in Korea has been in the human capital theory tradition. This tradition comprises two types of empirical study: one is earnings-function studies, which seek to measure the influence of years of schooling and other variables on short-run earnings, and another is the estimates of the rate of returns to investments in education.

One of the problems encountered in the empirical applications of human capital is how to quantify education in a meaningful way. So far, no satisfactory way has been found: 1) to include all forms of educations; 2) to reflect the quality as well as the duration of education; 3) to take into account lifetime earnings as well as external benefits; and 4) to consider socio-economic background in the relation between education and earnings. Moreover, studies of statistical association tell us that certain education and earnings measure move together to a significant extent, but they do not tell much about why this is so.⁴⁾

In spite of these weaknesses in the human capital theory virtually all empirical studies reveal significant positive statistical association between earnings, on the one hand, and both years of schooling and years of work experience, on the other. Rate-of-return studies have intellectual premises similar to those used for earnings-function studies, with the differences that they attempt to take into account lifetime earnings and they allow for the costs of education. Several research works were done in Korea, and the results of the three representative studies are summarized in Table 3.

It is believed that all the rates given in the Table are marginal social rates of return. That is, they are marginal in the sense that they reflect the additional income earned by graduates of a particular level of education over those who have completed the preceding, lower level, as well as the costs of obtaining that additional level of education. They are social in that they reflect the part of educational costs borne by society as a whole, as well as the costs met by the individuals being educated and their families.

<Table. 3> Estimated Rates of Return on Education in Korea

(Unit: %)

	I(1968)	II(1977)	III(1985)
Middle School	12.0	8.2	12.9
High School	9.0	14.6	7.6
College	5.0	9.3	14.8

Sources: I. Kwang Suk Kim, "Rates of Return on Education in Korea," Mimeographed. USAID/Korea 1968.

II. Chang Yong Jeong, "Rates of Return on Investment in Education." in Chuk Kyo Kim ed., *Industrial and Social Development Issues*, Vol. II.(KDI, 1977)

III. En Bai Gong, *Income Determination of Education and Income Distributions* (KEDI, 1985)

The results of the studies indicated rather low rates of return to investment in education, relative both to the approximately 20 percent rate of return on physical capital thought to exist in Korea during 1960s and 1970s and to rates of return on human capital calculated for other countries.⁵⁾ According to the logic of the human-capital approach, these results could be read to indicate over-investment in human capital relative to physical capital. However, low measured rates of return on education do not necessarily mean that education is overexpanded and should be cut back. They may be biased downward by the exclusion of benefits other than productivity gains. The excluded types of benefits would be production and consumption externalities, and socialization benefits to society as a whole.

The reason for the apparently low rates of returns on education (particularly on higher education during 1960s) may relate to institutional factors which hold down the earnings of elites and near-elites, such as urban white-collar and skilled blue-collar workers, rather than in the operation of competitive labor markets which set the wages of different types of labor (categorized by years of schooling) equal to marginal product.⁶⁾

If this is so, then a low measured return to education is inevitable, even though the school system is an important means of selecting individuals to occupy high-status positions. The importance of the school system as a selection device may be even more important in Korea than in most countries. Thus Korean parents are perfectly rational in seeking all the schooling they can get for their children, because they believe that the objective is high-status positions in the economy

Table. 4 Distribution of Income in Korea
(by Income Decile and Index of Concentration)

	1965 (1)	1970 (1)	1976 (1)	1980 (2)
Lowest 1st	1.32	2.78	1.84	1.57
Lowest 2nd	4.43	4.56	3.86	3.52
Lowest 3rd	6.47	5.81	4.93	4.86
Lowest 4th	7.12	6.48	6.22	6.11
Lowest 5th	7.21	7.63	7.07	7.33
Lowest 6th	8.32	8.71	8.34	8.63
Lowest 7th	11.32	10.24	9.91	10.21
Lowest 8th	12.00	12.17	12.49	12.38
Lowest 9th	16.03	16.21	17.84	15.93
Lowest 10th	25.78	25.41	27.50	29.46
Gini	0.3439	0.3322	0.3808	0.3891

Sources: (1) Hakchung Choo, "Economic Growth and Income Distribution in Korea", Working Paper 7810 (Seoul: Korea Development Institute, September 1978)
(2) Economic Planning Board, *Social Statistics Survey*, 1981.

Table. 5 Average Years of Educational Attainment
(by Age Groups in Korea)

Age	1966	1970	1975	1980
6-19	4.98	5.33	6.16	6.53
20-29	7.44	8.32	8.83	9.88
30-39	6.15	7.15	8.12	9.17
40-49	3.90	4.83	6.26	7.52
50 and over	1.52	1.98	2.74	4.16
Average	5.03	5.74	6.62	7.61

Source: Economic Planning Board, *Population and Housing Census*, various issues.

Note: Average Years of Educational Attainment = (Cumulative Years of Education Received by Total Population)/(Population 6 years old and Over—Total Students).

It is interesting to note that the rate of return to higher education has increased substantially, while that to lower, secondary schooling has either decreased or remained relatively the same. Although this is certainly inconsistent with diminishing returns to years of schooling, this shows some evidence that changes in level and distribution of rates of return to schooling may have contributed a lot to the deterioration of income distribution in Korea. As shown in Tables 4 and 5, the income distribution in Korea has worsened at least from the late seventies, while the average level of years of schooling has equalized. The reason for the worsening income distribution in Korea, therefore, might be found in variations in rates of return to years of schooling.

IV. Statement of the Problem.

It is said that Korea has been one of the top performers in the sense that it ranks well in terms of equality during the period of rapid economic growth. It also has been argued that improvement in educational attainment has been a major element contributing to income equality in addition to making a critical contribution to rapid economic growth. Evidence of an increase in educational attainment goes well with increase in quality and economic growth in the 1960s.

But more recent conditions give cause for concern. The rapid expansion of schooling seemed to be associated with greater inequality in the distribution of economic benefits to individuals in the more recent period of rapid economic growth between 1970 and 1980. During this period, the economy has continued to experience a rapid rate of growth. Formal schooling has also continued to expand rapidly at all levels in terms of its number and enrollment ratio. Owing to this expansion, the average level of educational attainment of the total population increased from 5.74 years in 1970 to 7.61 years in 1980, as shown in Table 5.

However, the Gini coefficient of the distribution of income has increased from 0.3322 to 0.3891 during this period, as shown in Table 4. This may not be a significant deterioration of income distribution. But we have doubts about earlier works which claim that the Korean economy has performed exceptionally well in terms of advancing equity during the rapid economic growth period owing to the role of education.

Now, this is our hypothesis: Equality in earnings may be positively related to the distribution of educational attainment, other things being equal. However, if the labor market is characterized by segments and if there exist institutional factors which persistently interrupt the operation of competitive market forces in the labor market, then education is expected to play substantially different roles and affect individuals far differently insofar as earnings are concerned. Thus, education alone may not have a major effect on altering earnings distribution.

In other words, even if greater equality in the distribution of formal education

were to occur, it would not necessarily lead to greater earnings equality unless changes in institutional factors such as wage or occupational structure go hand in hand. But this does not necessarily mean that education is not important. Education is still useful for income equality if equalization of education is accompanied by changes in institutional factors.⁷⁾

V. Empirical Analyses and Results.

The empirical framework is organized in two sections. The first section contains an analysis of the determination of earnings with special reference to the impact of education. This section is designed to examine the validity and interpretation of different theories and to derive some insights which can be applied to the distribution issue in relation to educational policy. The second section inquires whether or not equalizing education can be used as a policy tool for equalizing the earnings distribution, based on the insights obtained in the first section.

The data used in the empirical investigation were collected by nationwide surveys. The Korean Educational Development Institute(KEDI) performed the survey in order to investigate policy implications in relation to the educational expenditure. A sample of 6,000 individuals was selected from 322 establishments (firms), and the questionnaire was given to each individual by mail, or in some cases, by direct interview. The establishments selected were randomly chosen but restricted to those having more than 10 employees. The number of workers selected in each firm was assigned proportionally according to the size of the firm. Among 6,000 questionnaires, 1,152 cases were finally chosen and included in the data set as of May 31, 1985.

The data can be classified into three broad categories:

- 1) data referring to personal characteristics such as sex, age, years of schooling, experience, and years of employments;
- 2) data referring to socioeconomic variables such as father's education, father's occupation, and financial status of family during secondary schooling age;
- 3) data referring to institutional circumstances such as job ranking, location, occupational category, and hours worked.

1. Determination of Earnings

We construct, based on the human capital approach, a simultaneous equation system of earnings determination as follows.

$$\ln Y = f(S, X, W, Z) \quad (1)$$

$$S = g(YEX, X, W) \quad (2)$$

where

- Y = monthly earnings
 YEX = expected lifetime earnings
 S = years of schooling (formal education)
 X = a vector of personal characteristics
 W = a vector of socioeconomic variables
 Z = a vector of job characteristics

The equation (1) is the earning function which contains personal, socioeconomic and job characteristics. But the earning function is underidentified and thus the equation (2) is needed to be estimated first in order to test the validity of earning function. If the equation (2), schooling equation, proves to be statistically significant in terms of its explanatory power and significance of the coefficients, we know that the treatment of schooling as an endogenous variable is appropriate.

We estimate the equation (1) which includes instrumental variable SHAT for years of schooling S . The SHAT can be obtained as the predicted (computed) value from the estimation of equation(2). The regression was run on a total sample of 1,069 respondents by assuming a linear relationship between dependent and independent variables.

Table 6 presents estimated coefficients and t-statistics of the schooling equation (2). Overall, equation (2) seems to explain well the schooling determination. The value of R^2 shows that the model explain more than half of the schooling determination, and the value of F ratio is statistically significant at the 99 percent confidence level. As a whole, the estimation of the schooling equation indicates that schooling is an endogenous variable, and it appears to accept, at least partially, the human capital theory in the sense that expected lifetime earnings may play a certain role.⁸⁾

Then, Table 7 shows the estimated coefficients of the equation (1). The model seems to explain more than two-thirds of the earnings determination mechanism and the F-ratio is also statistically significant at the 99 percent confidence level. Although there may be differences in the importance of each variable in the equation (1) to the contribution of the earnings capacity, most variables play a role in the determination of the individual earnings.

Based on the empirical results, we can infer that human capital variables, especially education, have positive effects on earnings. Formal education in the form of the years of schooling is of importance in the determination of earnings. However, there is a certain indication that individual earnings are quite different according to some types of job characteristics. Sex and socioeconomic backgrounds do not appear to be directly related to earnings, while their indirect effects on earnings through occupational status and educational attainment are

Table. 6) Determination of Years of Schooling (Coefficients and 't-ratios')

Dependent variable = S (Years of Schooling)

*	Constant	YEX	AGE	SEX	FOCC	FSCH	FWHL
(1)	13.52259 (64.57)	0.00001 (28.41)	-0.16199 (-18.27)	0.69475 (4.57)	0.78464 (4.77)	0.71830 (4.44)	0.30026 (1.61)
(2)	14.33660 (48.05)	0.00001 (26.36)	-0.16624 (-16.45)	-	-0.83443 (4.34)	0.67508 (3.43)	0.22371 (1.05)
(3)	12.77288 (24.51)	0.00001 (3.95)	-0.13991 (-6.41)	-	0.62060 (1.95)	0.71343 (2.61)	0.74107 (1.81)
(4)	13.89727 (22.99)	0.00001 (10.46)	-0.13559 (-0.43)	0.90698 (2.13)	-	0.42083 (1.56)	-0.57692 (-1.93)
(5)	13.58395 (61.08)	0.00001 (26.29)	-0.16561 (-17.52)	0.69558 (4.28)	-	0.87057 (4.46)	0.68605 (3.02)
(6)	16.50028 (26.49)	0.00001 (13.34)	-0.27612 (-9.50)	0.61000 (1.94)	0.20874 (0.89)	-	0.02231 (0.08)
(7)	13.40391 (60.53)	0.00001 (25.85)	-0.15579 (-16.53)	0.68142 (4.04)	0.99632 (4.89)	-	0.44494 (1.93)
(8)	15.44685 (21.68)	0.00001 (12.10)	-0.19469 (-8.06)	0.60148 (1.25)	-0.20584 (-0.67)	0.39217 (1.27)	-
(9)	13.42365 (60.80)	0.00001 (26.20)	-0.15977 (-16.94)	0.68725 (4.29)	1.02737 (5.52)	0.76551 (4.20)	-

*	Case	R ²	Adj R ²	'F-ratio'	N
(1)	total sample	0.5103	0.5076	184,463	1,069
(2)	SEX=1	0.5077	0.5046	162,951	796
(3)	SEX=0	0.1955	0.1805	12,979	273
(4)	FOCC=1	0.4928	0.4755	28,561	153
(5)	FOCC=0	0.4480	0.4852	173,493	916
(6)	FSCH=1	0.6055	0.5926	46,968	159
(7)	FSCH=0	0.4838	0.4810	169,473	910
(8)	FWHL=1	0.6216	0.6032	33,834	109
(9)	FWHL=0	0.4929	0.4902	185,444	960

Note: See Appendix for the definition of variables.

substantial.

2. Earnings Distribution

The implications for earnings distribution in the human capital theory is clear:

(Table. 7) Earnings of Function(Coefficients and 't-ratios')

	(I)	(II)	(III)	(IV)	(V)
Constant	8.04883 (15.48)	8.31689 (15.87)	8.40762 (16.11)	7.93829 (15.25)	8.22337 (15.68)
SHAT	0.11331 (6.29)	0.10011 (5.46)	0.10646 (4.76)	0.11111 (6.25)	0.09754 (5.42)
EXP	0.06717 (3.34)	0.05969 (2.93)	0.05250 (3.13)	0.06631 (3.29)	0.05879 (2.87)
EXP1	-0.00052 (-2.97)	-0.00059 (-3.35)	-0.00049 (-2.74)	-0.00053 (-3.01)	-0.00060 (-3.41)
lnL	0.14706 (2.54)	0.12796 (2.20)	0.11111 (1.91)	0.14809 (2.57)	0.12562 (2.18)
AGE	0.02496 (9.19)	0.02054 (6.84)	0.01946 (6.49)	0.02544 (9.40)	0.02107 (7.06)
SEX	0.11008 (0.31)	-0.23804 (-0.65)	-0.09654 (-0.26)	0.16614 (0.47)	-0.18575 (-0.51)
OP1	4.71275 (4.21)	4.49143 (3.84)	3.93840 (3.36)	4.60173 (4.12)	4.41732 (3.80)
OP2	-0.62634 (-0.82)	0.38635 (0.48)	0.10537 (0.13)	-0.61161 (-0.80)	0.43415 (0.55)
OP3	2.42821 (3.37)	2.01081 (2.66)	1.98666 (2.64)	2.51530 (3.51)	2.12924 (2.83)
OP4	-0.60994 (-0.29)	2.08420 (0.95)	1.92248 (0.88)	-0.69783 (-0.33)	2.05883 (0.94)
OP5	-7.11762 (-1.48)	-1.07882 (-0.21)	-1.40869 (-0.28)	-7.42479 (-1.55)	-1.13520 (-0.27)
FOCC	0.21138 (2.29)	0.11432 (1.19)	0.13256 (1.39)	0.21351 (2.33)	0.11510 (1.21)
FSCH	-0.38873 (-5.53)	-0.35226 (-4.85)	-0.34358 (-4.76)	-0.38839 (-5.56)	-0.35414 (-4.92)
FWHL	0.9809 (0.95)	-0.03666 (-0.34)	-0.02371 (-0.22)	0.10355 (1.01)	-0.03310 (-0.31)
LOC1	0.17904	0.20598	0.19269	0.16900	0.19611
LOC2	0.02657 (0.79)	0.05909 (1.68)	0.04981 (1.44)	0.03091 (0.92)	0.05318 (1.83)
LOC3	-0.01530 (-0.48)	0.01184 (0.37)	0.00643 (0.20)	-0.01678 (-0.53)	0.01050 (0.32)
JOB2	0.05410 (1.81)	0.04377 (1.46)	0.04787 (1.60)	0.05213 (1.75)	0.03835 (1.28)
JOB3	0.20709 (5.20)	0.19415 (4.88)	0.18256 (4.60)	0.20533 (5.18)	0.19033 (4.81)

(Table 7) continued

	(I)	(II)	(III)	(IV)	(V)
JOB4	0.22760 (4.88)	0.22042 (4.74)	0.21526 (4.66)	0.21704 (4.68)	0.20831 (4.50)
JOB5	0.28528 (5.09)	0.29836 (5.32)	0.29693 (5.33)	0.28201 (5.05)	0.29293 (5.25)
JOB6	0.38732 (6.13)	0.38339 (6.08)	0.38142 (6.09)	0.38362 (6.10)	0.37800 (6.03)
ED2	—	-0.04924 (-0.74)	-0.03943 (-0.60)	—	-0.04420 (-0.67)
ED3	—	-0.10035 (-1.59)	-0.09537 (-1.52)	—	-0.11192 (-1.78)
ED4	—	-0.08302 (-1.19)	-0.07303 (-1.05)	—	-0.08880 (-1.28)
ED5	—	-0.01979 (0.27)	-0.03018 (0.41)	—	-0.01082 (0.15)
ED6	—	-0.20345 (0.27)	-0.20936 (2.14)	—	-0.19959 (2.05)
EMP	—	—	0.01075 (3.63)	—	—
GDE1	—	—	—	0.16006 (2.05)	0.14938 (1.93)
GDE2	—	—	—	0.06687 (0.87)	0.05117 (8.67)
GDE3	—	—	—	0.08856 (1.13)	0.06472 (0.83)
GDE4	—	—	—	0.04416 (90.41)	0.00915 (0.09)
R ²	0.7446	0.7499	0.7530	0.7491	0.7549
Adj. R ²	0.7373	0.7434	0.7464	0.7429	0.7576
'F-ratio'	138.639	115.596	113.239	119.672	103.031

Note: See Appendix for the definition of variables.

if the distribution of schooling changes, then earnings distribution will change and if the distribution of schooling becomes more equal, the earnings distribution also will become more equal. The alternative explanations emphasize that in analyzing changes in earnings distribution, we should look for changes in the institutional factors which affect the structure of wages and occupations. In other words, the distribution of educational opportunities, at least, cannot be the only variable in determining earnings distribution.

To address the distributive issue in relation to educational policy, the "relative

earnings inequality function" is derived from the previous earnings function (1).⁹⁾

$$\ln Y = c'D + u \quad (3)$$

where

$$\begin{aligned} c' &= 1 \times k \text{ row vector of coefficients} \\ D &= k \times 1 \text{ column vector of regressors} \\ u &= \text{disturbances term} \end{aligned}$$

By taking the variance of both sides of equation (3), we obtain the "relative earnings inequality function" if we assume that the regressors are random variables independent of their corresponding coefficients and that there is no correlation between regressors and disturbances terms.

$$\text{Var}(\ln Y) = c' \text{Cov}(D)c + \text{Var}(u) \quad (4)$$

where $\text{Cov}(D) = k \times k$ covariance matrix of vector D

We can analyze the contribution of variation in each independent variable on earnings distribution by taking the partial derivative of equation(4) with respect to the variables of interest. For example, if the sign of the partial derivative $\partial \text{Var}(\ln Y) / \partial SD(S)$ is positive, we can interpret it as a supporting argument that a more equal distribution of education can lead to a more equal distribution of earnings, other things being equal. Alternatively, if the variance of log of earnings increases when the variance of occupational dummies changes, we can interpret it as an counter-argument against the human capital approach. In this case, it can be only said that education can be used as a policy tool to achieve equal earnings distribution only if the occupational structure is in some sense equally distributed.

The estimates for the earnings inequality function are presented in Table 8. As shown in Table 8, the human capital variables as well as the institutional conditions of the labor market, especially occupational structure, appear to contribute greatly toward earnings inequality.

However, the joint effects of the explanatory variables which are related to the correlation coefficient between those variables turn out to be negative in total population in Table 8. It is unrealistic in the sense that any one of the explanatory variables can explain more than 100 per cent of the explained inequality accounted for by the model. This somewhat unrealistic result may arise either from the presence of the statistically insignificant coefficients, a multicollinearity problem, or any interactions between some of independent and dependent variables. To solve this problem, we estimate the separate earnings inequality function for two different groups of occupations.¹⁰⁾ This practice seems successful in the sense that two separate inequality functions provide some implications concerning the rela-

tive effects of the various variables toward the earnings inequality. This estimation results are also contained in Table 8.

The overall results in Table 8 indicates that our hypothesis based on the human capital theory is acceptable. That is, a more equal distribution of schooling, *ceteris paribus*, leads to a more equal distribution of earnings. But changes in other institutional factors (such as the variance of occupation) also have substantial effects on the distribution of earnings. This evidence suggests the probable exist-

<Table. 8> Contributions of Components Toward Earnings Inequality.

	Total (N=1,069)		Group 1 (N=395)		Group 2 (N=674)	
	Effects	%	Effects	%	Effects	%
S	0.0322	12.29	0.0412	16.77	0.0366	15.62
EXP	0.1636	62.42	0.0745	30.33	0.0398	16.99
EXP1	0.0114	4.35	0.0134	5.46	0.0150	6.40
AGE	0.0335	12.78	0.0022	0.90	0.0248	10.58
InL	0.0003	0.11	0.0001	0.04	0.0004	0.17
SEX	0.0108	4.12	0.0025	1.02	0.0040	1.74
OCP	0.2293	87.49	—	—	—	—
FOCC	0.0016	0.61	0.0005	20.36	0.0000	0.00
FSCH	0.0157	5.99	0.0001	0.04	0.0009	0.38
FWHL	0.0001	0.04	0.0002	0.08	0.0004	0.17
LOC	0.0089	3.40	0.0046	1.87	0.0050	2.13
JOB	0.0222	8.47	0.0145	5.90	0.0266	11.35
ED	0.0044	1.68	0.0110	4.48	0.0029	1.24
Joint Effects	-0.2720	-103.70	0.0810	32.98	0.0781	33.33
Explained Inequality	0.2621	100.00	0.2456	100.00	0.2343	100.00
Observed Inequality	0.3503		0.3161		0.3340	
R ²	0.7482		0.7770		0.7015	

Notes: Group 1 (Prestigious ones): "Professional & Technical workers," and "Administrative & Managerial workers."
 Group 2 (Non-Prestigious ones): "clerical & Related workers," "Sales Workers," "Service workers," and "Production & Related workers."

ence of segmentation in the urban labor market of Korea. Insofar as schooling is concerned, there appears to exist a separation in terms of its effect on the determination and distribution of earnings across occupations, and this is also in accordance with the predictions of institutional segmentation theories.

VI. CONCLUSION

Although we could not derive direct evidence from our empirical results concerning the worsening income distribution in Korea due to the limitations of the data set, the discussion indicated that the interactions of the role of years of schooling with the institutional or occupational structure were important forces which had helped cause the deterioration of earnings equality.

We conclude, then, that there is an apparent paradox in income distribution policy: schooling apparently plays a very important role in determining individual earnings in Korea, but the distribution of education alone in the labor force is less important in influencing earnings distribution. Educational policy can only contribute to a more equal distribution of earnings when it is carried out in concert with a government income policy which attempts to reduce earnings differentials between workers with higher levels of schooling and those with lower levels, and between higher paying occupations in the labor force and lower paying ones.

One educational policy option open to the Korean government is to spend much more on support of higher education than it is doing currently. But increased public investment in higher education could mean decreased public investment in lower and secondary education. The choice is a hard one. Evidence that rates of return on higher education have been increased as time has passed on may give some justification for the government to expand its investment to higher education. Expanded investment to higher education in Korea is especially important because the enlarged opportunities for higher education will help improve the earnings equality.

Notes

- 1) Gary S. Becker, *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, 2nd ed. (New York: National Bureau of Economic Research, 1975).
- 2) Lester C. Thurow, "Education and Economic Inequality," *Public Interest*, No. 28 (Summer 1972), pp. 66-81.
- 3) Richard C. Edwards, Michael Reich, and David M. Gordon, eds., *Labor Market Segmentation* (Lexington, M. D.: D. C. Heath and Company, 1975).
- 4) Noel F. McGinn, et al., *Education and Development in Korea* (Cambridge: Harvard

University Press, 1980), pp. 175-180.

- 5) George Psacharopoulos and Keith Hinchcliffe, *Returns to Education: An International Comparison* (Amsterdam and San Francisco, 1973).
- 6) This is an explanation based on the selection theory or the labor market segment theory rather than the human capital theory.
- 7) For a similar statement, see Samuel Bowles, "Schooling and Inequality from Generation to Generation," *Journal of Political Economy*, Vol. 80, No. 3, Part II, May/June 1972, pp. 219-251.
- 8) The expected lifetime earnings (YEX) can be calculated from the data set under the assumption that individuals with the same schooling, sex, and age are expected to earn the same amount of earnings throughout their whole life and that this expected lifetime earnings are proportionately related to the current average earnings of individuals. We admit that it may be a poor choice since it does not take into account the duration of schooling and lifetime employment. However, it is the only possible proxy for expected lifetime earnings due to the limited data. This proxy can be justified in the sense that its calculation is based on the rational expectations of the human capital approach.
- 9) It is a modified version of the human capital earnings function initially postulated by Becker and Chiswick and later developed by Chiswick and Mincer. Gary S. Becker and Barry R. Chiswick, "Education and the Distribution of Earnings," *American Economic Review*, Vol. LVI, No. 2, May 1966, pp. 358-369; Barry R. Chiswick and Jacov Mincer, "Time-series Changes in Personal Income Inequality in the United States from 1939 with Projection to 1985," *Journal of Political Economy*, Vol. 80, No. 3, Part II, May/June 1972, pp. 34-66.
- 10) The sample is broken down into two groups of occupational categories: prestigious and non-prestigious occupations. Occupational categories 1 and 2 are classified as prestigious ones (Group 1), while occupational categories 3 through 6 are chosen as non-prestigious (Group 2). This division of the occupations into two groups may be problematic since a precise empirical cut-off is unclear. This grouping is, however, along the lines of segmented labor market theory in the sense that the prestigious occupations correspond roughly to primary jobs, while nonprestigious occupations roughly match secondary jobs.

Appendix: Definition of Variables

ln Y	Log of monthly earnings, in 1985 prices(won)
YEX	Proxy for expected lifetime earnings
S	Years of schooling
SHAT	Instrumental variable for S
EXP	Years of post-school experience
EXP1	Square of EXP
EMP	Years of employment with current firm
ln L	Log of hours worked per week

SEX Dummy variable; 1 if male

AGE Respondent's age

Educational diploma

ED 1 Dummy variable; 1 if received primary school diploma

ED 2 Dummy variable; 1 if received middle school diploma

ED 3 Dummy variable; 1 if received high school diploma

ED 4 Dummy variable; 1 if received junior college diploma

ED 5 Dummy variable; 1 if received college diploma

ED 6 Dummy variable; 1 if received graduate school diploma

Grade (in final graduating class)

GDE 1 Dummy variable; 1 if top 20 per cent

GDE 2 Dummy variable; 1 if between 20 and 40 per cent

GDE 3 Dummy variable; 1 if between 40 and 60 per cent

GDE 4 Dummy variable; 1 if between 60 and 80 per cent

GDE 5 Dummy variable; 1 if bottom 20 per cent

Occupation

OCP1 Dummy variable; 1 if professional or technical workers

OCP2 Dummy variable; 1 if administrative or managerial workers

OCP3 Dummy variable; 1 if clerical and related workers

OCP4 Dummy variable; 1 if sales workers

OCP5 Dummy variable; 1 if service workers

OCP6 Dummy variable; 1 if production and related worker

OP Instrumental variable for OCP (occupation)

FOCC Dummy variable; 1 if father had a prestigious occupation(OCP1 or OCP2)

FSCH Dummy variable; 1 if father received higher education

FWHL Dummy variable; 1 if family was rich (upper 33 percent) during secondary schooling age

Region

LOC1 Dummy variable; 1 if living in Seoul

LOC2 Dummy variable; 1 if living in five big cities

LOC3 Dummy variable; 1 if living in small cities

LOC4 Dummy variable; 1 if living elsewhere

Job ranking

JOB1 Dummy variable; 1 if janitor, security, typist, etc.

JOB2 Dummy variable; 1 if mere clerk level

JOB3 Dummy variable; 1 if chief clerk level

JOB4 Dummy variable; 1 if section chief level

JOB5 Dummy variable; 1 if department manager level

JOB6 Dummy variable; 1 if executives level