Monographs in the Economics of Development

No. 8

Wages and Prices in Karachi: A Case Study

AZIZUR RAHMAN KHAN

November, 1961

THE INSTITUTE OF DEVELOPMENT ECONOMICS
Old Sind Assembly Building
Bunder Road, Karachi
(Pakistan)

THE INSTITUTE OF DEVELOPMENT ECONOMICS

Old Sind Assembly Building
Bunder Road, Karachi-1
(Pakistan)

The Institute of Development Economics is a non-official autonomous organisation established by the Government of Pakistan to conduct research on national and international problems of economic development.

Current activities at the Institute include research in the following five major subject areas: (1) Fiscal and Monetary Problems; (2) Consistency and Economic Planning; (3) Industrial Efficiency and Growth; (4) International Economics; (5) Population Growth and Economic Development.

ACKNOWLEDGEMENT

The author is grateful to Dr. Richard C. Porter and Dr. Henry J. Bruton who have been responsible for removal of countless errors from a first draft. He is also grateful to Mr. Abdul Majid for substantial help in the collection of data. No one, except the author, is, however, responsible for the errors that remain.

AZIZUR RAHMAN KHAN
Staff Economist
Institute of Development Economics

September, 1961.

CONTENTS

SECTION I

INTRODUCTION

1.1 *Introduction*

The objective of the present study is to examine the relationship between the course of wage rates and the general price level in Karachi during 1951-60. This is a part of a broader study of the problems of inflation in Pakistan, which is currently being done at the Institute of Development Economics.[1]

It would be more appropriate to study this relationship for the whole of Pakistan rather than confine the study to the principal city of the country. But this is not possible because of lack of uniform and current data. Karachi employs 22 per cent of the total labour force employed in the manufacturing industries of Pakistan[2]. Information about total employment and total wage bill are available separately for Karachi for the relevant years. It is convenient, therefore, to study the wage-price relationship in Karachi only. It is, however, believed that some inferences are possible about the situation in other urban areas of Pakistan from the relationship found for Karachi.

1.2 *Factors Influencing Wages*

Economic theory has advanced a number of hypotheses about wage determination. In this study, an attempt is made to analyse some of the important factors affecting wages. Wages in underdeveloped countries are generally not determined by market forces.

---

[1] Two studies on this subject are already published by the Institute: Monograph No. 3, *Deficit Financing in Pakistan*: 1951-60; and Monograph No. 4, *A Measure of Inflation in Pakistan*: 1951-60 (both published in 1961).

[2] This figure is for the year 1958. Refer to the *Statistical Bulletin*, Central Statistical Office (C.S.O.), December 1960, pages 1792 and 1804.

Wage rates are, for the most part, institutionally determined (near subsistence level) and are higher than 'market wages' (*i.e.*, the wage rate that would equate demand for and supply of labour).

It is initially assumed in this study that the most important factor affecting wages is the cost of living. Changes in the cost of living bring about changes in wage rates in either of two ways:

(a) A rise in the cost of living depresses real wages below the subsistence level and strengthens the workers' desire for higher wages. This induces the institutionally-determined wages to increase through trade union pressures. On the other hand, a decline in the cost of living widens the gap between the subsistence wages and the institutionally-determined wages. This induces the employers to resort to wage-cuts.

(b) The real wages in underdeveloped countries are already so close to the subsistence level that even if trade union resistance were not strong, consideration of working efficiency and labour productivity would stand against an upward shift in the cost of living without a corresponding increase in money wages. Employers may, therefore, raise the institutional wage when the cost of living goes up.[3] When the cost of living declines the employers have a justification for a wage-cut and the workers are unable to resist it because the institutional wage is too much higher than the subsistence wage.

Although the cost of living is singled out as the most important factor determining the wages, there are certain other factors which are believed to have strong influence on wage rates. In this study, an attempt is also made to take into account the effects of some of these factors (demand for labour and unemployment) on wages.

---

[3] "The amount of work that the representative labourer can be expected to perform depends on his energy level, his health, his vitality, etc., which in turn depend on his consumption level (which depends on income level)....." Harvey Leibenstein, *Economic Backwardness and Economic Growth*. New York, 1960, Page 62.

1.3 *Effects of Wages on Prices*

After attempting to specify the factors which determine wages, we attempt to discover the extent to which wage changes (due to prior changes in the cost of living) are being converted into further changes in general price level. The course of wages may influence the general price level in two ways:

(a) The first is the influence on the cost of production of manufactured goods. A general change in wage rates seems likely to generate a price change of domestically manufactured goods because it is a direct cost element.

(b) The second influence of wage changes on the general price level is through the level and composition of aggregate consumption demand. Money wage-rates determine money incomes in a large part of the economy and this affects both the level and the composition of consumption demand.

1.4 *An Outline*

Section II of the present study discusses the methodology. This section describes how the measurements of the various factors are secured. The method of constructing the wage index is stated. This section also discusses the limitations of the available price indicators and the difficulties encountered in finding quantitative data about the economic variables used in this study.

Section III attempts to specify the factors which determine the course of wages. Primarily, it investigates the relationship between the cost of living and the wages. It starts with the assumption that wages are, for the most part, determined by the cost of living. An attempt is made to test this hypothesis statistically. The influences of certain other economic variables on wages are also examined.

Section IV examines the effects of wage changes on the general price level. An attempt is made to state whether the course of wages act as encouragement or deterrent to further inflation.

SECTION II

METHODOLOGY

2.1 *The Wage Index*

In pursuing an analysis of the course of wages there are many difficulties—statistical data, theoretical concepts and analytical methods. Of all these, the most difficult is to obtain the necessary statistical data. The purposes for which data are collected and surveys designed are mostly administrative and political. The available data are not always fitted to the needs of economic research.

Because of the deficiency of statistical data the analysis in this study necessarily remains incomplete and limited to the examination of certain broad trends. Before the present study was undertaken, there existed no wage index for Karachi or for Pakistan. Data about the total wage bill and total employment in Karachi and in both the wings of Pakistan are, however, available from the following sources:

(a) The Central Statistical Office (C.S.O.) publishes these data in the *Census of Manufacturing Industries*. This is available for 1953, 1954, 1955, 1957, 1958 and 1959-60. Detailed information about total production and non-production workers and total wages paid to each of the two groups is, however, available only for 1953, 1954, 1955 and 1957.

(b) Data of "average annual earnings of factory workers in perennial factories" in Karachi and each of East and West Pakistan are available from the Ministry of Labour, Government of Pakistan. This is published annually in the *Workings of the Payments of Wages Act* 1934 and is available only upto 1956 (on a calendar-year basis).

(c) The Office of the Chief Inspector of Factories (Karachi Federal Capital Area) collects data of total employment and total wage bill in all registered factories of Karachi. This unpublished information is available for 1951 through 1960 (on a calendar-year basis).

Besides the agencies mentioned above, surveys of wage rates have been made by other agencies intermittently. Such a survey was undertaken in 1956 for the *Report of the International Labour Office (I.L.O.) on Manpower Survey in Pakistan.*[4] Such surveys were made only for the structural analysis of the wage rates. It is impossible to make yearly comparisons concerning changes in the wage rates from the results of such intermittent surveys designed by different agencies for different purposes.

Data obtained from the three sources mentioned above are not quite the same. While data supplied by the Ministry of Labour are very close to that obtained from the Office of the Chief Inspector of Factories, the C.S.O. figures are very different from that of the other two sources.[5] This is because the C.S.O. payroll statistics include the benefits received in kind by the labourers. The total wage-bill data supplied by the other two sources do not include them.

It is clear from the facts just stated that the only source from which continuous annual data are available about workers' annual average *income* for 1951 through 1960 is the Office of the Chief Inspector of Factories. It is also clear that the available data do not enable us to prepare an index of *wage rates* for Karachi. It is appropriate, therefore, to mention the characteristic features of the 'wage index' which is used in this study:

(a) The 'wage index', on which the analysis in this study is based, is an *index of workers' money income* in Karachi and not an index of wage rates. The index is only a rough index of wages. Ideally, the preparation of an index of wage rates would mean taking into account every wage rate weighted by the number of workers employed at each rate. But this is obviated by the lack of necessary data. Workers' income (or 'earning') includes overtime rates and other allowances paid in cash.

[4] Monthly average wages are given in Table 20, page 78 of the *Report*, Department of Manpower and Employment (Government of Pakistan), 1956.

[5] For a comparison of the data obtained from the three sources, *see*, Table B-1 in Appendix B.

Is it quite appropriate to use an index of workers' income in an analysis of wages and prices? In response to changes in the cost of living, either the wage rate may change, and/or the allowances may change, and/or there may be changes in the amount of overtime work permitted to each worker. Again, in determining the effects of wage changes on the general price level, the index of workers' income is more relevant. Changes in the amount of overtime work[6] and allowances have much the same effect on aggregate consumption demand and wage-cost per unit of output as changes in 'pure' wages.

(b) The *coverage* of the index is very wide. It includes total workers employed in eight selected groups of factories in Karachi.[7] These factories employ about 95 per cent of the total workers in all the registered factories of Karachi. The unregistered factories are excluded, but these do not employ a significant percentage of the total workers in Karachi.

(c) The index includes the earnings only of production workers. The definition of worker is given by the Factory Act of 1934, which includes persons employed in any manufacturing process, but excludes those who are solely employed in a clerical capacity in any room or place where no manufacturing process is being carried on.[8]

(d) The index is annual (on a calendar-year basis) from 1951 through 1960, with 1951 as the base year. It is annual because data are not available on a monthly or quarterly basis. This, however, does not present any difficulty because we want to abstract from the seasonal factors. The

---

6 Changes in the amount of overtime work will affect wage-cost per unit of output because overtime rates are usually higher than wage-rates.

7 These are: (1) Government and Local Fund Factories; (2) Textiles; (3) General Engineering; (4) Chemical and Dyes; (5) Printing and Bookbinding; (6) Wood, Stone and Glass; (7) Hides and Skins; (8) Food, Drink and Tobacco.

8 The Government of Sind, *The Factories Manual*, 1955, page 2.

index cannot be extended back to the years before 1951 because no information from the same source is available for those years. Moreover, the manufacturing industries of Karachi were just growing in those years, so that it had not yet become an important sector of the economy.

2.2 *The Indices of Cost of Living*

Two indices of cost of living are used in this study: (a) the general cost of living index for industrial workers in Karachi, published by the C.S.O.; and, (b) the cost of living index for industrial workers in Karachi for food items only (called the food index in this study), also published by the C.S.O. These indices have both merits and demerits. The commodity weights used in the indices are derived from the family budget survey made in 1944 and, therefore, neglect the change in the worker's consumption pattern that might have occured since then. The indices use controlled prices rather than free market prices for some items (*e.g.*, wheat and sugar). The use of controlled prices for wheat is justified by the fact that there existed few free markets for wheat in Karachi during 1951 through 1960 and that most workers bought their entire supplies of wheat from ration shops at the controlled prices. The reporting and coverage of the indices are believed to be fairly good and extensive.

2.3 *The Index of Real Wages*

The index of real wages is obtained by deflating the money-wage index by the general cost of living index according to the following formula:

$$W_t^s = \frac{W_t}{P_t''} \times 100$$

where W^s = index of real wages,

W = index of money wages,

P'' = index of general cost of living

and the subscript, t, refers to the time.

2.4 *Indices of Total Wage Bill and Employment*

In preparing the index of the wage bill, *all* the registered factories are included, not only the eight categories of factories for which the wage index is prepared. This means the coverage of the index of the total wage bill is wider than the coverage of the wage index. Similarly, the index of employment is based on the total workers employed in *all* the registered factories of Karachi. The unregistered factories employ less than 5 percent of the total working force in Karachi.[9]

2.5 *Indices of 'Demand for Labour' and 'Unemployment'*

No index of demand for labour is available for Karachi. As an approximation the index of placements made through the employment exchanges during each year may be used. This index is based on the number of persons employed through the employment exchanges to fill vacant positions each year. It is highly unsatisfactory to use this index as an indicator of employers' demand for labour. Neither a very high proportion nor a constant proportion of new appointments is made through the employment exchanges. In the absence of a better indicator of the demand for labour however, this index is used as an approximation.

No index of aggregate unemployment is available for Karachi. There, however, exist sufficient data on the basis of which an index of *unemployment registrations* is prepared for Karachi. This index is based on the total number of unemployment registrations outstanding in the live registers of the employment exchanges in Karachi. To use this as an index of unemployment is to assume that a constant percentage of *actually* unemployed population get themselves registered at the employment exchanges. But this assumption is not at all satisfactory; unemployment registration is, therefore, not a good indicator of the actual movements in the magnitude of unemployment.

---

[9] Unpublished material from the industrial survey of Karachi conducted by the Institute of Development Economics, 1959.

SECTION III

DETERMINATION OF WAGES

3.1 *Cost of Living and Wages*

The purpose of this sub-section is to carry the search for a statistical relationship between the cost of living and the wages in Karachi over 1951-60. A warning may be sounded at this stage that the mere establishment of some statistical relationship between movements in the cost of living and the wages will not justify any definite conclusion about causation. Even if such a systematic relationship were found, it would not be possible to tell which is the independent and which the dependent variable unless a great deal of additional information were available. There may be a two-way relationship between these two variables: the cost of living may affect the course of wages, and the wage-changes (through their influence on the general price level) may affect the cost of living. Here, we start with the assumption that the cost of living determines the wages and then see if the statistical results are in agreement with this hypothesis. For the time being the possibility of a reverse relationship (*i.e.*, wages affecting cost of living) is ignored. The reason we do so is that one can argue *a priori* that the latter relationship is likely to be tenuous in an underdeveloped economy.[10]

In Table 3.1 movements in the wage index and the cost of living indices are recorded. The general cost of living index and the food index are very highly correlated. Their movements are in the same direction for all the years both rising since 1951 with the exceptions of 1954, 1956, and 1959.[11]

---

10 This point is discussed at considerable length in Section IV of this study.

11 Since the two cost of living indices are almost the same, the relationship between one of these (the general index) and the wage index is shown in the text. The relationship between the food index and the wage index is, however, almost exactly the same.

TABLE 3.1

Movements in the Wage Index and the Cost of Living Indices

Year	Wage Index		General Cost of Living Index		Cost of Living Index for Food	
	Level	Annual Percentage Change	Level	Annual Percentage Change	Level	Annual Percentage Change
	(1)	(2)	(3)	(4)	(5)	(6)
1951 ...	100.0		100.0		100.0	
1952 ...	84.7	—15.3	102.0	+2.0	104.0	+4.0
1953 ...	96.8	+14.3	113.1	+10.9	112.1	+7.8
1954 ...	95.5	—1.3	111.1	—1.8	110.1	—1.8
1955 ...	103.7	+8.6	106.1	—4.5	106.1	—3.6
1956 ...	101.9	—1.7	110.1	+3.8	112.1	+5.7
1957 ...	111.3	+9.2	120.2	+9.2	126.3	+12.7
1958 ...	109.0	—2.1	124.2	+3.3	131.3	+4.7
1959 ...	99.5	—8.7	120.1	—3.3	126.5	—3.7
1960 ...	125.3	+25.9	128.3	+6.8	137.0	+8.3

SOURCE: *See* Summary Table, Appendix A.

To determine the time lag in the relationship between the cost of living and wages, the wage index is correlated with the cost of living index:

(a) of the present calendar year, allowing no time lag in the relation;

(b) of previous-year October to current-year September, allowing a three-month lag;

(c) of previous-year July to current-year June, allowing a six-month lag; and

(d) of the previous calendar year allowing a one-year time lag.

The results of these correlations appear in Table 3.2. It is found that longer time lags result in smaller correlation coefficients.

TABLE 3.2

Correlation Between Wage and Cost of Living Indices with Various Lags

The Magnitude of Lag	Correlation Coefficient
a. No Lag	+0.76
b. Three-month lag	+0.75
c. Six-month lag	+0.71
d. One-year lag	+0.54

The coefficient of correlation between *percentage changes* of the cost of living index and the *percentage changes* of the wage index are also calculated with various lags. These coefficients, given in Table 3.3, are lower than the coefficients for the *levels* of the indices. The general conclusion is, however, the same: the greater the time lag, the smaller the correlation coefficient.[12]

TABLE 3.3

Correlation Between Percentage Changes of Wage and Cost of Living Indices with Various Lags

The Magnitude of Lag	Correlation Coefficient
a. No lag	+0.51
b. Three-month lag	+0.49
c. Six-month lag	+0.34
d. One-year lag	−0.42

12 The negative coefficient of correlation between *changes* in the wage index and *changes* in the cost of living index with one-year lag requires explanation. A possible explanation is suggested by the negative coefficient of autocorrelation of the *changes* of the wage index (−0.68). It is quite plausible that a year of a large wage-increase is generally followed by a year of wage-cut or small wage-rise. Thus, whereas the correlation is positive between the changes of the two indices without any time lag, it turns out to be negative with a one-year lag.

The regression equation relating wages to cost of living in the *same* period (the one giving the best correlation) is:

$$W_t = 4.92 + 0.86P''_t$$

where W (money wages) and P'' (cost of living) are both index numbers. The relationship between the cost of living and wages suggested by this equation is rendered tenuous by the absence of lag in it. The instantaneous wage-adjustment to changes in the cost of living is not in conformity with the commonly-held hypothesis that a time lag is involved in the process. Considering that trade unions in Karachi do not enter into wage bargains more than once a year, it is hard to accept this evidence.

It is indeed very difficult to ascertain why no-lag gives a better correlation than would a lag. A possible explanation may be found by assuming a two-way relationship between the cost of living and wages, each affecting the other. But the data are not sufficiently varied to enable us to examine this two-way relationship statistically.[13]

---

13 Such possibility may be illustrated with the help of a model. Suppose that

$$W_t = aP''_{t-1} + U_t \quad \ldots\ldots(1)$$

Where W = Wage index,

P'' = Cost of living index,
U = random error,

and the subscript 't' refers to time;
and also that

$$P''_t = bW_{t-1} \quad \ldots\ldots(2)$$

Then let us estimate the wage equation with one-period lag:

$$W_t = \bar{a}P''_{t-1} + U_t \quad \ldots\ldots(3)$$

where $\bar{a}$ = estimated value.

The correlation coefficient will be determined by $\sigma_u^2 = \frac{1}{T}\sum_t U_t^2$
where T = number of observations.

But W_t also equals (from 2)

$$W_t = \frac{1}{b}P''_{t+1} \quad \ldots\ldots(4)$$

Averaging (1) and (4) we get

$$W_t = \frac{1}{2b}P''_{t+1} + \frac{1}{2}aP''_{t-1} + \frac{1}{2}U_t \quad \ldots\ldots(5)$$

Now if (i) $P''_t \sim \frac{P''_{t+1} + P''_{t-1}}{2}$ and

(*Footnote contd. on next page*)

3.2 *The Influence of Other Factors on Wages*

Although, we, so far, have examined the relationship only between the cost of living and the wages, there may be other important factors which influence the course of wages in Karachi. Here an attempt is made to analyse the effect of two other economic variables on wages. These are: (i) demand for labour; and (ii) unemployment.

The index of placements (used as an indicator of demand for labour) and the index of unemployment registrations (used as an index of unemployment) appear in Table 3.4.[14]

TABLE 3.4

Wages, Demand for Labour and Unemployment

Year	Wage Index	Index of Placements	Index of Unemployment Registrations
	(1)	(2)	(3)
1951	100.0	100.0	100.0
1952	84.7	129.7	106.7
1953	96.8	83.5	83.7
1954	95.5	114.6	77.1
1955	103.7	99.7	98.6
1956	101.9	181.9	121.6
1957	111.3	171.8	127.5
1958	109.0	125.6	133.7
1959	99.5	134.3	154.2
1960	125.3	165.0	182.8

SOURCE: Cols. 2 & 3: Data supplied by the Office of the Director General, Manpower and Employment, Karachi.

Footnote contd. from previous page

(ii) $ab \sim 1$

then (5) becomes

$$W_t \sim \frac{1}{b} P''_t + \frac{1}{2} U_t \quad \ldots\ldots(6)$$

This will fit closely when estimated

$$W_t = \left(\frac{1}{b}\right) P''_t + \frac{1}{2} U_t \quad \ldots\ldots(7)$$

Where $\left(\frac{1}{b}\right)$ = estimated value.

The correlation coefficient will be determined by $\sigma_u^2 = \frac{1}{4T} \sum_t U_t^2$

σ_u^2 will be $\frac{1}{4}$ *as large* as in the case of the equation (3) above.

The purpose of this model is to suggest that perhaps in our wage equation it is $\left(\frac{1}{b}\right)$ that is estimated, and not a. $\left(\frac{1}{b}\right.$ should be approximately equal to $\bar{a}$ if this model is correctly specified). This suggests one possible explanation of the better correlation with no lag.

[14] *See*, Section II.

The correlation coefficient between the index of placements and the wage index is not large.[15] This may be due to the fact that the level of actual unemployment is so great compared to the number of vacancies filled every year that the effect of the variations of the latter is negligible. Moreover, the use of the index of placements as an indicator of demand for labour may be a bad approximation for reasons already mentioned.

Unemployment is another important variable which may influence the course of wages. Workers' ability to bargain for higher wages varies inversely with the level of unemployment. The correlation coefficient between the index of unemployment registrations and the wage index is positive and rather high.[16] A high negative correlation between the two would have been more consistent with common belief. The high positive correlation probably derives from the following factors: (1) a higher cost of living increases the necessity for the unemployed to get employment at the same time as it leads to a rise in wages; (2) when wages rise a greater supply of labour is induced into the market. For these reasons, it is not too surprising to find that the cost-of-living rises (falls) lead simultaneously to wage-rate rises (falls) and increased (decreased) unemployment registrations. The secular increase in unemployment registrations since 1954 is partly explained by the increasing popularity of the employment exchanges.

3.3 *Wage-Movement in Individual Industries*

Separate wage-indices are prepared for each of the eight broad classes of factories in Karachi. The coefficients of correlation between each of these indices and the cost of living index are shown in Table 3.5.

---

[15] It is +0.47

[16] It is +0.71

TABLE 3.5

Correlation Between Cost of Living Index and Wage Index of Each Industry

Name of the Industry	Coefficient of Correlation
1. Government and Local Fund Factories ...	+0.75
2. Printing and Bookbinding	+0.73
3. Chemical and Dyes	+0.71
4. Food, Drink and Tobacco	+0.67
5. Hides and Skins	+0.59
6. Textiles	+0.59
7. General Engineering	+0.55
8. Wood, Stone and Glass	+0.46

One would expect high correlation in the industries which require a high proportion of skilled labour and/or have strong trade unions. If high wages are regarded as the indicator of skilled-labour-requiring industries, then it is not the case that correlation coefficient is higher for high wage industries; [17] nor is it true that the higher the degree of unionisation the higher the correlation coefficient. [18]

[17] The following are the relatively "highwage" industries; General Engineering; Printing and Bookbinding; Food, Drink and Tobacco; and Wood, Stone and Glass.

[18] Percentage of workers enrolled as members of trade unions in six of these industries are shown below:

Industry	% of workers enrolled as members of trade unions
1. Engineering ...	16.1
2. Textiles ...	13.8
3. Chemicals and Dyes ...	13.5
4. Printing Presses ...	24.5
5. Foods and Tobacco ...	20.3
6. Hides and Skins ...	12.5

SOURCE:— Office of the Labour Commissioner and Registrar of Trade Unions, Karachi.

The correlation coefficient between the wage index and the cost of living index is highest for the Government and Local Fund Factories. Wages in these factories are largely determined by the decisions made by the Government. This probably shows that the Government, more than any other employer, is opposed to an upward shift in cost of living without a corresponding shift in money wages.[19] The hypothesis is strengthened by the fact that whereas real wages had been declining in most of the industries, it never showed a downward trend in the Government and Local Fund Factories.

3.4 *Movements in Real Wages*

The index of real wages appear in table 3.6.[20] This index shows to what extent increases in the cost of living were offset by increases

TABLE 3.6

Index of Real Wages

Year	Real Wage Index (Base = 1952)	Cost of Living (Base = 1951)
	(1)	(2)
1951	120.5	100.0
1952	100.0	102.0
1953	103.1	113.1
1954	103.6	111.1
1955	117.7	106.1
1956	111.6	110.1
1957	111.6	120.2
1958	105.8	124.2
1959	99.7	120.1
1960	117.7	128.3

SOURCE: *See*, Summary Table Appendix A.

in the money wages. The index shows a downward trend after 1955 which continues until 1959. The implications of declining real wages in a period of rising prices are discussed in the next section.

19 *See*, Section I.

20 For the method of derivation *see* Section II. The base of the real wage index is 1952. Since 1951 was a year of very high real wages, it is not used as the base.

SECTION IV

WAGES AND INFLATION

4.1 *Wages and General Price Level*

In this section the effects of general change in wage rates on the general price level are discussed. In analysing the consequences of an economy-wide wage change in highly unionised, developed countries, economists take extreme positions.[21] It is of great practical interest to examine the extent to which an increase in wage rates may influence the general price level in an underdeveloped country such as Pakistan.

Wage changes may affect the general price level in two possible ways: first, by affecting the cost of production directly; and secondly, by influencing the level and composition of effective demand through income redistribution. In this section both of these possible reactions of wage-changes on the general price level are discussed.

4.2 *Wages and Cost Inflation*

Wage-rate is one of the important factors which explain the price movement of domestically-manufactured commodities because it is a direct cost element. A general increase in wage rates seems likely to generate a rate of price increase of domestically-manufactured goods which will lead to some increase in the general price level. The question then arises whether any situation of rising prices, accompanied by rising wages, should be identified as cost-inflation. If workers are just trying to keep pace with the cost of living, we clearly have a situation not of cost inflation, but of demand inflation (although wage rises may reinforce the demand inflation). Only if workers are able to push up wages *ahead* of movements in cost of living when no rise in the prices and the cost of living would have occurred in the absence of the wage increase, is there evidence of cost inflation.

---

[21] "It is hardly an exaggeration to say that instead of being on a Gold Standard we are now on a Labour Standard." J.R. Hicks, "Economic Foundations of Wage Policy", *Economic Journal*, September 1955.

The evidence of this study indicates that money wages in Karachi did not rise at a rate higher than the cost of living. The evidence is obtained from movements in real wages. If money wages rose at a higher rate than the cost of living, real wages would show an upward trend. While movements in real wages cannot show conclusively the causes of price rises, the evidence of Section III does indicate that workers in Karachi have failed to achieve a rising share of income and, in years of rising prices, have usually been forced to accept a declining share.

Although, the existence of cost inflation is discounted by the above evidence, there may still be some relation between wage rates and prices of domestically-manufactured goods. Wage increase in response to a rise in cost of living may itself result in increasing the cost of production and price level of manufactured goods. It is, however, very difficult to say anything about this relationship in Karachi, because no index of prices of goods manufactured in Karachi is available.

Even if we assume that wages have strong influence on the prices of manufactured goods, the effects of the changes in the manufactured goods prices on the general price level is quite insignificant. In the case of West Pakistan, it was found that the movements in the general price index are determined primarily by the changes in wheat price.[22] The correlation between changes in the prices of manufactured items and the changes in the general price index was found to be very weak. It is highly probable that such a relationship also exists for Karachi.

In the same study it was found that the changes in the prices of most of the manufactured items are highly correlated with the changes in the previous years price index.[23] This can be explained in several ways. One possible explanation is the following: the price level rises in a certain year and induces the workers to demand higher wages because of the increase in the cost of living. The process may end up

22 Refer to *A Measure of Inflation in Pakistan*: 1951-60, Monograph No. 4, Institute of Development Economics. Page 9.

23 *Ibid.* Page 9.

by raising the prices of manufactured items in the following year. The opposite process may follow a year in which the price level and the cost of living fall.

4.3 *Wages as a Form of Income*

The argument that wage-rate changes affect the level and composition of demand rests upon the fact that wages are a form of income and the source of a portion of effective demand. In this connection it is not the wage rate which is relevant, but the total wage bill. The source of demand changes not only with wage rates, but also with the level of employment. (If the demand for labour is elastic, total wage bill will increase in spite of reduction in wage rates).

Let Y be the total income of all the people of Karachi and Y^w be the total wage bill for *all* the labourers of Karachi. Then $X = \frac{Y^w}{Y}$ is the ratio of wage bill to total income. The higher this ratio, the greater should be the effect of change in wage bill on consumption demand and the price level. If this ratio is very low change in wage bill will have a negligible effect on consumption demand and the price level.

The true value of X cannot be computed for Karachi because Y is not known. A rough estimate of X may be obtained by estimating Y as the population of Karachi multiplied by ' n ' times national per capita income. The value of ' n ' has to be determined arbitrarily. The most conservative estimate will put ' n ' greater than 1, because per capita income of Karachi is believed to be much higher than national per capita income. Putting $n = 2$ we have $X = 0.13$ (approximately) for Karachi for the year 1960. This is indeed a very low value of X which indicates that a change in the total wage bill is likely to have a very insignificant effect on aggregate demand and prices in Karachi.

The index of the total wage bill appears in Table 4.1. The index has been increasing secularly since 1951 at a very high rate, irres-

pective of the direction of wage-rate changes. In the absence of a general price index for Karachi, it is, however, not possible to determine the extent to which change in wage bill affected the general

TABLE 4.1

Index of Wage Bill

Year	Index of Wage Bill
1951	100.0
1952	112.5
1953	204.0
1954	274.4
1955	294.5
1956	384.5
1957	418.6
1958	452.9
1959	516.4
1960	606.4

SOURCE: *See*, Summary Table. Appendix A.

price level. We, however, can infer on the basis of the available price indicators[24] that the general price level declined in 1954 and 1955, and probably also in 1959. In these years, therefore, wage bill and the general price level moved in opposite directions. We cannot, however, quantify the relationship (or the lack of it) between the two.

[24] These are the two cost of living indices and the West Pakistan price index. The latter is believed to be fairly representative for Karachi.

SECTION V

CONCLUSIONS

The main conclusions of this study may be summarised as follows:

In trying to explain the causes of wage movement, we start with the assumption that the cost of living is the most important of the factors which determine the wages. Some statistical relationship is found between movements in the cost of living and movements in the wages to support this hypothesis. Usual theoretical considerations suggest that the relationship should be stronger if wage-rate changes lag slightly behind changes in the cost of living. Our computations give the exact opposite: the highest correlation is for unlagged relationship. An attempt is also made, with little success, to explain wage movements with reference to movements in unemployment and demand for labour.

To determine the extent to which wage changes affect the general price level, the effects of wage movements on both the cost of production of manufactured goods and the level of aggregate demand are studied. No conclusive evidence is available to indicate whether wage changes are responsible for cost inflation in the economy. But, there exists considerable evidence to show that wage changes are not likely to influence the level of aggregate demand to a considerable extent.

APPENDICES

APPENDIX A

VARIABLES IN THE SUMMARY TABLE

Prices and Quantities

L = Average Annual Earning of Workers (Average Wage in Rupees).

A = Average Employment

W^b = Total Wage Bill (in Thousand Rupees)

Indices

W = Index of Money Wages

P^n = *General* Cost of Living Index for Industrial Workers

P^f = Cost of Living Index for *Food*

W^g = Index of Real Wages (W/P^n . 100)

Y^w = Index of Wage Bill

a = Index of Employment

U = Index of Unemployment Registrations

E = Index of Placements

Changes

$\triangle W$ = Percentage Change in the Wage Index

$\triangle P$ = Percentage Change in the General Cost of Living Index

APPENDIX A

Summary Table

Variables	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Prices and Quantities										
L ...	1,039.4	880.2	1,006.2	993.0	1,077.6	1,059.5	1,157.2	1,133.0	1,033.8	1,302.4
A ...	21,905	28,571	46,506	64,110	63,556	83,912	84,061	92,714	113,349	105,584
W^b ...	22,801.8	25,649.6	46,511.7	62,561.4	67,142.3	87,675.6	95,446.1	103,270.1	117,755.9	138,276.3
Indices										
W ...	100.0	84.7	96.8	95.5	103.7	101.9	111.3	109.0	99.5	125.3
P^u ...	100.0	102.0	113.1	111.1	106.1	110.1	120.2	124.2	120.1	128.3
P^f ...	100.0	104.0	112.1	110.1	106.1	112.1	126.3	131.3	126.5	137.0
W^z ...	100.0	83.0	85.6	86.0	97.7	92.6	92.6	87.8	82.8	97.7
Y^w ...	100.0	112.5	204.0	274.4	294.5	384.5	418.6	452.9	516.4	606.4
a ...	100.0	130.4	212.3	292.7	290.1	383.1	383.8	423.3	517.5	482.0
U ...	100.0	106.7	83.7	77.1	98.6	121.6	127.5	133.7	154.2	182.8
E ...	100.0	129.7	83.5	114.6	99.7	181.9	171.8	125.6	134.3	165.0
Changes										
$\triangle W$ ...		—15.3	+14.3	— 1.3	+ 8.6	— 1.7	+ 9.2	— 2.1	— 8.7	+25.9
$\triangle P^u$ ...		+ 2.0	+10.9	— 1.8	— 4.5	+ 3.8	+ 9.2	+ 3.3	— 3.3	+ 6.8

SOURCES: L, A and W^b obtained from the Office of the Chief Inspector of Factories, Karachi.
W, a and Y^w prepared on the basis of L, A and W^b respectively.
P^u and P^f obtained from *C.S.O. Monthly Bulletins*.
W^z obtained by deflating W by P^u.
U and E prepared on the basis of data supplied by the Office of the Director General, Manpower and Employment, Karachi.

APPENDIX B

ON METHODOLOGY

Average wage is found by dividing the total wage bill by total employment. The wage index is prepared according to the following formula:

$$100 \cdot \frac{\text{Average Earning (Wage) in the Current Year}}{\text{Average Earning (Wage) in the Base Year}}$$

Besides the eight categories of factories chosen for the index, there exist a few more categories of factories in Karachi. These have not been included in the index because information about them is not available for all the years. Information about them is available for certain (recent) years from the same source, under the heading "Miscellaneous". These factories, however, do not employ more than 5 per cent of total workers in Karachi. Data obtained from the three sources are compared in Table B.1.

TABLE B.1

Comparison among Sources of Data

Annual Average Wage (in rupees)

Year	Data used in this study	Data from Ministry of Labour	Data from Census of Manufacturing Industries
	(1)	(2)	(3)
1951	1039.4	1028.8	—
1952	880.2	905.2	—
1953	1006.2	963.2	—
1954	993.0	970.9	1195.8
1955	1077.6	1061.6	1158.6
1956	1059.5	1055.6	—
1957	1157.2	—	1393.1
1958	1133.0	—	—

Column (2) is total payments made to the workers divided by the total number of persons employed. Column (3) is total employment cost divided by total employment.

SOURCES: Column 1. Unpublished data from the Office of the Chief Inspector of Factories.
Column 2. *Workings of the Payment of Wages Act*, Government of Pakistan (Ministry of Labour).
Column 3. *Censuses of Manufacturing Industries*, C.S.O.

APPENDIX C

WAGE EQUATION AND ANALYSIS OF THE RESIDUALS

As noted in the text there are many hypotheses explaining changes in wage rates. In this appendix we discuss some of these which we tried to apply to Karachi workers but for a variety of reasons were unable to do so satisfactorily.

1. Observed changes in the wage index may be expressed as a function of the difference between "appropriate wage" in the current year and actual wage in the previous year:

$$W_t - W_{t-1} = b(W_t^* - W_{t-1}) \quad \ldots\ldots(1)$$

where W = actual wage index

W^* = "appropriate" wage (an index number)

b = a constant

and t = time period.

W^* may be expressed as a function of the cost of living in the previous period:

$$W_t^* = a_0 + a_1 P_{t-1}^u \quad \ldots\ldots(2)$$

where P^u is the cost of living index.

By substituting (2) in (1) we get:

$$W_t - W_{t-1} = ba_0 + ba_1 P_{t-1}^u - bW_{t-1}$$

$$W_t = ba_0 + ba_1 P_{t-1}^u + (1-b)W_{t-1}$$

$$W_t = A_0 + A_1 P_{t-1}^u + A_2 W_{t-1} \quad \ldots\ldots(3)$$

The values of the coefficients are estimated for Karachi so that the equation becomes:

$$W_t = 26.78 + P''_{-t} - 0.36W_t$$

The errors of the regression coefficients are, however, very large and the multiple correlation coefficient is only + 0.62. The independent variables are so highly correlated that the problem of multicollinearity is overwhelming.

2. Wages in a year may be expressed as a function of the cost of living and unemployment in that year:

$$W_t = a_0 + a_1 P''_t + a_2 U_t$$

where U is the index of unemployment. This type of relation could not be employed to explain wage movements in Karachi because no index of *actual* unemployment is available for Karachi.

3. In trying to explain short term fluctuations in wages in India Mr. Narasimham made wages a function of the cost of living and the proportion of population employed (a/N, where N is the index of population and 'a' the index of employment.[1]) It would be interesting to see whether such a relation can explain wage movements in Karachi. But this is obviated by the lack of data about the total population of Karachi during each year.

In the remaining part of this appendix an attempt is made to analyse the residuals of the wage-equation estimated in Section III. The residuals of the wage-equation are calculated according to the following formula:

$$W_t - (4.92 + 0.86\ P''_t) = R_t$$

were R_t = the residual in the t-th year.

---

1 N.V.A. Narasimham, *A Short Term Planning Model for India*. North-Holland Publishing Co., Amsterdam, 1956. Page 38.

Table C.1 presents the residuals and the percentage changes in the index of unemployment registrations and the percentage changes in the index of placements.

TABLE C.1

Residuals and Percentage Changes in Unemployment Registrations and Placements

Year	Residuals	% change in the Index of Unemployment Registrations	% change in the Index of Placements
	(1)	(2)	(3)
1951	+8.9	—	—
1952	—8.1	+ 6.7	+29.7
1953	—5.6	—21.6	—35.6
1954	—5.2	— 7.9	+37.2
1955	+7.3	+27.9	—13.0
1956	+2.1	+23.3	+82.5
1957	+2.8	+ 4.9	— 5.4
1958	—3.0	+ 4.9	—26.9
1959	—8.9	+15.3	+ 6.9
1960	+9.8	+18.5	+22.9

It is found that movements in the unemployment index do not help to explain the residuals. One would expect that an increase in unemployment will be associated with a negative value of the residual and a decrease in unemployment with a positive value of the residual. In six out of nine years both the unemployment registrations and the residuals, move in the same direction. On the other hand, one would expect that the index of placements and the residuals will move in the same direction. But an examination of the Table shows that for majority of years they moved in opposite directions.

APPENDIX D

I.—Average Annual Earnings of Workers in Karachi

(Average Wage)

(in Rupees)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
(A) Government and Local Fund Factories	962.2	1037.5	1,226.7	1,115.2	1,434.4	1,241.5	1,287.9	1,343.4	1,345.3	1,507.5
(B) Other Factories:										
1. Textiles	950.5	564.9	873.6	966.1	974.4	944.9	1,086.3	948.2	851.2	1,221.6
2. Food, Drinks and Tobacco.	1,117.9	1,002.7	1,457.0	1,071.9	1,318.5	1,364.2	1,517.8	1,459.6	1,086.6	1,622.7
3. General Engineering ...	1,403.3	1,126.5	1,147.0	1,161.9	1,165.6	1,344.7	1,342.7	1,431.0	1,393.3	1,418.9
4. Chemicals and Dyes ...	886.2	665.4	763.7	692.9	883.8	911.8	1,029.6	969.9	1,111.7	1,103.1
5. Printing and Bookbinding ...	749.0	1,301.4	1,352.5	—	1,134.6	1,327.5	1,302.9	2,215.8	1,978.8	1,513.8
6. Wood, Stone and Glass ...	680.4	855.0	1,168.8	1,453.2	1,134.4	1,012.1	1,014.1	1,135.4	1,224.6	1,105.3
7. Hides and Skins	842.0	659.0	660.0	740.2	1,086.6	970.7	963.7	1,119.1	1,302.9	1,284.0
For All Factories	**1,039.4**	**880.2**	**1,006.2**	**993.0**	**1,077.6**	**1,059.5**	**1,157.2**	**1,133.0**	**1,033.8**	**1,302.4**

Source: Office of the Chief Inspector of Factories, Karachi.

APPENDIX D

II.—Index of Workers' Income in Selected Industries, Karachi: 1951-60

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Money Wages										
1. Govt. & Local Fund Factories ...	100.0	107.8	127.4	115.9	149.1	129.0	133.8	139.6	139.8	156.7
2. Textiles	100.0	59.4	91.9	101.6	102.5	99.4	114.3	99.8	89.6	128.5
3. General Engineering	100.0	80.3	81.7	82.8	83.1	95.8	95.7	102.0	99.3	101.1
4. Chemicals and Dyes	100.0	75.1	86.2	78.2	99.7	102.9	116.2	109.4	125.4	124.5
5. Printing and Bookbinding ...	100.0	173.8	180.6	—	151.5	177.2	173.9	295.8	264.2	202.1
6. Wood, Stone and Glass ...	100.0	125.7	171.8	213.6	166.7	148.8	147.5	166.9	180.0	162.4
7. Hides and Skins	100.0	78.3	78.4	87.9	129.0	115.3	114.5	132.9	154.7	152.5
8. Food, Drinks and Tobacco ...	100.0	89.7	130.3	95.9	117.9	122.0	135.8	130.6	97.2	145.2

(contd.)

D II.—Index of Workers' Income in Selected Industries, Karachi: 1951-60—(*contd.*)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
					Real Wages					
1. Govt. & Local Fund Factories ...	100.0	105.6	112.6	104.3	140.5	117.2	111.3	112.4	116.4	122.1
2. Textiles	100.0	58.2	81.3	91.4	96.6	90.3	95.1	80.4	74.6	100.2
3. General Engineering	100.0	78.7	72.2	74.5	78.3	87.0	79.6	82.1	82.7	78.8
4. Chemicals and Dyes	100.0	73.6	76.2	70.4	94.0	93.5	96.7	88.1	104.4	97.0
5. Printing and Bookbinding ...	100.0	170.4	159.7	—	142.7	160.9	144.7	238.2	220.0	157.5
6. Wood, Stone and Glass ...	100.0	123.2	151.9	192.3	157.1	135.1	122.7	134.5	149.9	126.6
7. Hides and Skins	100.0	76.8	69.3	79.1	121.6	104.7	95.3	107.0	128.8	118.9
8. Food, Drinks and Tobacco ...	100.0	87.9	115.2	86.3	111.1	110.8	113.0	105.2	80.9	113.2

SOURCE: Same as the previous table. Real Wages obtained by deflating money wages by the general cost of living.

APPENDIX E

Wage Bill in Karachi

Year	In thousand Rs.	Index
	(1)	(2)
1951	22,801.8	100.0
1952	25,649.6	112.5
1953	46,511.7	204.0
1954	62,561.4	274.4
1955	67,142.3	294.5
1956	87,675.6	384.5
1957	95,446.1	418.6
1958	103,270.1	452.9
1959	117,755.9	516.4
1960	138,276.3	606.4

SOURCE: Unpublished data from the Office of the Chief Inspector of Factories.

NOTE: Here the total wage bill is considered not only of the eight categories of factories but of *all* the registered factories.

APPENDIX F

Employment in Karachi

Year	Number	Index
	(1)	(2)
1951	21,905	100.0
1952	28,571	130.4
1953	46,506	212.3
1954	64,110	292.7
1955	63,556	290.1
1956	83,912	383.1
1957	84,061	383.8
1958	92,714	423.3
1959	113,349	517.5
1960	105,584	482.0

SOURCE: Unpublished data from the Office of the Chief Inspector of Factories.

NOTE: Here *total employment* in Karachi is estimated. It is slightly greater than total employment in the eight categories of factories chosen by us.

APPENDIX G

Cost of Living Index for Various Periods

Calendar Year	The General Cost of Living Index	Cost of Living Index for Food items only
	(1)	(2)
1951	100.0	100.0
1952	102.0	104.0
1953	113.1	112.1
1954	111.1	110.1
1955	106.1	106.1
1956	110.1	112.1
1957	120.2	126.3
1958	124.2	131.3
1959	120.1	126.5
1960	128.3	137.0

Year	The *General* Index		The *Food* Index
	July-June	Oct-Sept.	July-June
	(1)	(2)	(3)
1950-51	100.0	100.0	100.0
1951-52	104.2	103.4	106.3
1952-53	111.5	112.9	113.7
1953-54	115.6	114.1	115.8
1954-55	111.5	109.5	112.6
1955-56	111.5	111.1	112.6
1956-57	117.7	119.4	124.2
1957-58	128.1	128.6	137.9
1958-59	122.9	120.2	130.5
1959-60	130.2	130.3	140.0

SOURCE: *C.S.O. Monthly Bulletins.*

PUBLICATIONS OF
THE INSTITUTE OF DEVELOPMENT ECONOMICS, KARACHI

The Institute of Development Economics publishes results of its research activities in the form of monographs. These and other publications of the Institute may be obtained on application addressed to the Joint Director.

Quarterly Journal

The Pakistan Development Review Editor : *Dr. Henry J. Bruton*

Monographs in the Economics of Development

No. 1 : A Study of Planning Methodology with Special Reference to Pakistan's Second Five-Year Plan
By Dr. J.C.H. Fei and Dr. G. Ranis

No. 2 : Towards the Application of Inter-regional Input-Output Models to Economic Planning in Pakistan
By S. M. Naseem

No. 3 : Deficit Financing in Pakistan, 1951-60 *By Dr. M. Haq*

No. 4 : A Measure of Inflation in Pakistan, 1951-60
By Monetary & Fiscal Section

No. 5 : Industrial Efficiency and Economic Growth : A Case Study of Karachi *By Dr. G. Ranis*

No. 6 : Urban Consumer Expenditure and the Consumption Function *By Dr. G. Ranis*

No. 7 : Problems of Budgetary Reform in Pakistan
By Mrs. N. Sarfraz

No. 8 : Wages and Prices in Karachi: A Case Study
By A. R. Khan

Statistical Papers

No. 1 : Acreage, Production and Prices of Major Agricultural Crops of West Pakistan (Punjab): 1931-59
Compiler : A. Rab

Special Publications

Social Science Bibliography for Pakistan, 1947-53
By A. H. Siddiqui

Report on the Seminar on Industrialization and Labour Management Relations, held in Karachi in January, 1959
Editor : *M. L. Qureshi*

A Summary of Selected Studies on Family Planning in Underdeveloped Countries *By W. P. Mauldin*

Population Growth and Economic Development, with Special Reference to Pakistan (Price Rs. 10.00)
Editor : *M. L. Qureshi*

The Inter Services Press Ltd., Karachi-4