Changes in the Skill Differential: Union Wages in Construction, 1907-1972

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MOVEMENTS of the wage differential between skilled and unskilled workers are generally well known, but their causes have been a matter of considerable debate among economists.[1] The movements to be

explained are both cyclical (a tendency to narrow in good times and widen in bad) and secular (a trend toward narrowing of the differential over the long run). The hypotheses advanced fall into three broad categories based on: demand factors, supply factors, and institutional factors. This paper seeks to integrate the relevant factors into a single model capable of answering a number of puzzling questions. It uses a two-variable model, explaining variations in the percentage excess of skilled wages over unskilled wages embodied in union contracts in the construction industry from 1907 to 1972.[2] One supply factor (immigration) and one demand factor (changes in the price level) combine to explain nearly three-quarters of the year-to-year changes in the skill differential. The former accounts for the overall trend in the data, while the latter accounts for the cyclical movements.

[1]Some of the main contributions are listed here: J. M. Clark, "Wage Theory in an Age of Organized Labor," in Philip D. Bradley, ed., *The Public Stake in Union Power* (Charlottesville, Virginia: University of Virginia Press, 1959), pp. 301-23; H. Gunter, "Changes in Occupational Wage Differentials," *International Labour Review,* Vol. 89, No. 2 (February 1964), pp. 136-55; Alan L. Gustman and Martin Segal, "The Skilled-Unskilled Differential in Construction," *Industrial and Labor Relations Review,* Vol. 27, No. 2 (January 1974), pp. 261-75; George H. Hildebrand and George E. Delahanty, "Wage Levels and Differentials," in Robert A. and Margaret S. Gordon, eds., *Prosperity and Unemployment* (New York: John Wiley and Sons, 1966), pp. 265-301; Robert M. McDonald, "Pulp and

Paper," in Lloyd G. Reynolds and Cynthia H. Taft, *The Evolution of Wage Structure* (New Haven, Conn: Yale University Press, 1956), pp. 99-166; Harry Ober, "Occupational Wage Differentials, 1907-1947," *Monthly Labor Review,* Vol. 67, No. 2 (August 1948), pp. 127-34; Richard Perlman, "Forces Widening Occupational Wage Differentials," *The Review of Economics and Statistics,* Vol. 40, No. 2 (May 1958), pp. 107-15; Melvin W. Reder, "Theory of Occupational Wage Differentials," *American Economic Review,* Vol. 45, No. 5 (December 1955), pp. 833-52; Melvin W. Reder, "Wage Differentials: Theory and Measurement," in National Bureau of Economic Research, *Aspects of Labor Economics* (Princeton, N.J.: Princeton University Press, 1962), pp. 257-317; and Lloyd G. Reynolds and Cynthia H. Taft, *The Evolution of Wage Structure* (New Haven, Conn: Yale University Press, 1956).

[2]This definition of the skill differential or "margin for skill" is consistent with Reder, "Wage Differentials: Theory and Measurement," p. 259.

Alternative Explanations

Wage differentials are thought to compensate workers for (1) unpleasantness of and (2) cost of preparation for certain jobs. Since skilled work is generally more pleasant than unskilled, the major explanation for higher pay for skilled work in a competitive market must be the cost of training and preparation. Following the usage of Albert Rees, people who undertake training and preparation enabling them to seek skilled work may be said to have a taste for skilled work. People who choose not to undertake the requisite training and preparation nor to incur the costs and risks associated with it and who accept unskilled work may be said to have a taste for unskilled work.[3] If worker mobility is limited, "non-competing groups" may be created such that some workers are consigned to unskilled work by some attributed, nonfunctional characteristic. The number of workers possessing or not possessing this attributed characteristic (such as ethnicity or a high school diploma) would affect the supply of unskilled workers and the size of the wage differential.

The long-run tendency for the skill differential to narrow has most often been explained by supply factors, such as the greater number of workers with a taste for skilled work and the smaller number of workers with a taste for unskilled work now (post-World War II), as compared with earlier periods (pre-World War II).[4] The private cost of training and skill acquisition has fallen, influencing the supply of skilled workers. The greater availability of free public education has reduced out-of-pocket expenditures, while child labor laws have reduced the income loss associated with additional education and training. The decrease in the supply of people with a taste for unskilled work has been explained by less foreign immigration and by the fact that net farm outmigration is no longer an important source of unskilled labor.

The marginal productivity theory tells us that wages are some function of labor productivity at the margin. As economic activity increases over the business cycle, wages of unskilled workers tend to rise relative to wages of skilled workers (that is, the skill differential narrows). This has piqued a certain curiosity on the part of economists, who ask why the price of the less productive factor rises under these circumstances relative to the price of the more productive factor. Several attempts have been made to explain skill differential shifts on the basis of demand factors, which may alter the relative marginal revenue products of skilled and unskilled labor, thereby causing the observed systematic change in the wage differential between them. These explanations deal directly with the cyclical variation in the differential, but, if the occurrence of these demand events has altered over time, this could constitute an explanation of the trend, as well. For example, if fewer recessions occurred in the post-war period, less opportunity for widening and more net narrowing would occur; thus the differential would display a long-run tendency to narrow. For this paper four distinct demand arguments were identified and tested.

Search.[5] As economic activity increases cyclically, skilled workers become fully employed. From this point on, hiring a skilled worker involves (1) waiting, (2) an extensive search, or (3) bidding him away from his current employment. These alternatives are costly and tend to raise the marginal cost of hiring a skilled worker. Alternative factors are employed up to the point that the marginal benefits per dollar

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[3]Albert Rees, *The Economics of Work and Pay* (New York: Harper and Row, 1973), pp. 166–67, 170.

[4]Reynolds and Taft, *Evolution of the Wage Structure,* p. 184; Lloyd G. Reynolds, *Labor Economics and Labor Relations,* 4th ed. (Englewood Cliffs, N.J.: Prentice-Hall, 1964), p. 473; Rees, *Economics of Work and Pay,* p. 174; Neil W. Chamberlain and Donald E. Cullen, *The Labor Sector,* 2nd ed. (New York: McGraw-Hill, 1971), p. 426; Reder, "Wage Differentials: Theory and Measurement," p. 264.

[5]Reder, "Wage Differentials: Theory and Measurement," pp. 269–76; Charles C. Holt, "Job Search, Phillips' Wage Relation, and Union Influence: Theory and Evidence," in Edmund S. Phelps et al., *Microeconomic Foundations of Employment and Inflation Theory* (New York: W.W. Norton, 1970), pp. 106–07.

expended on each are equalized. So, un-skilled workers—still readily available in the pool of unemployed—are sought, causing their relative wages to rise.

Real productivity.[6] In cyclical upswings production methods may be altered to accommodate the relative scarcity of skilled workers and the lesser attainments of unskilled workers. Skilled jobs may be broken down into a series of less taxing, more repetitious jobs when long production runs associated with peak economic activity permit. The unskilled worker's marginal product then rises because he contributes output that under other demand circumstances could only be produced by a skilled worker. This argument is applicable to the construction industry, the source of data for this article. Carpenters and their helpers are represented by different unions and their tasks are spelled out in their respective contracts. Stripping concrete forms and erecting scaffolding more than fourteen feet in height are tasks reserved to carpenters. A cyclical shift in physical productivity may occur in times of high activity when the helpers take on these tasks of carpenters. When demand slackens, the carpenters, anxious to keep occupied, demand enforcement of the collective bargaining agreement and reassert their hegemony over these tasks. Over the cycle, the helpers' marginal productivity rises as demand rises and falls when demand falls.

Labor as a quasi-fixed factor.[7] Walter Oi has argued that hiring and training costs are analogous to fixed costs. Hence, skilled workers who embody large amounts of these costs may be treated like fixed factors of production. These quasi-fixed factors experience little volatility in demand because only large shifts in expected product demand or price would alter their marginal revenue productivity sufficiently to justify hiring or separating them. Unskilled workers embody few of these costs and rela-

tively small shifts in the demand for goods and services would induce their being hired or fired. In the presence of flexible relative wages these demand factors would "predict a widening of skill differentials in a downswing and a narrowing in the upswing."[8]

Tight labor market effect.[9] Albert Rees, puzzling over the concentration of narrowing in war and post-war situations of hyperdemand and inflation, argued that only in a tight labor market could the true compensating differential between skilled and unskilled work be approached. At other times, the wages of unskilled workers would reflect the necessity of accepting unpleasant work or nothing.

Institutional factors also are hypothesized as determinants of the skill differential. Labor unions are believed to exert an egalitarian influence reflected in pay raises of equal cents per hour across the occupational structure.[10] This inevitably would have the effect of narrowing percentage differentials. Other institutional forces conceivably acting on the skill differential would be minimum wage legislation, value of welfare allotments, and equal employment opportunity enforcement.

In fact, these theories compete with each other to explain the same phenomena. Reder argues that "supply factors are adequate to explain the secular decline in the skill differential."[11] He also makes supply arguments to account for the cyclical variation in the skill differential. Some commentators on labor relations are persuaded that union activity accounts for the narrowing trend, if not the cyclical variation. Although little has been written about the demand factors, these, too, are hypothesized here as causes of both cyclical and trend movements in the skill differential.

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[6]Eliot S. Orton, "The Skill Differential and the Effect of Collective Bargaining Upon It," unpublished paper (Cornell University, 1967).

[7]Walter Y. Oi, "Labor As a Quasi-Fixed Factor," *Journal of Political Economy*, Vol. 70, No. 6 (December 1962), pp. 538–55.

[8]Ibid., p. 554.

[9]Rees, *Economics of Work and Pay*, pp. 174–75.

[10]McDonald, "Pulp and Paper," pp. 118–19; Clark, "Wage Theory in An Age of Organized Labor," p. 313; Reynolds and Taft, *Evolution of the Wage Structure*, p. 196; Gunter, "Changes in Occupational Wage Differentials," p. 151; Hildebrand and Delahanty, "Wage Levels and Differentials," pp. 271–77; Chamberlain and Cullen, *The Labor Sector*, pp. 424–25.

[11]Reder, "Wage Differentials: Theory and Measurement," p. 266.

The Model

A great many variables, expressing different aspects of the demand, supply, and institutional arguments, were regressed on a long time series of skill differential data.[12] A simple, parsimonious model, which answered most of the questions posed above and some others besides, emerged.

The dependent variable was constructed from wage indices of skilled and unskilled union contract rates for a large number of occupations in the construction industry. The indices spanned the years 1907 to 1972. The length of this series made it ideal for the analytical use at hand. Its limitation to the construction industry is a drawback, but not a serious one. All factors thought to affect the skill differential in any industry occur in the construction industry. Nowhere is the effect of unionization more likely to be apparent. Other analysts have written about "the" skill differential based on construction industry data, and much theorizing apparently has been based on this same series. Because the results obtained below have not been replicated in other industries, they should be regarded as partial. Nevertheless, the explanatory variables are not drawn from the construction industry and applicability of the model may be quite general.

The independent variables were constructed to test the alternative explanations. Supply variables tested the hypothesis that the number of workers with a taste for skilled work was rising relative to the number of workers with a taste for unskilled work. These variables, with their expected sign in parentheses, are:

Net migration from farms (in millions). Farm outmigrants have been hypothesized as a source of unskilled labor; so when this variable is large the differential should widen. (+)

Foreign immigration (in millions) ultimately incorporated in the model with a two-year lag (IMM_{t-2}). Large numbers of immigrants with a taste for unskilled work should cause the differential to widen. (+)

The proportion of the population with a high school diploma or some college, but not a college degree $(ED12)$. As this proportion rises, the skill differential should narrow. (−)

The proportion of the population with five years of elementary education or less $(ED5)$. When this proportion is high, the skill differential should be large. (+)

Percentage change in the number of people in the population with twelve years or more education. (−)

Percentage change in the number of people in the population with five years or less education. (+)

Demand variables reflect the contention that as economic activity rises, the marginal cost of searching for and hiring an unskilled worker falls relative to the marginal cost of searching for and hiring a skilled worker.

All the demand variables were highly correlated with each other and with the dependent variable. Any model using absolute magnitudes would be afflicted with multicolinearity. Therefore, the dependent variable and all demand variables, including wage level (a test of the institutional hypothesis), were transformed to year-to-year percentage changes.

Change in the price level—a test of the quasi-fixed factor hypothesis $(\overset{*}{P})$. As the price level rises, increase in the marginal revenue product of unskilled workers induces their hiring and narrows the skill differential. (−)

Change in money supply. This was

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[12]The indexes of skilled wages and unskilled wages appear in U.S. Bureau of Labor Statistics, *Handbook of Labor Statistics, 1974,* Bulletin 1825 (Washington, D.C.: G.P.O., 1974), Table 92, pp. 218–19. The differential itself was taken from Table 95, p. 229. The ratio of skilled wages to unskilled in the 1957–59 period was 1.3747:1. The index of skilled wages was set equal to 137.47 and the index of unskilled was set equal to 100. Having established the differential, the indexes were chain-computed for all years from the years for which the appropriate differential was established. The new index for skilled workers was divided by the new index for unskilled workers to determine the differential for all years.

used to test the quasi-fixed factor argument. (−)

Change in implicit price deflator for business fixed investment. This was used to test the quasi-fixed factor hypothesis. (−)

Change in real gross national product; it expresses the "real productivity hypothesis" that the shift in relative demand for skilled and unskilled workers that compresses the skill differential occurs as a result of increasing demand for goods and services. (−)

Change in money gross national product; it also tests the productivity hypothesis but does not correct for price changes. (−)

Change in construction employment. This was used as an indirect measure of the demand for construction output in a test of the real productivity hypothesis. (−)

Change in unemployment rate of skilled workers; it reflects the search hypothesis. As this variable declines, the dependent variable should decline or narrow. (+) (Unemployment rate is an "inverted" demand variable; thus we expect it to have a positive sign with respect to changes in the skill differential, while all the other measures of economic activity have a negative sign.)

Change in unemployment rate of construction workers; it also tests the search hypothesis. (+)

The testable aspect of the institutional argument is the assertion that narrowing is associated with raises of equal dollar amounts across the occupational spectrum generated by unionism.

Increases in wage levels, which will cause narrowing of the skill differential. (−)

A dummy variable taking the value 0 in all years before the passage of the Wagner Act (National Labor Relations Act of 1935) and taking the value 1 for the years 1936–72. Since the act promoted the growth of unions, and in this context, particularly construction laborers unions, it should have produced more narrowing from the same set of demand and supply elements. (−)

In addition, other dummy variables were used to express certain relationships. A "tight labor market dummy" was constructed to reflect Rees's observation that much of the historical narrowing has occurred in a few episodes of wartime hyper-demand and post-war inflations. This dummy took the value 1 in years when the national unemployment rate was less than 3 percent. (−)

A set of dummies coinciding with major swings of the business cycle was constructed to reflect underlying supply shifts not expressed by the continuous supply variables. This formulation was suggested by Reder's argument that peaks in demand for labor draw unskilled workers into the performance of skilled tasks and result eventually in a step shift in the supply of skilled workers.[13] The coefficients on these dummies should produce progressively more narrowing. (−)

Construction of the model was plagued by anomalous observations arising during and immediately after World War II. The presence of price and wage controls from 1942–45 meant that economic forces generated then did not affect prices and wages until after the war; the causal relationship was present but disjointed. Omitting these years left the model open to the criticism that all of the narrowing was not accounted for. Including these years reduced the effectiveness of the model. To circumvent this problem a composite observation for each variable for the years 1942–47 was created. These observations reflected the total change in the demand variables, an average value for ED12 and ED5, and total foreign immigration and farm outmigration. The statistical validity of this procedure was confirmed by a test of the identity of the regression plane for 1942–47 and the regression plane for all the other years.

The final form of the model related the

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[13]Reder, "Wage Differentials: Theory and Measurement," pp. 270–71.

percentage change in the skill differential to a number of supply and demand variables. The dependent variable—annual percent change in the skill differential—was constructed as follows:

(1)
$$SD = \frac{W_{sk}}{W_{unsk}} - 1$$

where SD is the skill differential; W_{sk} is the wage index of skilled construction workers; and W_{unsk} is the wage index of unskilled construction workers.

(2)
$$\overset{*}{SD_t} = \frac{SD_t - SD_{t-1}}{SD_{t-1}}$$

where $\overset{*}{SD_t}$ is the percentage change in the skill differential from year $t - 1$ to year t.

(3) $\overset{*}{SD_t} = b_0 X_0 + b_1 X_1 + b_2 X_2 + b_3 \overset{*}{X_3}$
$$+ \dots b_n X_n + e$$

where X_0 is a constant always equal to 1; b_0 is the y-intercept; and b_i represents the coefficients of the X_i parameters as i runs from 1 to n (the unstarred variables are absolute magnitudes; the starred variables express annual percentage changes); and e is a randomly distributed error term.

A slightly different form was needed to incorporate dummy variables; since none were found to contribute significantly, however, that form is not shown.

Results

Most of the variables possessed at least some vestige of the hypothesized relationship. Table 1 shows the simple correlation of the independent variables with changes in the skill differential. All possessed the hypothesized signs except net farm outmigration. This indicates that farm migrants are less likely to enter unskilled occupations and cause widening and more likely to enter skilled occupations and cause narrowing of the skill differential. Despite possessing the proper sign, however, the independent variables drawn from the construction industry had less explanatory power than comparable variables relating to the economy as a whole.

The skill differential was regressed on all of the variables in Table 1 both singly and in combination. A variety of lag structures were employed, and the one found to

Table 1. Simple Correlation of Change in Skill Differential with Selected Demand and Supply Factors.

Factor	r
Net farm outmigration	−0.21
Foreign immigration	0.39
Percent of population with 12–15 years of education	−0.09
Percent of population with 0–5 years of education	0.17
*Percent of population with 12–15 years of education	0.32
*Percent of population with 0–5 years of education	−0.66
*Consumer price index	−0.77
*Money supply (lagged one year)	−0.50
*Price deflator—business fixed investment	−0.54
*Real GNP (lagged one year)	−0.14
*Money GNP (lagged one year)	−0.47
*Employment—construction	−0.15
*Unemployment rate—skilled	0.69
*Unemployment rate—construction	−0.02
*Wage level—construction	−0.06
Wagner Act dummy	−0.25

* The starred items and the dependent variable are expressed as year-to-year percentage changes.

have the most explanatory power is shown. In addition, a number of dummy variables and sets of dummy variables were employed.

The parameters that best explained the dependent variable are shown in Table 2. They were $\overset{*}{P_t}$ and IMM_{t-2}. The t-values on the coefficients and the F statistic for the equation as a whole are significantly different from zero at levels of significance far beyond 0.01. The R^2 value of 0.71 is remarkably high for a model dealing in percentage changes. The Durbin-Watson statistic indicates no problem in correlation of residuals. Inspection of the residuals indicates no trend or bias, except a greater dispersion in earlier years.

These results indicate that a 2 percent increase in prices will cause a one percent narrowing of the skill differential, if other factors remain unchanged. Foreign immigration of one million persons in a year would cause the skill differential to widen by 6.45 percent two years hence. In a time of stable prices the skill differential would be stable if the level of immigration were 407,000 persons. It would narrow if immi-

Table 2. Change in the Skill Differential Regressed on Demand and Supply Factors, 1908–72.
(*t*-values in parentheses)

Parameter	Value
Constant term	−2.377
	(−3.788)
$\overset{*}{P}_t$	−0.517
	(−10.850)
IMM_{t-2}	6.462
	(5.142)
R^2	0.712
F	73.82
(d.f.)	(2, 57)
S.E.E.	3.068
D.W.	2.048
n	60[a]

[a] The six years 1942–47 are included in a single composite observation. The sixty-five individual observations from 1908 to 1972 are thus compressed into sixty.

gration were less, widen if it were more. Although a number of variables (such as investment price deflator and money supply lagged one year) were nearly as effective as the consumer price index in representing the cyclical movements, no other supply variable, combination of supply variables, or transformation or interaction of these variables approached the explanatory power of the immigration variable.

This simple model answers a number of questions about movements of the skill differential.

Which demand hypothesis best explains the cyclical movements of the dependent variable? Labor as a quasi-fixed factor hypothesis is the clear choice, since it predicts changes in relative wages based on the effect of price changes on marginal revenue productivities of the two occupational groups. Quite possibly, movements of the skill differential and changes in price level have a common cause, such as changes in the money supply, for example. This relationship may have been obscured by the use of annual rather than quarterly data. Nevertheless, the predictions of the Oi hypothesis are precisely fulfilled. Neither unemployment nor real output measures, respectively representing the search and real productivity hypotheses, were

nearly as effective as those relating to price or to monetary measures.

It may be that the relationship between $\overset{*}{SD}$ and $\overset{*}{P}_t$ is different for very large values of $\overset{*}{P}_t$. When inflation is rapid and skilled workers' marginal revenue products rise rapidly, employers may have an economic incentive to bid up skilled wages as fast as unskilled. Apparently the observed rates of inflation are not sufficiently rapid to produce this effect. At any rate dummy variables designed to reflect a large inflationary effect were not significant.

What causes the narrowing trend in the data since 1929? The demand variable, namely the price level, could account for the narrowing trend only if its own trend had changed significantly. In fact, more price increase in percentage terms occurred from 1908 to 1919 than in any other twelve-year period or from trough to peak in any other major cycle, even 1933 to 1948. Prior to 1929 the price level was observed to fall more readily than in recent decades. Nevertheless the net increase in the price level in the early years of the series was greater than in comparable periods since. In the twenty-three year period from 1907 to 1929, the price level more than doubled, increasing 112 percent (from 34.7 to 73.3 on a 1947–49 base). In the twenty-three year period from 1930 to 1952, the price level increased from 71.4 to 113.5, a 59 percent increase. In the twenty-three year period from 1933 to 1955, the price level increased from 55.3 to 114.5, an increase of 107 percent, nearly matching the 1907–29 increase. In the twenty-three year span ending in 1972 (1950–72), the price level rose from 102.8 to 178.6, an amount considerably less than that from 1907 to 1929. On the basis of these observations it is difficult to conclude that quickening price change accounts for the narrowing trend in the skill differential.

The supply parameter, millions of foreign immigrants lagged two years, accounts fully for the change in trend of the dependent variable. Comparing the periods 1907 to 1929, when the skill differential showed little net narrowing, and 1934 to 1958, which encompasses virtually all of the net narrowing in the skill differential,

reveals that the change in price level over the two periods was almost identical. The average yearly immigration in the first period was over 600,000, while in the second it was barely 100,000, causing the skill differential to narrow by 6 percent during the first period and by 58 percent during the second. The drop of 500,000 in annual immigration reduces the widening influence by more than 3 percent per year, more than enough to produce net narrowing in the years of low immigration and account for all the net narrowing observed in the series.

Why is narrowing concentrated in the years during and immediately following wars? Because foreign immigration is relatively low and price rise relatively fast during and immediately after wars.

What is the role of unions in shaping the skill differential? Since the dependent variable was created from wage series based on union contract rates, unions can be considered the proximate cause of the observed skill differential. Nevertheless, the independent variables created to reflect the additional impact of unionism had little explanatory power. The macro variables were in no way benefited and their coefficients were not significantly altered by the inclusion of variables reflecting the contribution of unionism. One would be foolhardy to say that unions had no impact on relative wages, but this model records none (except a lessening of dispersion among the residuals, which may result from an increasing uniformity among union contracts).

Why has the skill differential narrowed so little in recent years? Some recent observations of the premium for skill show it standing at 33.8 percent in 1961, 32.2 percent in 1967, and 33.2 percent in 1972. This essentially flat trend occurred during a period of quickening price inflation. There are several possible explanations: (1) the true compensating differential for the expense of skill acquisition may have been reached; (2) union strategy may have shifted;[14] (3) fear of inflation may have led skilled workers to protect the real

value of the premium for skill; or (4) watering down the skill content of jobs with skilled titles may have stopped. As plausible as these *ad hoc* hypotheses are, none are supported by the model; yet the small number of observations involved since 1960 makes arriving at final conclusions difficult. In fact the model handles the observations since the early 1960s rather poorly. But other evidence in the model points clearly to the cause of the flat trend: the resurgence of foreign immigration, much of it illegal. Michael Piore has estimated that in fiscal year 1973 the gross flow of illegal immigrants was at least 1,200,000 and perhaps as much as 2,400,000, of which 600,000 were apprehended. Thus the net inflow was between 600,000 and 1,800,000.[15] The mid-1960s has been cited as the beginning of the current surge in illegal immigration.[16] Using these benchmarks official immigration estimates were adjusted to produce a new, hopefully more accurate series. A figure of 100,000 illegals was added to the official estimate in 1965 and 100,000 more were added in each subsequent year until a total of 500,000 illegals annually was reached in 1969. This level was maintained through 1970, the last observation for this variable. Using this adjusted series, R^2 was raised by 0.02 and the standard error of estimate was reduced by 0.1. This adjustment process was done without looking at the residuals, that is, without tailoring the adjustment process to the shortcomings of the model. In 1968 and 1969 the skill differential widened by more than 3 percent. On the basis of price change and official immigration the model predicted narrowing of 2.46 percent and 2.8 percent respectively. Official immigration figures indicated that the appropriate IMM_{t-2} observations were in excess of 300,000. But

[14]Gustman and Segal, "The Skilled-Unskilled Wage Differential in Construction," p. 274.

[15]Michael J. Piore, "The 'New Immigration' and the Presumptions of Social Policy," in Industrial Relations Research Association, *Proceedings of the Twenty-Seventh Annual Winter Meeting* (Madison, Wis.: IRRA, 1974), p. 351.

[16]Walter Fogel, "Mexican Labor in United States Labor Markets," in Industrial Relations Research Association, *Proceedings of the Twenty-Seventh Annual Winter Meeting* (Madison, Wis.: IRRA, 1974), p. 345.

the residuals for those two years could be reduced to zero if actual immigration had been 862,000 for the 1968 observation and 945,000 for the 1969 observation. These estimates of actual immigration yield an estimate of illegal immigration in excess of 500,000 in 1966 and 600,000 in 1967 $(t-2)$. Although the estimates are imprecise, the inference that immigration is an important factor determining relative wages seems fully warranted by the statistical evidence.

Summary

The skill differential (the percentage excess of skilled wages over unskilled) narrows and widens as economic activity rises and falls. In addition it has had a secular trend toward narrowing from 1933 to around 1960, after which the trend has been essentially flat. Time-series analysis of changes in the skill differential from 1907 to 1972 found the cyclical movements to be associated with changes in the price level, as predicted by the "labor as a quasi-fixed factor" hypothesis. Although the demand variables explained the bulk of the variation in the series, these cyclical movements largely cancelled out. The trend component of the data series was found to be determined by the level of foreign immigration. The model's failure to explain the flatness of the trend in the prosperous 1960s suggests a resurgence of illegal foreign immigration. A better fit is obtained if some estimate of illegal immigration is added to official immigration figures.