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WAGES AND EMPLOYMENT IN MANUFACTURING INDUSTRIES : A CASE STUDY OF PAKISTAN

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WAGES AND EMPLOYMENT IN MANUFACTURING INDUSTRIES

A CASE STUDY OF PAKISTAN

by

Abdur Razzaq Shahid*

A labour surplus economy faces a dilema between the desire to raise wages and the desire to raise employment and cut into the surplus labour. It is not our purpose here to design an optimal wage policy which requires balancing of a variety of short-term and long-term considerations. The aim of the study is to provide empirical evidence on the wage-productivity employment relationships in Pakistan's manufacturing industries at two digit level of classification, our method of studying these relationships will the theory of production Via CES production function.

Wages

There has been a rapid change in the average money wages in the Industrial sector and this might have resulted insignificant substitution of other factors of production for labour. We will explore the effect on employment of rapid wage increase in Pakistan's Manufacturing Industries.

Figure (1) (see next page) shows that average hourly earnings rose by about 113.6% between 1954-55 and 1969-70 from 35.32 to 75.47 paisa. The figure also enables us to compare this rise in earning with wholesale price index and cost of living index. It is apparant that the wholesale price index rose by abour 32% and cost of living index rose by 43%. The implied rise in the real equivalent average hourly earning when we apply the cost of lving index is 37.72% over the 16 years or an average annually compounded rate of 2.05 %.

The data for figure 1 are given below:

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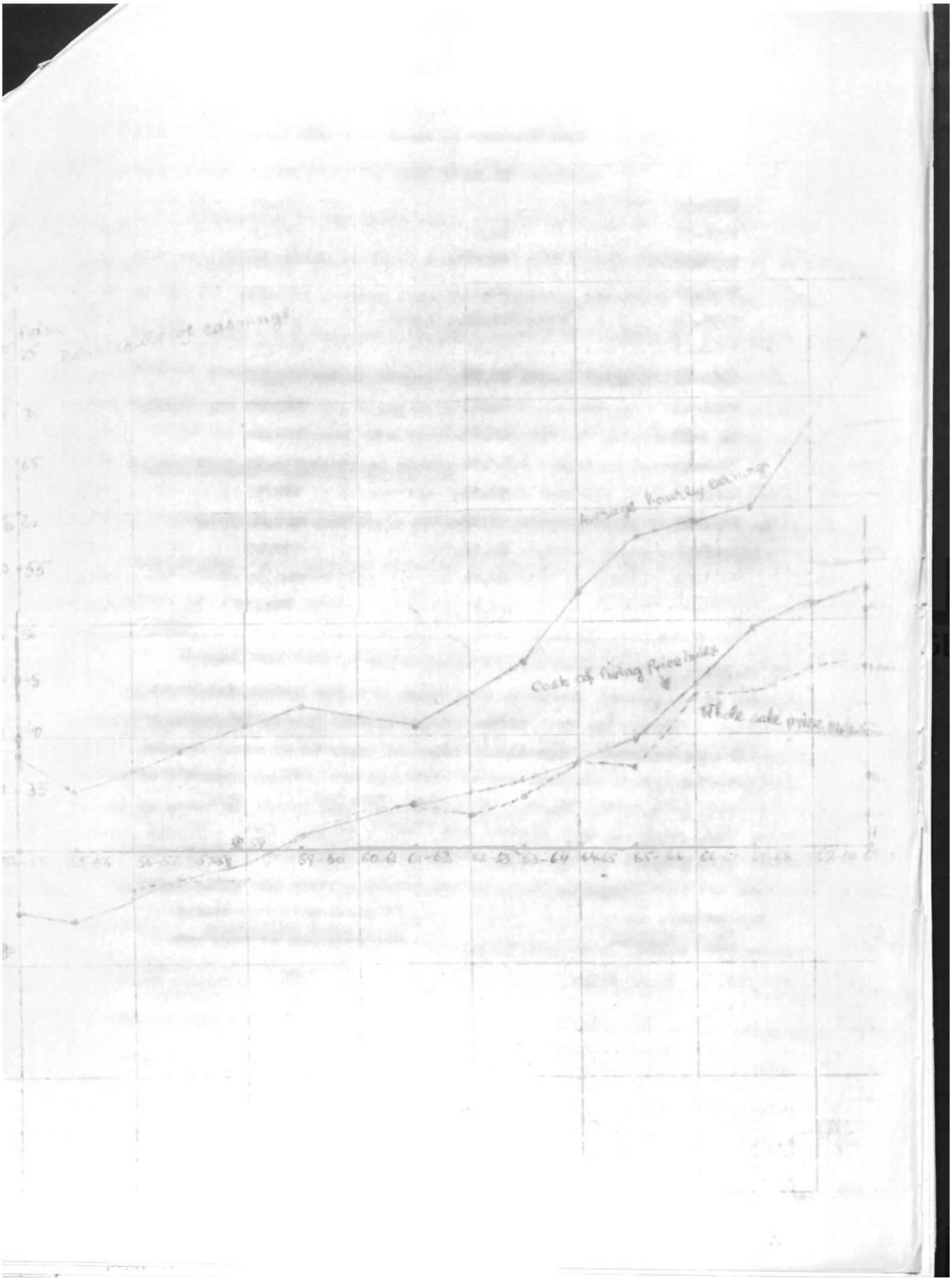
	Average hourly earning (Paisa)	Cost of living Index	Wholesale pric Index
1954-55	38.32	87.40	-
1955-56	35.00	84.70	-
1956-57	36.91	89.00	90.00
1957-58	38.82	93.30	95.38
1958.59	40.82	95.50	92.80
1959.60	42.61	100.00	100.00
1960-61	41.38	103.59	104.77
1961-62	40.77	105.30	104.65
1962-63	40.15	107.19	102.86
1963-64	46.67	109.80	106.35
1964-65	52.34	113.60	113.55
1965-66	57.19	117.10	112.03
1966-67	58.98	127.00	124.36
1967-68	60.00	137.40	125.68
1968-69	67.74	140.20	129.54
1969-70	75.47	143.00	132.19

Employment

During the past fifteen years of its planned development Pakistan has experienced a significant rates of economic growth. Between 1954-55 and 1967-68 gross national product (at constant prices) expanded at annual compound rate of 4.05 %. However the effects of such growth in terms of employment generation re not equally good. The following table presents forecast of labour force and employment, during the third five year plan.

Sector	(Thousands of Men Years)
Manufacturing	Accitional Employment
i. Large Scale	255
ii. Small Scale and other	205
Total Manufacturing	460
Agridulture	1140
Construction	280
Trade and Services	650
Total all sectors	2530

Employment in large scale Manufacturing as % of total employment 10.07.


Average Powerly earnings
Cost of living Price Index
Wholesale price index
59-60
60-61
61-62
62-63
63-64
64-65
65-66

Allocation to the large scale manufacturing in the third five year plan was 255000 which is 10.07 % of total additional employment. If we r on the CMI data, it appears from the statistics available that the emplo in this sector had increased by 52029, approximately. Data on employment fo 1968-69 was not available from CMI, therefore, the average of data for 1967-68 and 1969-70 was taken as a proxy for 1968-69..

Wages, Employment and Productivity

The level and structure of wage earnings influence labour productiv because high wage earnings serve as an incentive to the workers and they often put in their best.

An, entrepreneur, wants to minimize his cost of production. The factor combinations in his production process are to a large extent deter by the relative prices of resource inputs. When wage earnings rise, proportionately more than the price of say capital he uses more capital inputs by adopting labour saving techniques subject to the technical limitations of his production process. The level of employment is direct influenced by the level and movement of wage earnings.

The annual average rate of growth of employment between 1954-1959 w 16.8% slightly higher than 15.6 % the annual rate of output growth. But this rate declined to 4% between 1959/60 and 1969/70 while output at factor co rose by about 13.38 %. The output elasticity of demand for labour thus works out to be 0.298 % for this period. Implicit in these growth rates i the fact that labour productivity was increasing at an average of 8% per

Methodology.

This methodology has already been used earlier in other studies for Developing Countries.

As mentioned earlier the aim of this study is to provide, empirical evidence on the wage-employment-productivity relationship using time serie data (1954-70). Our method of studying these relationships will be the theory of production via CES production function.

CES production function is typically give by

$$(1) \quad V = \gamma \left[K^{-P} + (1 - \delta) L^{-P} \right]^{-\frac{u}{P}}$$

The relationship that Arrow, chenery, Minhas and solow used to estimate, elasticity of substitution between labour and capital for cross-section data is :

$$(2) \quad \log \left(\frac{V}{L} \right) = a + b \log W + e$$

Equation (2) is derived from usuall profit maximization conditions in which perfectly competitive markets prevail and constant returns to scale are assumed.

We shall use time-weries data. Since their is not term in above mentioned relationship to allow for technical progress or the effects associated with passage of time, we let $\gamma = e^{\lambda t}$ where $e^{\lambda t}$ indicates the neutral technical progress. Thus time-weries counterpart of (2) becomes

$$(3) \quad \log \left(\frac{V}{L} \right) = a + b \log W + ct + e$$

Following P.J. Thryms we develop a more general model within the framework of CES production function.

Differentiating equation (1) with respect to labour and re-arranging we get:

$$\frac{\delta V}{\delta L} = U \gamma \frac{-P}{u} \left(1 - \delta\right) \left(\frac{V}{L}\right)^{1+P} V^{P} \left[(1-u)/u\right]$$

Equating with $\frac{W}{P}$ we get

$$\frac{W}{P} = U \gamma \frac{-P}{u} \left(1 - \delta\right) \left(\frac{V}{L}\right)^{1+P} V^{P} \left[(1-u)/u\right]$$

Thus

$$\left(\frac{V}{L}\right)^{1+P} = \frac{W}{P} \left[u \gamma^{P/u} \left(1 - \delta\right)\right]^{-1} V^{-P} \left[(1-u)/u\right]$$

After taking logrithms and dividing by 1+p we arrive at our estimating equation as follows:

$$(4) \quad \log \left(\frac{V}{L}\right) = \sigma \log \left[u \left(1 - \delta\right) r^{\frac{-P}{u}}\right]^{-1} + \sigma \log W + (-\sigma) \log P + \frac{(1-\sigma)(u-1)}{u} \log V$$

where

$a = \sigma \log \left[u r^{-\frac{P}{u}} \left(1 - \delta\right)\right]^{-1}$ is constant

$\sigma = \frac{1}{1+P}$ is the eleasticity of substitution between capital and labour.

W= product wages

P= Industry's product price

U= The degree of return to scale

Letting $R = \frac{(1-6)\ (u-1)}{u}$

and adding a term to take account of those forces which are associated with the passage of time", eg. technical progress, equation (4) can be written as

$$(5) \quad \log \left(\frac{V}{L}\right) = a + b \log W - \log P + R \log V + Ct + e$$

The manufacturing industries in Pakistan are characterized by imperfections in both the commodity and factor markets. Foreign firms tend to pay higher than average wages while indiginous firms tend to pay lower than average wages. According to general formula worked out by Theil, the ommission of variable for market imperfections in estimation would bias the slppe of

log W - the elasticity of substitution - upwards, if the variable for market imperfections and log W are positively correlated across firms ownerships.

R Co-efficient is 'Vendronn's coefficient. In literature the regression coefficient of output per man on output is known as vendroon's coefficient.

Neither value added nor average earnings, will be deflated for price changes because there is no adequate deflator available. Therefore, log P for price change will not be included in the estimating equation which means certain biases are introduced into the estimation of σ .

An entrepreneur wants to minimize his cost of production; the factor combinations in his production process are to a large extent determined by the relative prices of resource inputs. When wage earnings rise proportionately more than the price of say capital he uses more capital inputs by adopting labour-saving techniques subject to the technical limitations of his production process. The level of employment is directly influenced by the level and movement of wage earnings. In our estimated model co-efficient of Log W will give the approximate measure of labour displacement by other factors of production due to increase in wages.

We mentioned earlier the relationship

$$R = \frac{(1 - \sigma)\ (u - 1)}{u}$$

where u is returns to scale and σ is elasticity of substitution.

For any given value of u greater than unity (increasing returns to scale) R is linearly decreasing function of σ . When we have constant returns to scale (u = 1) the term R log V drops out of estimating equation. Therefore,

the elasticity of substitution parameter will be estimated from the stand ACMS model. For any given value of u <1 (decreasing returns to scale) R i increasing function of elasticity of substitution.

We will calculate labour absorption percentages in the manufacturin industries based on R values from our model. - (R-1) will give the elast of employment with respect to output. From this labour absorption perce will be calculated assuming 13 % growth in value added. The following in groups will be considered in this study.

1. All Industries
2. Food
3. Beverages
4. Tobacco
5. Textiles
6. Foot-Wear and Wearing a
7. Wood cork and Allied
8. Furniture and fixtures
9. Paper and paper products
10. Printing nd Publishing
11. Leather
12. Rubber
13. Chemicals
14. Non-metalls minerals
15. Basic Metals
16. Metal Products
17. Machinery
18. Electric Machinery
19. Transport
20. Miscellenous Industries

In addition to our estimating equation (5) regressions will be run for the following equations to see which are the explanatory variables: and which equation gives the best results:

(1) $\log \left(\frac{V}{L}\right)_2 = a + R \log V + e$

(2) $\log \left(\frac{V}{L}\right) = a + b \log W + e$

(2') $\text{Log} \left(\frac{V}{L}\right) = a + b \log W + ct + e$ (values deflated)

(3) $\log \left(\frac{V}{L}\right) = a + b \log W + R \log V + e$

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(3) $\log \left(\frac{V}{L}\cdot\right) = a + b \log W + R \log V + e$

(3') $\log \left(\frac{V}{L}\cdot\right) = a + b \log W + R \log V + ct + e$

(4) $\log \left(\frac{V}{L}\right) = a + b \log W + R \log V + ct + e$ (values not deflated.

(1),(2) and (3) have been run without including the time trend variable and without deflating the values of the variables. Regressions for the Equations (2') and (3') have been carried out including time trend variable 't' and by deflating the relevent values of the variables. Finally regression for equation (4) has been run after including time trend variable 't' but without deflating the relevant values of the variables.

Data

The data has been taken from Second five year plan and the CMIs. The reliability of data is doubtful therefore the results can be regarded as tentative.

For the time series estimates data is available for the two digit level of industries from 1954 to 1970 with the exception of four years (1956. 1960-1961. 1961-1962. 1967-1968). Product price indices have been taken from 25 years of Pakistan in statistics.

Following are the definitions of the variables used in the study.

1. Gross value added. (V) Depreciation changes which depend on tax policy rather than on capital consumption, have not been deducted.

We wanted to add a variable for the market imperfections. The equation of the following form : $\text{Log} \left(\frac{V}{L}\right) = a + b \log W + R \log V + \log M + ct + c$

But due to unavailability of data that variable was excluded.

2. Employment (2): Employment includes production workers, other administrative and supervisory staff (and unpaid workers).

3. Wage Rate (W): Wage rate is the average wage obtained by dividing total employment dost (including wages, salaries and other cash and non-cash benefits.) by the number of employees. For equations (2') and (3') the average wage is also deflated by the whole sale price index.

Results

The equations (2) and (3) give the best fit. When we Compare the results of equation (2) with those of (2') we observe that in the case of equation (2') all the coefficients of log W are insignificant except for four industries. While in the case equation (2) all the coefficients are highly significant except for Tabacco industry. R^2 has also improved for seven industries out of thirteen industries compared and is high enough for the remaining industries.

Similarly equation (3) gives better results when compared to (3') and (4). Therefore labour absorption will be calculated from qeuation (3). The reason for the improvement of results of equation (2) and (3) over the others can be that the deflators are unreliable and there might be the problem of multi-corrinearity or the effect of some other unkown factor might be in operation.

The results of equation (3) from which we will calculate labour absorption per-centages are given in table (1) for 18 industry groups, manufacturing sector as a whole and for miscellenous industries.

Table 1

	INDUSTRY GROUP	Constant	Log w	t Value	Level of significant	log V	t Value	Level of Significant	R^2	F	D	VW	No of observation
1.	All Industries	-3.96	1.31	3.42	.005	0.14	1.35	.100	0.96	106	1.607	.82	11
2.	Food	-2.55	0.26	0.95	.200	0.51	6.45	.005	0.98	325.11	1.60	.80	9
3.	Beverages	-1.61	0.85	0.85	.250	0.28	1.48	.100	0.67	6.22	1.82	.87	6
4.	Tabacco	2.08	0.39	0.52	.350	0.27	3.58	.025	0.81	6.74	2.50	.35	11
5.	Textiles	-2.13	1.23	1.68	.100	0.08	0.40	.350	0.77	13.59	2.19	.97	11
6.	Footwear & Wearing	0.87	0.38	1.29	.100	0.29	2.93	.010	0.71	9.60	2.64	.51	11
7.	Woodcork & Allied	-0.61	0.62	1.38	.150	0.29	3.45	.010	0.90	27.98	2.53	.88	8
8.	Furnitur & Fixture	1.94	0.20	0.82	.250	0.31	3.00	.025	0.92	29.38	3.20	.30	7
9.	Paper & Paper Prod	2.18	0.22	0.32	.400	0.31	0.90	.250	0.55	2.43	1.06	.81	7
10.	Printing & Pub	-3.41	1.30	5.21	.005	0.12	1.84	.150	0.92	53.22	2.20	.83	11
11.	Leather	-1.03	-0.50	-1.56	-	0.79	7.16	.005	0.92	50.21	2.84	.76	11
12.	Rubber	-0.72	0.61	1.95	.050	0.31	2.61	.025	0.96	78.90	2.28	.96	10
13.	Chemicals	-1.49	0.72	1.43	.100	0.28	2.22	.050	0.90	34.30	0.98	.92	11
14.	Non-Metallic Minerals	-0.60	-0.04	-0.06	-	0.47	3.55	.005	0.88	32.25	2.07	.95	11
15.	Basic Metals.	-0.79	0.68	1.17	.150	0.25	1.19	.150	0.81	18.59	1.43	.98	11
16.	Metal Products	-1.23	0.41	2.03	.050	0.36	4.98	.005	0.96	117.59	2.36	.94	11
17.	Machinery	-1.56	0.93	5.56	.005	0.17	3.07	.010	0.98	244.86	1.68	.97	11
18.	Electrical Machinery	-1.12	.90	9.84	.005	0.17	6.21	.005	0.98	321.93	2.21	.92	11
19.	Transport Equipment	-0.59	0.36	0.62	.300	0.36	2.15	.050	0.86	25.36	1.28	.85	10
20.	Miscelleneous Ind.	-4.61	0.85	2.26	.050	0.39	2.37	.025	0.90	36.92	1.66	.86	11

The coefficient of log W would be expected to be positive i.e. σ would be expected to be positive. It is evident from table (1) that coefficient of log w is positive in all the cases expect for leather and non-metalic minerals. The coefficient of log w measures the clasticity of labour displacement by other factor's of production due to increase in wages. For example Table 1 shows that in the Metal Products Industry a 10 per cent increase in wages would reduce employment (all other factor being equal) by 4.1 per cent. In Textile Industry a 10 per cent increase in wages would reduce employment by 12.3 per cent, all other factors being equal.

The coefficient of v is positive in all industries and is significant at 5 per cent level in fourteen industries and at 10 per cent level in two industries.

The ommission of log p from estimating equation would bias the slope of log W-σ-downward (upward) if prices are negatively (positively) correlated with wages in an inter-industry sense.

Regression was run with log w and log v as explanatory variables. The results of the regressions are given in Table (2) and Table (3).

From table 2 and table 3 we observe that either log w or log v is a possibly explanatory variable for value added per worker. However Table 1 indicates that there is multi-collinearity between log w and logv. Lawrence Klien has suggested a rule of thumb that multi-collinearity is tolerable if $\gamma_{wv} < R$, where R is square voot of the co-efficiant of multiple determination. We observe from Table (1) that γ_{wv} is less than R in fifteen industries except for Beverages, Textile, Paper and Paper products, Non-metalic minerals, and Basic metals and even these industries are nearly passing that criteria.

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TABLE 2

Industry Group	Constant	Log w	t Value	R^2
All Industry	-4.47	1.80	13.89	0.96
Beverages	-5.73	2.01	2.96	0.56
Food	-	-	-	-
Tobacco	5.45	0.61	0.41	0.40
Textiles	-2.47	1.50	5.46	0.77
Footwear and Wearing app.	2.45	0.82	2.40	0.38
Woodcork & Allied	-5.23	1.85	3.96	0.72
Furniture & Fixtures	1.90	0.84	4.37	0.81
Paper & Paper Products	3.45	0.75	2.06	0.46
Printing & Publishing	-3.22	1.55	9.95	0.90
Leather	-0.76	1.33	2.73	0.45
Rubber	-1.37	1.39	9.34	0.92
Chemicals	-3.92	1.72	6.66	0.83
Non-Metallic Minerals	-5.48	1.94	4.85	0.72
Basic Metals	-1.12	1.32	5.85	0.79
Metal Products	-1.48	1.31	7.60	0.86
Machinery	-2.90	1.41	15.76	0.96
Electrical Machinery	-1.48	1.35	10.31	0.92
Transport Equipment	-2.87	1.51	5.73	0.79
Miscelleneous Industries	-2.79	1.61	6.71	0.83

TABLE 3

REGRESSION RELATING VALUE ADDED PER WORKER TO VALUE ADDED

S.No	Industry group	Constant	Log V_t	Value	R^2
1.	All Industries	-1.75	0.49	5.59	0.90
2.	Food	-	-	-	-
3.	Beverages	2.72	0.40	3.49	0.64
4.	Tobacco	4.97	0.27	4.02	0.81
5.	Textiles	0.54	0.38	4.50	0.69
6.	Footwear & Wearing	2.64	0.35	4.04	0.64
7.	Woodcork & Allied	2.52	0.38	6.85	0.88
8.	Furniture & Fixture	2.31	0.38	7.90	0.92
9.	Paper and Paper Products	2.30	0.40	2.41	0.53
10.	Printing & Publishing	0.57	0.52	4.51	0.69
11.	Leather	2.23	0.66	9.20	0.90
12.	Rubber	0.28	0.52	10.72	0.94
13.	Chemicals	0.95	0.44	7.22	0.86
14.	Non-Metalic Minerals	0.45	0.47	8.65	0.88
15.	Basic Metals	0.23	0.47	5.86	0.79
16.	Metal Products	0.55	0.49	13.09	0.94
17.	Machinery	0.30	0.45	10.29	0.92
18.	Electrical Machinery	1.72	0.38	6.49	0.83
19.	Transport Equipment	0.40	0.46	7.35	0.86
20.	Miscelleneous Industries.	4.48	0.71	6.87	0.85

Labour Absorption Percentages

As mentioned earlier we will calculate labour absorption percentages from the coefficient of log V, which is :

$$R = \frac{(1-\sigma)(u-1)}{u}$$

Our estimate of u from the above mentioned relationship suggest that assumption of constant returns to scale is not justified which leads us to the conclusion that results obtained from CES production function model where log W is the only independent variable become questional.

All the estimate of R (coefficient of log V), except four , are significant. Based on the values of R we have calculated the labour absorption percentages which have been presented in table (4) taking 13% as growth rate of value added.

Labour absorption percentage for Kenya are given in table 5 we can not compare them directly with those of Pakistan because of difference in the classification of industries. However we can get a rough idea as to how Pakistan's labour absorption percentages compare with those of Kenya. Table 5 presents the labour absorption percentages for Kenya.

After examining table 4 and table 5 we reach the conclusion that labour absorption percentages for Pakistan are significantly higher than those of Kenya.

TABLE 4

S.No	Industry Group	R	-(R-1)	Labour Absorption percentages a 13% growth in V
1.	All Industries	0.14	0.86	11.18
2.	Food	0.51	0.49	6.37
3.	Beverages	0.28	0.72	9.36
4.	Tobacco	0.27	0.73	9.49
5.	Textiles	0.08	9.92	11.96
6.	Footwear & Wearing	0.29	0.71	9.23
7.	Woodcork & Allied	0.29	0.71	9.23
8.	Furniture & Fixture	0.31	0.69	8.97
9.	Paper & Paper Products	0.31	0.69	8.97
10.	Printing Publishing	0.12	0.88	11.14
11.	Leather	0.79	0.21	2.73
12.	Rubber	0.31	0.69	8.97
13.	Chemicals	0.28	0.72	9.36
14.	Non-Metals	0.47	0.53	6.89
15.	Basic Metals	0.25	0.75	9.75
16.	Metal Products	0.36	0.64	8.32
17.	Machinery	0.17	0.83	10.79
18.	Electrical Machinery	0.17	0.83	10.79
19.	Transport Equipment	0.36	0.64	8.32
20.	Miscellenceous Industries.	0.39	0.61	7.93

TABLE 5

S.No	Industry Group	Labour Absorption 8% growth in Value added percentages
1.	Food	2.2
2.	Tobacco and Beverage Industries	-7.6
3.	Textile clothing and footwear Industries	1.2
4.	Sawn timber furniture	0.02
5.	Paper and Paper Products.	1.4
6.	Leather and Rubber Products	1.7
7.	Basic Industries,Chemicals	2.0
8.	Clay products, glass product	4.0
9.	Metal Products	5.3
10.	Machinery and Transport	13.7
11.	Miscellaneous Manufacturing	6.1

Conclusion and Policy Implications

One of the reason or higher labour absorption percentages in Pakistan's manufacturing than those in Kenya's manufacturing is difference in the growth rates of value added between the two countries. For Pakistan's we took 11 as growth in value added while for Kenya it has been taken as 8 %.

Average rate of growth of employment between 1959/60 and 1969/70 was 4 percent while output value added at factor costs rose by abour 13. The labour absorption capacity of Pakistan's manufacturing industries may judged therefore to have been rather limited.

As pointed out in / 6 / if the industrial labour absorption is considereds a major social objective, shifts in manufacturing structure to decreasing labour use, such as those absorved in Pakistan's manufacturing to be reversed, implying the adoption of policy measures that will promote small scale production in labour using industries, with proper recognition the interdependance among industries in terms of input requirements and distribution of output. There are important limitations, however, on the extent to which such policy guidelines can be applied. For one thing, resource allocation within the manufacturing sector also bears on policy objectives other than employment generation. For example higher productivity would be associated with the economics of large scale production. In such a case "walking on two legs policy" could be beneficial i.e. exploiting both the benefits from the economies of scale in particular industries and the high employment generating potential of small production in other industries with a view to minimizing the social cost of producting a given vector of commodities.

	Industry group	Constant	Log w
1.	All Industries	-4.47	1.80
2.	Beverages	-5.73	2.011
3.	Food	-	
4.	Tobacco	5.45	0.61
5.	Textiles	-2.47	1.50
6.	Footwear and wearing apparel	2.45	0.82
7.	Woodcork & Allied	-5.23	1.85
8.	Furniture & Fixtures	1.90	0.84
9.	Paper & Paper Products	3.45	0.75
10.	Printing publishing	3.22	1.55
11.	Leather	0.70	1.33
12.	Rubber	1.37	1.39
13.	Chemicals	3.92	1.78
14.	Non-Metalic Minerals	5.48	1.94
15.	Basic Metals	1.12	1.32
16.	Metal Products	1.48	1.31
17.	Machinery	2.09	1.41
18.	Electrical Machinery	1.48	1.35
19.	Transport Equipment	2.87	1.51
20.	Miscellaneous Ind.	2.79	1.61

Appendix I

+ b w + e

ratio tried for worker to average earnings.

Value t	level of significance	R^2	F	b
13.89	.005	.96	193	2.20
2.96	.025	0.56	8.75	2.56
0.41	.350	0.04	0.16	1.19
5.40	.005	0.77	29.80	2.32
2.40	.025	0.38	5.74	1.84
3.96	.055	0.72	15.67	1.07
4.37	.005	0.81	19.05	3.05
2.06	.05	0.46	4.23	1.86
9.95	.005	0.90	99.00	2.73
2.73	.025	0.45	7.47	2.05
9.34	.005	0.92	87.23	2.80
6.66	.005	0.83	44.34	0.89
4.85	.005	0.72	23.51	1.79
5.85	.005	0.79	34.18	1.61
7.60	.005	0.86	57.77	1.77
5.76	.005	0.96	248.26	1.28
.31	.005	0.92	106.33	1.71
.73	.005	0.79	32.87	1.40
.71	.005	0.83	45.03	2.10

$$\log\left(\frac{V}{L}\right) = a + b \log w + ct + e$$

Estimates of the Elasticity of Substitution from the time series data

		Equation (2')						
		(a) Intercept	Estimate of	t Value	Level of Significance	Coefficient of time	t Value	R^2
1.	All Industries	1.15	-0.22	-0.97	-	0.07	11.42	0.94
2.	Textiles	.9	0.46	1.31	Insig	0.05	5.27	0.96
3.	Food	1.45	0.26	0.43	-	0.06	2.37	0.70
4.	Leather	1.48	0.49	0.51	-	0.03	1.41	0.21
5.	Footwear	.82	1.02	3.51	0.01	0.02	2.49	0.67
6.	Rubber	1.02	1.36	3.05	0.01	0.02	3.64	0.83
7.	Chemicals	.9	1.59	1.43	Insig	0.03	0.45	0.00
8.	Basic Metals	1-01	0.32	0.67	Insig	0.03	2.40	0.53
9.	Non-Metallic Minerals	1.73	-1.76	-1.35	-	0.09	5.70	0.34
10.	Printing & Publishing	.53	1.52	5.25	0.01	0.02	2.42	0.88
11.	Electrical Machinery	.91	0.87	4.11	0.01	0.03	3.24	0.82
12.	Tabacco	2.28	0.42	1.68	Insig	0.05	3.30	0.58
13.	Paper	1.9	0.33	0.36	Insig	0.003	0.07	0.09

Contd.....

Regression relating Value added per worker to Value added

	Industry group	Constant	Log V	t Value	level of significant	R^2	F	D
1.	All Industries	1.75	0.49	9.59	.005	0.90	92	0.91
2.	Beverages							
3.	Food	2.72	0.40	3.49	.005	0.64	12.19	1.21
4.	Tabacco	4.97	0.27	4.02	.010	0.81	16.18	2.17
5.	Textiles	0.54	0.38	4.50	.005	0.69	20.22	1.47
6.	Footwear and wearing apparel	2.64	0.35	4.04	.005	0.64	16.32	2.60
7.	Woodcork & Allied	2.52	0.38	6.85	.005	0.88	46.93	2.60
8.	Furniture &Fixtures	2.31	0.38	7.90	.005	0.92	62.27	2.54
9.	Paper&Paper Products	2.30	0.40	2.41	.050	0.53	5.80	0.98
10.	Printing publishing	0.57	0.52	4.51	.005	0.69	20.34	1.79
11.	Leather	2.23	0.66	9.20	.005	0.90	84.62	2.37
12.	Rubber	0.28	0.52	10.72	.005	0.94	114.88	2.23
13.	Chemicals	0.95	0.44	7.22	.005	0.86	95.54	1.05
14.	Non-Metalic Minerals	0.45	0.47	8.65	.005	0.88	74.77	2.07
15.	Basic Metals	0.23	0.47	5.86	.005	0.79	34.41	1.33
16.	Metal Products	0.55	0.49	13.09	.005	0.94	171.45	1.47
17.	Machinery	0.30	0.45	10.29	.005	0.92	105.98	1.12
18.	Electrical Mechinery	1.72	0.38	6.49	.005	0.83	42.15	1.92
19.	[illegible]	0.40	0.46	7.35	.005	0.85	[illegible]	1.41
20.	Miscellaneous Ind.	4.48	0.71	6.87	.005	0.85	47.24	2.11

Equation (3') $\log \left(\frac{V}{L} \right) = a + b \log W' + k \log$

Estimates of the Elacticity of Substitution from the

		(a) Inter-Cept	Estimate of	t Value	Level of Signi-ficance
1.	All Industries	-5.75	-0.13	-0.63	-
2.	Textiles	-4.34	0.35	1.19	Insig
3.	Food	-9.29	0.25	0.60	Insig
4.	Leather	-7.51	-0.13	-0.57	-
5.	Footwear	-6.52	0.33	1.36	Insig
6.	Rubber	-3.27	0.58	1.6	Insig
7.	Chemicals	-6.03	0.65	1.30	Insig
8.	Basic Metals	-1.89	0.52	0.86	Insig
9.	Non-metallic minerals	-7.32	0.62	0.75	Insig
10.	Printing & Publishing	-3.15	1.85	4.4	0.01
11.	Electrical Machinery	2.81	0.87	3.93	0.01
12.	Tabacco	0.93	0.45	1.51	Insig
13.	Paper	-1.10	0.53	0.54	Insig

Appendix IV
(7)

V+et=e

time series data

Coeffi-cient of V	Level of Sig.	t Value	Coeffi-cient of time	t Value	R^2	r_{Vt}	No of observation
0.50	.35	1.79	0-02	0.65	0.96	0.98	10
0.41	.350	2.11	0.02	0.86	0.96	0.97	10
0.96	.200	3.06	-0.07	1.50	0.88	0.97	10
0.99	.200	12.42	-0.05	-5.47	0.96	0.76	12
0.77	.250	4.14	-0.02	-1.59	0.88	0.80	12
0.53	.300	2.65	-0.02	-9.98	0.92	0.89	11
0.67	.300	5.71	-0.04	-1.38	0.98	0.95	10
0.29	.300	0.65	0.02	-	0.56	0.9	10
0.83	.250	4.67	-0.02	-0.95	0.96	0.93	10
0.34	.400	1.07	0.003	0.10	0.90	0.74	10
-0.19	-	-0.62	0.06	1.48	0.84	0.96	10
0.13	.450	0.25	0.02	0.25	0.58	0.98	11
0.32	.400	0.9	-0.03	-0.54	0.22	0.76	9

Appendix V

$\log \left(\frac{V}{L}\right) = a + b \log w + \lambda \log V + Ct + c$ (Values not tallied)

	Industry group	Constant	Log W	t Value	level of significance	Log V	t Value	Level of Significance	Coefficient of t	t Value	Level of Sig	R^2	F	D	r_{VT}	No of observat
16.	All industries															
16.	All Industries	-2.29	1.85	9.69	.005	0.02	0.44	.350	0.02	-1.27	- 0.96		62.21	2.54	.81	11
15.	Food	-2.82	4.06	2.68	.025	-0.76	-1.91	-	0.02	0.126	- 0.59		3.31	2.63	.82	11
5.	Beverages	-2.05	0.78	1.53	.450	0.51	4.68	.350	0.13	-4.30	- 0.92		22.40	2.54	.92	9
1.	Tabacco	-2.42	-0.78	-0.126	-	0.863	2.632	.400	-0.178	-1.840	- .94		9.196	3.369	.99	11
14.	Textiles	-1.40	0.64	0.88	.250	0.35	1.48	.100	-0.05	-1.74	- 0.85		12.37	2.24	.95	11
13.	Footwear&Wearing apparel	0.04	0.42	1.32	.150	0.31	2.72	.025	0.01	-0.50	- 0.72		5.89	2.78	.90	11
4.	Wood cork & Allied	-0.67553	1.175	2.286	.050	0.073	0.483	.350	0.077	1.645	1000.92		25.92	2.97	.91	8
3.	Furniture & Fixture	-0.073	0.24	0.90	.250	0.427	2.08	.100	-0.031	-0.68	- 0.94		17.14	3.45	.92	7
2.	Paper & Paper Products	3.43	-0.188	-0.248	-	0.161	0.454	.350	0.070	1.161	2000.69		2.212	1.473	.93	7
8.	Printing & Publishing	-2.05	1.29	6.52	.005	0.205	2.44	0.025	-0.045	-2.41	- 0.96		58.66	2.38	.95	11
9.	Leather	-1.57	0.10	0.27	.400	0.70	7.26	.005	-0.07	-2.37	- 0.96		54.54	2.72	.85	11
7.	Rubber	-0.38	0.62	1.81	.100	0.320	2.45	.025	-0.01	-0.33	- 0.96		45.37	2.2	.92	10
11.	Chemicals	-0.80	0.37	1.50	.100	0.45	6.31	.005	-0.07	-5.06	- 0.98		101.70	2.83	.95	11
10.	Non-metallic Minerals	-0.55	0.08	0.15	.450	0.53	4.60	.005	-0.042	-2.07	- 0.94		32.68	3.06	.95	11
12.	Basic Metlas	-0.53	0.61	0.92	.200	0.30	1.01	.200	0.013	-0.27	- 0.83		10.98	1.41	.97	11
17.	Metal Products	-0.15	0.89	2.78	.025	0.11	0.689	.300	0.05	1.80	1000.98		101.48	2.19	.98	21
18.	Machinery	-0.10	0.639	2.27	.050	0.34	2.381	.050	0.03	-1.28	- 0.98		177.06	1.74	.97	11
6.	Electrical Machinery	-0.53	0.90	9.03	.005	0.18	4.33	.005	-0.00	-0.26	- 0.98		186.04	2.31	.97	[illegible]
19.	Transport Equipment	-0.50	-0.09	-0.188	-	0.60	3.58	.010	0.10	-2.37	- 0.92		28.58	2.17	.85	[illegible]
20.	Miscellaneous Industries	[illegible]														

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