

The Competitive Market Hypothesis and the Movement of Interindustry Wage Structure in Korea

Hwang Joe Kim*

The competitive market hypothesis¹ as an approach to explain interindustry wage structure builds on the neoclassical treatment of relative wages. Economic relationships develop from market-oriented individual behavior. Demand and supply schedules are rationally determined by personal preferences for goods and services and work versus leisure. Total demand and supply curves in the market are the summation of individual personal schedules. Wages are determined like other prices in the competitive market. Hicks has said that "the theory of the determination of wages in a free market is simply a special case of the general theory of value. Wages are the price of labour; and thus, in the absence of control, they are determined like all prices, by supply and demand."² The competitive market hypothesis posits the operation of competitive supply and demand forces, treating market imperfections as aberrations without systematic and prevailing influence on the market.

Under pure competitive conditions, interindustry differentials in the "price of labor"³ tend to disappear. Labor and other factors of production move in the long run to the industries with the highest returns until there is an equality of marginal returns among industries. Industrial wage differentials persist only while market imperfections are operating. Industries whose marginal revenue

* ssAitant Professor of Economics, Yonsei University

1. As Reder succinctly defines, the competitive hypothesis is that relative wage levels, both by skill and industry, behave more or less as though they were market prices reflecting predominantly the interplay of changing taste, techniques, and resources." See Melvin W. Reder, "Wage Differentials: Theory and Measurement," *Aspect of Labor Economics*, (New York: National Bureau of Economic Research, 1962), reprinted in John F. Burton *et al.*, (eds.) *Readings in Labor Market Analysis*, (New York: Holt, Rinehart, Winston, Inc. 1971), p.308.
2. J.R. Hicks, *The Theory of Wages*, (New York: St Martin's Press, 1963), p.1.
3. There are different measures of wages. The market hypothesis is concerned with the "price of labor," which is ambiguous in that it can be the wage rate or earnings. In most empirical studies on the market hypothesis, researchers have earnings measure rather than wage rate measure. The collective bargaining hypothesis typically refer to union impact on "wage rates," but it could be broadened to include whole "packages" of contract benefits.

product schedules allow higher wages to be paid can do so only in the short run and their labor supply curve will shift to the right in the long run until all industries pay the same wage.

Once the assumptions in the neoclassical model are relaxed, interindustry wage differentials arise. First of all, if the assumption of homogeneous labor quality is relaxed, interindustry wage differentials develop. If we allow for different qualities of labor in a given industry in our labor market we can expect an equal wage for a given quality of labor. This means that average wage of an industry will vary as a function of its skill mix. Therefore, other things being equal, real wage differentials among industries should reflect only the skill mix.⁴ The higher the proportion of skilled workers in a given industry, the higher the average wage of the industry.

In the world of classical and neoclassical pure competitive markets, skill margins are expected to decline in the long run. Despite their differing explanations, most writers agree that there has been a secular decline in occupational wage differentials.⁵ Ober reported that the skilled-unskilled wage spread narrowed sharply from 1907 to 1947.⁶ Stieber also observed, contrary to widespread opinion among economists, that occupational earnings differentials in the basic steel industry had "narrowed substantially in steel during the past fifty years much as they have in most other industries."⁷

The narrowing of the skill differentials should have been a systematic long-run influence on the industrial wage structure. Reder illustrates this view by saying that "the secular decline in skill margins and in regional differentials,"

4. Of course, there can be wage differentials based on the nonpecuniary advantages and disadvantages inherent in each industry. For example, extremely high wages in the coal mining industry in Korea even if demand for coal is decreasing appears to reflect dangerous working conditions in the industry. These wage differentials may be called "equalizing industrial wage differentials" analogous to A. Smith's explanations of occupational wage structure. These "equalizing industrial wage differentials" are not examined in this study.

5. According to Turner, for example, the narrowing of wage differentials in the United States could be attributed to the emergence of mass trade unionism. This explanation implicitly rejects the neoclassical competitive hypothesis. Many writers follow the competitive hypothesis. A typical example is Reder's explanation in terms of variations in hiring standards during periods of high level employment and the increased supply of skilled workers through the rising level of educational attainment of the American labor force. See H. A. Turner, "Inflation and Wage Differentials in Great Britain," in Dunlop, J.T. (ed). *The Theory of Wage Determination*, (New York: Macmillan, 1957), pp.131—35; M. W. Reder, "The Theory of Occupational Wage Differentials," *American Economic Review*, 44 (December, 1955), 833—852; Reder, "Wage Differentials: Theory..": pp.281—294, especially n.1, provides an extensive bibliography of the literature concerning the long run trend of occupational wage structure.

6. H. Ober, "Occupational Wage Differentials, 1907—1947," *Monthly Labor Review*, LXVII(Aug., 1948), 127—134, quoted in Donald E. Cullen, "The Interindustry Wage Structure, 1899—1950," *American Economic Review*, 46 (June, 1956), 367.

7. Jack Stieber, "Occupational Wage Differentials in the Basic Steel Industry," *Industrial and Labor Relations Review*, 12 (Jan., 1959) 167.

according to the competitive market hypothesis, should have produced "a secular decrease in interindustry relative wage dispersion if the skills and geographical mix had remained more or less unchanged."⁸ Thus, if the internal wage structure of job classifications is uniform throughout industries at the beginning and at the end of a period under study, decline in skill margins must produce a reduction in industrial wage differentials.

Is there any tendency of a reduction in industrial wage differentials in the case of Korea?

The purpose of this paper is to test the validity of the competitive market hypothesis in explaining interindustry wage structure in Korea by examining the movement of interindustry wage structure in mining and manufacturing industries from 1960 to 1971. Because of the rearranged industrial classification for wage data from 1972, the 1960-71 period was the longest possible time series for the maximum number of mining and manufacturing industries which have available wage data.

We will briefly examine the existing empirical works on the movement of interindustry wage structure in advanced countries, proceeding to analyze the changes in the ranking of industrial wage hierarchy and the dispersion of interindustry wage differentials in Korea, and finally derive its implication for the competitive market hypothesis.

I. Empirical Works on the Movement of Interindustry Wage Structure

There is no strong empirical evidence that there has been a secular decrease in interindustrial relative wage dispersion.⁹ Cullen who has done a serious study in this field found "a definite secular stability over the 1899-1950 period" by measuring both the ordinal rankings of industries and the interquartile range as a percentage of median average earnings for 84 industries.¹⁰ According to the former measurement, Cullen found a very high rank correlation of 0.66 for 76 manufacturing industries between ranks of per worker annual earnings in 1899 and 1950. Using the latter measurement, he found the dispersion

8. Reder, "Wage Differentials" p.297.

9. For example, See Ronald E. Cullen, "The Interindustry Wage..." pp.353-369, Sumner H. Slichter, "Notes on the Structure of Wages," *Review of Economics and Statistics*, 32 (February 1950), 88-89, Pamela Haddy and N. Arnold Tolles, "British and American Changes in Interindustry Wage Structure under Full Employment," *Review of Economics and Statistics*, 33 (Nov., 1957), 408-414. In contrast to the above conclusion, Ulman observed a slightly widening industrial wage structure during 1948-1962 period. See Lloyd Ulman, "Labor Mobility and the Industrial Wage structure in the Postwar United States," *Quarterly Journal of Economics*, LXXIX (Feb., 1965), 80-81. In the case of Japan, interindustry wage structure showed cyclical fluctuations but with relative stability from 1909 to 1914. See Koji Taira *Economic Development and the Labor Market in Japan*, (New York: Columbia University Press, 1970), pp.81-83.

10. Cullen, "The Interindustry Wage Structure,...." pp.360-65.

of annual earnings about the median average earnings to fluctuate within narrow limits around 25.0 throughout most of the 1899-1950 period. He concluded that "*the interindustry wage structure in manufacturing has been surprisingly stable over the long run; that the ranking of manufacturing industries within the wage structure changed so slowly in the past that many of the high-wage and low-wage industries of 1899 were still to be found among the high-wage and low-wage industries in 1950; that there was little if any long-run tendency toward compression of the interindustry wage structure over the past half-century, although differentials were often narrowed temporarily during both extremes of the business cycle; and that, as a logical corollary of the stability of this structure, there was only a slight tendency for workers' earnings to be equalized among those industries which ranked at the very top and bottom of the wage structure in 1899*".¹¹ Slichter has also found "considerable stability during short or moderately short period of time."¹² He calculated a coefficient of rank correlation of 0.7289 between the hourly earnings of male unskilled labor in twenty industries in 1923 and 1946. Wachter also recently observed that wage differentials among industries could not be fully explained by the skill differential for the post war period.¹³ Williams, using the detailed data on the skill composition in the railroad industry, concluded, "changes in the skill composition have not been a significant determinant of the relative movement of the sector in the table of earnings changes in the postwar years."¹⁴ These findings suggest that interindustry wage differences are not substantially determined by changes in an industry's skill mix.

But the meaning of skill used in above empirical studies is ambiguous. Economists use the term skill without specific content and do not question the current classification of skill mix. The term skill is a surrogate for different qualities which often have nothing to do with human capital investment. Furthermore, the data for skill mix are too aggregated to measure accurately the varying degrees of individual labor quality. For example, Williams' conclusion was derived by examining only seven categories of railroad labor.¹⁵ If he had a finer breakdown of skill mix according to human capital investment, he might have had a different conclusion.

11. *Ibid.*

12. Slichter, "Notes on the Structure. . .," p.58.

13. M. L. Wachter, "Cyclical Variation in the Interindustry Wage Structure," *American Economic Review*, 60 (March, 1970), 75-84.

14. C. Glyn Williams, "Changes in the Skill Mix and Their Effect on the Railroad Industry's Wage Level," *Industrial and Labor Relations Review*, 20 (Oct., 1966), 88-91

15. The seven categories are 1) executive, officials, and staff assistants, 2) professional, clerical, and general, 3) maintenance of equipment and stores, 5) transportation (other than train, engine, and yard), 6) transportation (yard-masters, switch tenders, and hostlers), and 7) transportation (train and engine service). See Williams, "Changes in the Skill Mix" p.40.

In contrast, a cross sectional study by Haworth-Rasmussen shows that skill mix is significant at the 1 percent level in explaining interindustry wage structure for 390 manufacturing industries in 1963.¹⁶ Their skill classifications into craftsmen, operators, and laborers were broader than those of Williams. Schweitzer also observed a significant skill mix variable at the 1 percent level for 35 manufacturing industries in 1963.¹⁷ His skill variable was cruder one, the proportion of the professional and craftsmen to total employment.

Besides the conceptual problems of the skill variable, the empirical results so far reported do not confirm the competitive market hypothesis. Reder states his view of the implication of the above data for the competitive market hypothesis as follows.

It is possible that further investigation will show that dispersion has indeed been reduced. But if it does not, certain more or less alternative inferences may be drawn: (1) despite the general decline in skill margins, the relative wage premiums that must be paid by industries that are expanding their labor forces rapidly were as great in the late 1940's as at the turn of the century; (2) there was an increasing dispersion in the 'richness' of industrial skill mixes which offset the reduced skill margins; (3) there were off-setting interindustry changes in skill mixes, location mixes, etc.; (4) the competitive hypothesis is wrong. These inferences are not mutually exclusive, and they could all be true to a degree...¹⁸

Since the industries that were at the upper and lower extremes of the inter-industrial earnings hierarchy in a given year tended over time to regress toward the mean, Reder argues that this evidence supports the competitive hypothesis.¹⁹

One source of interindustry wage dispersion, the influence of industries expanding and contracting employment more than the average on interindustry wage differences, may have been reduced over time by the operation of price

16. C. T. Haworth and D. W. Rasmussen, "Human Capital and Inter-Industry Wages in Manufacturing," *The Review of Economics and Statistics*, LIII (November, 1971), 376-79. They measured skill mix variables as follows.

$$Sk = (C/T)W_c + (C/T)W_o + (L/T)W_l$$

where Sk=skill index

$$T = C(\text{Craftsmen}) + O(\text{Operators}) + L(\text{Laborers})$$

W_c, W_o, W_l are the skill weights which are derived from the earnings of each occupation given as a ratio of their earnings to the earnings of the laborer group, e.g.,

$$W_c = Y_c/Y_l$$

17. Stuart O. Schweitzer, "Factors Determining the Interindustry Structure of Wages," *Industrial and Labor Relations Review*, 22 (January, 1969), 222-25.

18. Reder, "Wage Differentials...." pp.297-98. By "richness of the skill mix," he refers to the relative numbers of skilled, semiskilled, and unskilled workers employed. For detailed method of measurement, see p. 298 n.61.

19. *Ibid.*, pp. 298-99.

system.

But the question may be asked whether this tendency of a declining inter-industry wage structure is necessarily a proof of the influence of the price mechanism, because forces other than price mechanism could contribute to a declining interindustry wage structure. One of the most important forces may have been industrial union wage policies. Solomon Barkin points out that among their policies are "wage stabilization policies...directed toward the stabilization of the wage structure, competitive parity in labor costs among employers, and the equalization of wages among workers." He further elaborates as follows:

A number of union policies seek to create such stability and to protect wage standards. In the first place, the written agreements define the wage terms precisely. In the second place, these contracts usually are written for at least one year. In the third place, changes are usually permitted only at specified periods. In the fourth place, organized labor definitely attempts to extend its organization to assure the widest application of its wage scales. Finally, unions maintain extensive enforcement machinery to assure compliance with their contracts. All of these policies contribute toward a stable wage structure.²⁰

Trade unions have "...strengthened the forces which have reduced the spread between the lower and higher paid jobs...and also strongly pressed...for the equalization of rates among the different regions of the country."²¹ Interindustry wage structure could therefore be compressed if skill mixes remain more or less unchanged.

The movement of the interindustry wage structure are also affected by other factors such as the general level of employment and inflation. The rationale is as follows.²² During periods of prosperity and inflation the range of wage adjustment is wider than in periods of depression. First, all workers are more or less equally affected by increases in the cost of living. This generates a more or less equal pressure for relief throughout the labor market. The existence of labor unions reinforces this pressure. Second, when most employers are prosperous, uniform adjustments in wage payment are easier to be made than

20. Solomon Barkin, "Industrial Union Wage Policies," *Plan Age*, 6 (January, 1940), 1-14, especially, 2-9. Even though he does not refer explicitly to interindustry wage structure, he provides us with deep insight into the role of unions on the stability of industrial wage structure.

21. Solomon Barkin, "Trade-Union Attitudes and Their Effect upon Productivity," in Solomon Barkin *et al.* (eds.), *Industrial Productivity*, (New York: Arno Press Inc. 1966) pp.123-24. Another explanation is given by Richard Perlman, *Labor Theory*, (New York: John Wiley & Sons Inc., 1969), pp.108-109

22. Arthur M. Ross, "The External Wage Structure," in George W. Taylor and Frank C. Pierson, (eds.) *New Concepts in Wage Determination*, (New York: McGraw-Hill Book Company, Inc., 1957), p.200.

would otherwise be the case. Dunlop and Rothbaum's study seems to support the significance of these variables.²³ These researchers thus hypothesize that inflation and periods of high employment tend to narrow all wage structure but with the latter factor having a relatively weak significance.²⁴ This hypothesis may be called the business cycle hypothesis since the wage structure will expand during downturn and contract during upturn.

Several studies concerning Japanese interindustry wage structure seem to support this business cycle hypothesis. Taira observed considerable narrowing since 1959 which corresponds to the beginning of a state of intensified labor shortage of the 1960's.²⁵ Evans also reports its contraction since 1960 giving essentially the same explanation as that of Taira.²⁶

II. Changes in the Ranking of Industries in the Wage Hierarchy

The detailed ranking of the 23 mining and manufacturing industries on the basis of their average monthly earnings of production workers from 1960 to 1971 shows its general short-run stability in most industries (Tables 1). Coal mining maintained the highest rank up to 1967 and fell to the sixth in 1971. Transport equipment increased its rank from rank 5 to rank 2 during the period. Printing, publishing and allied industries and basic metal industries maintained ranks 2 and 3 in 7 out of 11 years. Among the lowest-ranked

23. Dunlop and Rothbaum found that the range of interindustry wage differentials varied with both changes in the general level of employment and changes in the extent of inflation in a study of the United States, Italy, and France for the period 1938-1952. See J. T. Dunlop and M. Rothbaum, "International Comparisons of Wage Structures," *International Labour Review*, 71 (April, 1955), 347-48.

24. Johri and Agarwal presented a seemingly contrary argument stating that inflation has widened industrial wage dispersion and falling prices tend to narrow it. But they have admitted that this conclusion might not hold true when data on a longer period were available. They covered the 1950-1961 period for Indian 29 manufacturing industries. See C. K. Johri and N. C. Agarwal, "Inter-industry Wage Structure in India, 1950-1961; An Analysis," *Indian Journal of Industrial Relations*, 1 (April, 1966), 386-89.

25. Taira, *Economic Development*..., pp.77-83, especially Chart III in p.78.

26. Robert Evans, Jr., *The Labor Economics of Japan and the United States* (New York: Praeger Publishers, 1971), pp.182-88. Evans gave several more factors beyond labor shortage such as rapid productivity increase during the 1958-1965 period in smaller firms relative to that of larger firms. Consistent with this explanation was the observation of interfirm wage structure by Yamamura, who argued that since 1956, there had been the erosion of the traditional "dual structure of wages." The main factor, according to him, was that "the postwar Japanese labor market has undergone a fundamental transformation, i.e., from a chronic excess supply condition to one of excess demand at prevailing wage rates. See Kozo Yamamura, "Wage Structure and Economic Growth in Postwar Japan," *Industrial and Labor Relations Review*, 19 (October, 1965), 58-69. Previously, Hotani and Hayashi characterized the Japanese wage structure as having wide wage differentials depending on the size of establishments. None of the last three authors draw any inference of this interfirm wage structure on interindustry wage structure. See Rokuro Hotani and Takashi Hayashi, "The Evolution of Wage Structure in Japan," *Industrial and Labor Relations Review*, 15 (October, 1961), 52-66.

Table 1 Ranking of Average Monthly Earnings of Production Workers in Mining and Manufacturing, 1960-1970

Industries	60	61	62	63	64	65	66	67	68	69	70	71
Coal mining	1	1	1	1	1	1	1	1	3	2	4	6
Metal mining	8	6	4	5	8	5	5	4	7	4	7	8
Stone quarrying, clay & sandpits	16	17	18	17	16	14	13	15	13	15	22	12
Non-metal mining	22	20	13	11	17	10	7	7	10.5	12	12	11
Food	21	19	22	22	22	21	20	17	20	17	14	14
Beverage	13.5	12	8	9	12	16	14	19	17	16	15	15
Textiles	19	21	21	21	19	19	21	18	18	21	20	20
Foot wear & wearing apparel	4	8	13	16	23	23	22	23	23	22	23	23
Wood & cork	9	11	16	8	9	7	9	9	8	8	10	13
Furniture & fixtures	7	9	13	15	20	15	17	20	21	23	21	22
Paper & paper products	20	15	10	14	5	11	15	12	9	9	9	9
Printing, publishing & allied	2	2	2	2	4	3	3	6	6	5	3	5
Leather & leather products	6	7	11	10	14	17	16	16	16	14	17	18
Rubber products	12	16	15	13	10	12	18	21	19	19	19	21
Chemicals & chemical products	15	14	9	12	7	8	8	8	7	3	6	3
Petroleum & coal products	10.5	13	17	19	15	6	6	5	5	6	2	1
Clay, glass & stone products	13.5	10	6	6	11	13	12	13.5	10.5	10	8	7
Basic metal	3	3	6	7	2	2	2	2	2	4	5	4
Metal products	18	22	19	20	18	20	19	13.5	14	18	16	17
Machinery	10.5	5	6	4	6	9	10	10	12	13	13	16
Electrical machinery	17	18	20	18	13	18	11	11	15	11	11	10
Transport equipment	5	4	3	3	3	4	4	3	1	1	1	2
Others	23	23	23	23	21	22	23	22	22	20	18	19

a. Until 1968, the figures are for production workers, and thereafter for regular employees

Source: The Bank of Korea, *Economic Statistics Yearbook*, 1972, pp.330-33.

industries, miscellaneous manufacturing had kept ranks 22 and 23 in 8 out of 11 years. Textiles ranked between 19 and 21 for 10 years.

Several industries showed significant changes in rank. The range of rank change, as measured by the difference between the lowest and highest rank for the whole 11-year period, was 19 in foot wear and wearing apparel, the highest rank change among the industries. Petroleum and coal products changed by 18, furniture and fixtures by 16, and paper and paper products and non-metallic mining by 15, respectively. But these wide ranges of rank change in these five industries were due to the erratically high and low ranks in several industries during the first couple of years or so. For example, foot wear and wearing apparel, furniture and fixtures and, leather and leather

products maintained extremely high ranks in 1960 and 1961, which is quite unusual for consumers' goods industries. On the other hand, chemical and chemical products, paper and paper products, and petroleum and coal products held extremely low ranks during the period 1960-1963.

If we rule out the first two years, the range of rank changes in all industries are reduced significantly. Since the beginning of the Five-Year Economic Plans in 1962, the ranking of the industries is more stable. The relatively more stable wage structures since 1962 is partially accounted for by the general tendency for consumers' goods industries to lose their high ranks and for producers' goods industries to raise their ranks. This implies that the Korean wage structure is approaching those of advanced countries, where producers' goods industries are generally paying higher wages than consumers' goods in-

Table 2. Rank Correlation Coefficients for Average Monthly Earnings of Production Workers in 23 Mining and Manufacturing Industries, 1960-1971

Years Compared; Various Periods	Coefficients of Rank Correlation		Years Compared; Various Periods	Coefficients of Rank Correlation	
2—Year Period			6—Year Period		
1960—62	.6713	***	1960—66	.5053	**
1961—63	.8488	***	1961—67	.5149	**
1962—64	.7921	***	1962—68	.6581	***
1963—65	.7727	***	1963—69	.6512	***
1964—66	.7935	***	1964—70	.7302	***
1965—67	.8752	***	1965—71	.7579	***
1966—68	.9217	***	8—Year Period		
1967—69	.9133	***	1960—68	.3969	*
1968—70	.8876	***	1961—69	.5455	***
1969—71	.9348	***	1962—70	.5782	***
4—Year Period			1963—71	.4595	**
1960—64	.4905	**	10—Year Period		
1961—65	.6739	***	1960—70	.3150	*
1962—66	.7129	***	1961—71	.3443	*
1963—67	.6187	***			
1964—68	.8174	***			
1965—69	.8419	***			
1966—70	.8361	***			
1967—71	.8638	***			

*= significant at the 10 percent level

**= significant at the 5 percent level

***=significant at the 1 percent level

Calculated from: The Bank of Korea, *Economic Statistical Yearbook*, 1972, pp.330-33.

dustries.

In order to verify our analysis of the rank changes, Spearman's rank correlation coefficients were calculated for the 23 industries for various periods ranging from 2-year to 10-year spans. The rank correlation coefficients within each time span tend to be higher in recent periods than remote ones (Table 2). For example, when we compare 6-year changes, the coefficients steadily increased over time along with their significance levels. The coefficients were significant at the 5 percent level for the periods 1960-1966 and 1961-1967, while they are significant at the 1 percent level thereafter.

This finding is consistent with previous findings that the stability of the interindustry wage structure has been increased in later years. When the data are confined only to manufacturing industries, the results are essentially the same.

Do the above high coefficients imply that the wage structure has neither narrowed nor widened over the years? On the basis of the above analysis, we may jump to this conclusion. It should be noted, though, that the coefficients are much lower than those of the United States found by Cullen and Slichter. Cullen found 0.88 or higher for various ten-year period from 1899 to 1950.²⁷ Slichter found 0.8902 between 1929 and 1939.²⁸ Note that the coefficient was only 0.3443 for the period 1961-1971 in Korea. Therefore, the much lower coefficients in Korea indicate that there has been a higher degree of shifting in the relative position of the industries in Korea. Furthermore even if the coefficients were as high as those found in the United States, rank correlation coefficients would not tell the whole story. Groupings of industries can have a diverse pattern of wage changes over years while nevertheless retaining their relative ranking throughout the years. Rank correlation coefficients take into account the ranking of industries but not the amount of wage changes. For thorough analysis we must also examine the absolute and relative changes of the earnings of industries for each year, along with some measure of wage dispersion. Those analyses comprise the next section.

III. Changes in the Dispersion of the Interindustry Wage Structure

One measure of wage dispersion including all industries is the coefficient of variation, i.e., standard deviation as a percentage of the mean. Table 3 presents the standard deviations, the means, and the coefficients of variation of the average monthly earnings of the production workers in the 23 industries from 1960 to 1971. The coefficients of variation range from 19.63 to 25.38,

27. Cullen, "The Interindustry Wage....," p.359.

28. Slichter, "Notes on the structure....," p.88.

which are generally higher than those of the United States as found by Ulman.²⁹ The figures vary from 15.05 to 19.79 for 27 manufacturing industries from 1948 to 1962. Thus the interindustry wage differentials are wider in Korea than in the United States.

What about the movement of the coefficients of variation? Except for a slight decrease in 1963, they have constantly increased from 1960 to 1968. The coefficient of variation moved from 19.63 in 1960 to 25.38 in 1968. Although the coefficients declined from 25.38 to 22.31 in 1969 and 22.30 in 1970, the latter two figures are still higher than those figures in the period 1960-1966. The year 1969 might be the starting point of a contracting wage structure in terms of these coefficients of variation. But in 1971 the coefficient reaches 22.94 which is rather higher than those of the previous two years. Therefore, it can clearly be said that the period 1960-1971 as a whole is not one of contracting wage structure but rather one of widening wage structure. It is definitely so as far as the period 1960-1968 is concerned.³⁰

Changes in the dispersion of the wage structure can be also measured using

Table 3. Standard Deviations, Means, and Coefficients of Variation of Average Monthly Earnings of Production Workers in 23 Mining and Manufacturing Industries, 1960-1970

	Standard Deviations	Means	Coefficients of Variation
1960	500.5	2,550.4	19.63
1961	565.7	2,843.9	19.89
1962	630.0	3,062.6	20.57
1963	690.7	3,387.4	20.39
1964	863.6	4,135.7	20.88
1965	1,068.0	5,033.0	21.22
1966	1,293.7	5,973.9	21.66
1967	1,817.0	7,264.3	25.01
1968	2,343.6	9,236.1	25.38
1969	2,685.1	12,034.8	22.31
1970	3,298.4	14,878.8	22.30
1971	4,163.9	18,149.6	22.94

Calculated from: The Bank of Korea, *Economic Statistical Yearbook*, 1972, pp.330-33.

29. Lloyd Ulman, "Labor Mobility and the Industrial Wage...." 80-81.

30. Basically the same conclusion is drawn with respect to the wage structure of the 19 manufacturing industries alone. Their coefficients of variation are 17.44 (1960), 17.52 (1961), 18.51 (1962), 18.29 (1963), 18.97 (1964), 18.54 (1965), 19.17 (1966), 20.64 (1967), 25.72 (1968), 22.65 (1969), 22.76 (1970), and 23.25 (1971).

only the top and the bottom quarters of the wage hierarchy. Table 4 presents the interquartile range³¹ as a percentage of the median, high-low percent differentials, and high-low absolute differentials for the 23 industries in each of the years from 1960 to 1971.

The interquartile range has consistently widened from 680 won in 1960 to 7,330 won in 1971, while the median increased from 2,480 won in 1960 to 17,490 won in 1971. The increased high-low absolute differentials are consistent with this widening interquartile range during the period. That is, the inter-industry wage structure has widened in terms of the absolute measure of the wage differentials. If we can reasonably assume that there have been same percentage increases in earnings as the price level increases, this tendency of the widening absolute differentials is to be expected. Cullen also found a generally steady increase in the absolute wage differentials throughout most

Table 4. Interquartile Range of Average Monthly Earnings with Absolute and Percentage Differentials in 23 Mining and Manufacturing Industries, 1960—1971

	Interquartile Range (won)	Median (won)	Interquartile Range ÷ Median × 100	High-low Percent Differentials	High-low Absolute Differentials (won)
1960	680	2,480	27.42	159.5	1,193
1961	680	2,770	24.55	161.6	1,370
1962	680	2,970	22.90	163.1	1,475
1963	830	3,320	25.00	160.8	1,620
1964	1,310	4,030	32.51	166.6	2,095
1965	1,460	4,800	30.42	164.8	2,530
1966	2,110	5,640	37.41	166.3	3,108
1967	2,260	6,620	34.14	174.4	4,175
1968	3,590	8,750	41.03	187.6	5,862
1969	4,920	11,280	43.62	210.0	8,277
1970	6,730	14,040	47.93	174.4	8,260
1971	7,330	17,490	41.81	182.7	11,056

- a. For each year, the mean of the average monthly earnings in the six industries forming the top quarter of the wage structure divided by the mean of the average monthly earnings in the six industries forming the lowest quarter of the wage structure

- b. For each year, the absolute differentials between the means described in (a)

Source: The Bank of Korea, *Economic Statistical Yearbook*, 1972, pp.330—33.

31. Cullen used the median of the average annual earnings in the top and the bottom quarters in analyzing the wage dispersion in the United States. Because of the small sample in the case of Korea, however, the mean of the average monthly earnings was used here to calculate the interquartile range.

of the 1899-1950 period in the United States.³²

More relevant for the purpose of this study in relation to the movement of the wage structure are relative measures rather than absolute measures. Table 4 presents two relative measures in columns 4 and 5. The high-low percent differentials between the top and the bottom quarter of the wage structure have shown a general tendency to widen. Although the differentials declined slightly in 1963 and 1965, they have steadily widened up to 1969 varying from 159.5 percent in 1960 to 210.0 percent in 1969. Except for the extremely high percent of 1969, the mean earnings of the production workers in the high-wage industries of each year are quite consistently 60 to 80 percent higher than the mean earnings in the low-wage industries of the same year for the whole 1960-1971 period. These percentage differentials are greater than those of the United States, i.e., a 50 to 60 percent gap found by Cullen for the period 1899-1950.³³ In addition, while the United States data show a general stability in these percent differentials, Korean data for a much shorter period reveal a generally widening tendency of the differentials.

Another relative measure is the interquartile range as a percentage of the median of the average monthly earnings in the 23 industries. As shown in Table 4, it has been fluctuating between 22.90 and 47.93 for the period 1960-1971. The range has declined slightly in 5 years. However, it generally widened for the whole period. When we divide the period into 3 subperiods, 1960-1963, 1964-1967, and 1968-1971, we note that the range has widened. That is, the first subperiod is between 20.0 and 30.0, the second between 30.0 and 40.0, and the third between 40.0 and 50.0. The level of the range since 1964 is much higher than that of the United States, i.e., around 25.0 throughout most of the Cullen's period.³⁴

IV. Concluding Remark

Thusfar we have made two major points concerning the interindustry wage structure in mining and manufacturing in Korea. First, the interindustry wage differentials are quite noticeable in Korea. The average monthly earnings in the high-wage industries are consistently 60-80 percent higher than those in the low-wage industries. Second, even though there has been a constant shifting in the relative ranking of the industries in wage hierarchy, there has been no sign of a contracting interindustry wage structure. The wage structure has rather widened during the period covered.

What are the implications of these findings for the competitive market hypo-

32. Cullen, "The Interindustry Wage...", p.361

33. *Ibid.*

34. *Ibid.*

thesis? First of all, do the high wage differentials in Korea reflect correspondingly high differentials in skill mix among industries, as the competitive market hypothesis suggests? Our limited data suggest that the skill mix is not associated with the level of the monthly earnings. The rank correlation coefficients of the skill mix variable, measured as the proportion of professional and skilled workers to the total workers, with respect to the average monthly earnings of regular employees is -0.1764 for 18 manufacturing industries in 1970.³⁵ It even has the wrong sign. When we use a broader definition of skill mix including semiskilled workers, the coefficient worsens, i.e., -0.2742 . However, the insignificance of these skill mix variables can not be conclusive, since great variations within these two categories are possible. The data used here were too aggregated to measure accurately the varying degrees of individual labor quality.³⁶

Secondly, if the skill mix is not related to the interindustry wage structure as the above limited evidence shows, the declining skill margin, if any, would not affect the movement of the wage structure. Even if the skill mix is significant in years other than 1970, the widening interindustry wage structure during the period suggests that occupational wage differentials may not have declined, contrary to what is suggested by the competitive market hypothesis. It seems reasonable to say that skill margins might have increased because of high demand for scarce skilled workers in the midst of abundant unskilled labor during the period.³⁷ Besides the possibility of widening skill margins, relative labor immobility among industries must have contributed to the widening interindustry wage structure in Korea. If there had been sufficient labor mobility from low-paying industries to high-paying industries as is suggested by the competitive market hypothesis, there would have been much less widening or even a narrowing of the interindustry wage structure. Although we may not completely reject the competitive market hypothesis in the case of Korea because of the absence of sufficient data, the above evidence about the movement of the wage structure does not support the hypothesis.

REFERENCES

- The Bank of Korea, *Economic Statistics Yearbook*, 1972, Seoul, 1972.
- Solomon Barkin, "Industrial Union Wage Policies," *Plan Age*, January, 1940, 1-14.
- Solomon Barkin and Others (eds.), *Industrial Productivity: A Social and Eco-*
-
35. For the distribution of the skill mix of regular employees in mining and manufacturing industries, see Office of Labour Affairs, *Yearbook of Labour Statistics*, 1971, pp.52-55.
36. *Ibid.*
37. Hwang Joe Kim, "General Supply and Demand Conditions in the Korean Labor Market," *Yonsei Business Review*, 11 (August, 1974), 190-200.

- conomic Analysis*, New York: Arno Press, 1966.
- John F. Burton and Others, *Readings in Labor Market Analysis*, New York: Holt, Rinehart and Winston, 1971.
- Donald E. Cullen, "The Interindustry Wage Structure, 1899-1950," *American Economic Review*, 46, June, 1956, 353-369.
- John T. Dunlop (ed.), *The Theory of Wage Determination*. New York: The Macmillan Company, 1957.
- John T. Dunlop and M. Rothbaum, "International Comparisons of Wage Structures," *International Labour Review*, 71, April 1955, 346-363.
- Robert Evans Jr., *The Labor Economies of Japan and the United States*. New York: Praeger Publishers, 1971.
- C. T. Haworth and D. W. Rasmussen, "Human Capital and Interindustry Wages in Manufacturing," *The Review of Economics and Statistics*, LIII, November, 1971. 376-79.
- J. R. Hicks, *The Theory of Wages*, New York: St. Martin's Press, 1963.
- Rokuro Hotani and Takashi Hayashi, "The Evolution of Wage Structure in Japan," *Industrial and Labor Relations Review*, 15, October, 1961, 52-66.
- C. K. Johri and N. C. Agarwal, "Interindustry Wage Structure in India, 1950-1961: An Analysis," *Indian Journal of Industrial Relations*, 1, April, 1966, 397-414.
- Hwang Joe Kim, "General Supply and Demand Conditions in the Korean Labor Market," *Yonsei Business Reviews*, 11, August, 1974, 185-202.
- Korea Office of Labour Affairs, *Yearbook of Labour Statistics*, 1971, Seoul, 1971.
- Stuart O. Schweitzer, "Factors Determining the Interindustry Structure of Wages," *Industrial and Labor Relations Review*, 22, January, 1969, 217-225.
- Sumner H. Slichter, "Notes on the Structures of Wages," *Review of Economics and Statistics*, 32, February, 1950, 80-91.
- Jack Stieber, "Occupational Wage Differentials in the Basic Steel Industry," *Industrial and Labor Relations Reviews*, 12, January, 1959, 167-181.
- K. Taira, *Economic Development and the Labor Market in Japan*, New York: Columbia University Press, 1970.
- George W. Taylor and Frank Pierson, *New Concepts in Wage Determination*, New York: McGraw-Hill Book Company, Inc., 1957.
- Lloyd Ulman, "Labor Mobility and the Industrial Wages in the Postwar United States," *Quarterly Journal of Economics*, LXXIX, February, 1965, 73-97.
- , "Cyclical Variation in the Interindustry Wage Structure," *American Economic Review*, 60, March 1970, 75-84.
- C. Glyn Williams, "Changes in the Skill Mix and Their Effect on the Railroad Industry's Wage Level," *Industrial and Labor Relations Review*, 20, October, 1966, 88-91.
- Kozo Yamamura, "Wage Structure and Economic Growth in Postwar Japan," *Industrial and Labor Relations Review*, 19, October, 1955, 148-165.