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PRODUCTIVITY TRENDS IN THE MANUFACTURING INDUSTRIES

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by

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The importance of productivity as a factor of economic development is now almost universally recognised. Some of the developed countries attribute their economic achievements more to increases in productivity than to anything else. The significance of changes in productivity becomes all the more important for the developing countries where the resources are limited in supply and have a very high social cost. Productivity growth is an "absolute requirement" in the developing countries and a "fundamental requisite in any form of planning" irrespective of the stage of development and economic and social system [1, pp. 127-8].

In Pakistan hardly any work has been done to see the trends in the productive efficiencies of the factors in the manufacturing industries. This paper is an attempt to provide an empirical evidence firstly, about the inter industry differentials in productivity levels and their trend growth rates and secondly, to see that when productivity increases how is the resulting gain distributed between the factors. A study of this kind is important not only from the economic but also from the social point of view.

This paper is divided into three parts. Part I is about the method and data, Part II deals with the estimation of productivity trends, Part III is about the distribution of productivity gains, and then finally, a few concluding observations have been made.

1. Methodology and Data

Total productivity is defined as " the ratio between the output of wealth produced and the input of resources used up in the process of production" [3, 0. 1]. This is a very broad difinition and the outcome of any empirical exercise will depend entirely upon how the terms "output" and "input" are defined. Productivity may be calculated either on the basis of output or value added. Again output and value added figures could be either at market prices or at factor costs. "Inputs" may refer to either factor inputs or material inputs or both. Once these variables are defined and the productivity ratios estimated then their growth rates can be easily found out. There are two ways in which this can be accomplished. Firstly, by fitting trend lines to the already prepared productivity indices, and secondly, by estimating production functions and then slightly manoeuvring the technological coefficients of these functions. The results in both cases are almost the same provided the weights used in the first case are same as the exponents obtained from the statistical production functions [7, p. 13]. The advantage in the first method i.e. the ratio of output to inputs is that it makes possible the inter temporal and inter industry comparisons of productivities which is not possible in the case of production functions. It was for these reasons that we decided to obtain productivity growth rates from the productivity indices.

Trend rates of growth of total factor productivities were obtained by estimating the following equation:-

$$\text{Ln } P = a + b\,t \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where 'P' stands for productivity and 't' denotes the trend variable. For each industry growth rate was given by b, the coefficient of trend

variable t. In order to estimate the above equation, total productivity indices were prepared for each industry covering a ten year period from 1959-60 to 1969-70. Two types of indices were constructed, one based on the value added and the other on the output measure. The formulas used for this purpose were:

$$P_t = \frac{V_t}{w_o L_t + r_o K_t} \quad \ldots\ldots\ldots\ldots (2)$$

$$P'_t = \frac{O_t}{w_o L_t + r_o K_t + m_o M_t} \quad \ldots\ldots\ldots\ldots (3)$$

where $w_o = W_o/L_o$, $r_o = \frac{V_o - w_o}{K_o}$

P = Total productivity based on value added.

P' = Total productivity based on output.

V = Gross value added.

L = Number of persons employed.

K = Gross value of capital.

M = Raw Materials

w = Wage rate.

W = Total wages.

r = Rate of return on capital.

m = Price of raw materials.

Subscripts refer to the time periods.

For equation (2) value added was taken at constant factor costs instead of at market prices expecting the results to be more consistent with factor cost figures, because in this way the effect of indirect taxes

which is otherwise likely to reflect itsel in the form of increased productivity is separated. Total number of persons was used for calculating labour input and no distinction was drawn between production and non-production workers as with technological development the differen between the two is becoming increasingly difficult to determine. The be measure of labour input is the number of hours worked but since no such data are available for any industry employment figures were taken as th second best and were weighted by the base year wage rates to obtain measures of labour input. Capital stock figures included land an buildi machinery and other assets as defined in the Census of Manufacturing Industries. Gross capital figures were preferred to net figures because of the controversial nature of depreciation rates and also to avoid any possible bias as the depreciation rates allowed by the government are invariably much higher than the actual productive capacity depreciation [4, pp. 34-35]. Capital data as such shows the level of capital stoc but for comparing efficiency of capital at different points of time the stocks need to be converted into flows. This conversion was done by multiplying the value of capital stocks by the rate of return on capital. Base year rate of return was used to construct capital input series. Fo raw materials, price and quantity figures were not available separately. So raw materials at constant prices were obtained by substracting value added from output which were both available at constant prices.

In Part III, for calculating total productivity gains and the shares received by labour and capital the following relations were used*:

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$$G_T = \triangle V_T - \triangle I_T$$

$$G_L = \triangle Y_L - \triangle L_T$$

$$G_K = \triangle Y_K - \triangle I_K$$

where G stands for productivity gains V for gross value added, Y for income and I for input. Subscripts T, L & K stand for total, labour and capital respectively. Total gains are defined as the difference between increases in gross value added and total factor inputs measured at constant factor costs and constant rates of compensation respectively. Labour's share of productivity gains is the difference between an increase in labour income i.e. wages (at constnat prices) and an increase in labour input (at constant wage rate). And similarly capitals share is the difference between an increase in non-wage income (at constant price) and an increase in capital input (at constant rate of return).

The entire data used in this paper is the adjusted CMI data which was taken from the appendix tables of two earlier studies [4, 5].

II. Productivity Trends

Productivity indices prepared on the basis of equation (2) as given in appendix table I showed unexpectedly large year to year fluctuations in many industries and as a result the estimates of trend growth rates also did not show any uniformity. They were very high in some industries and extremely low in some others. These apparently doubtful estimates necessitated the verifications of the findings by some other method. An alternative set of trend rates was therefore estimated with the help of equation (3). In this case outputs were used instead of values added.

Raw materials which were ignored in the previous equation were thus explicitly included in the productivity formula. Not relying on the estimated figures for business taxes, "outputs" were taken at market prices instead of factor costs.

Rates of growth of total factor productivity estimated both on the basis of value added and output are given in table I. A comparison of the two estimates confirms the prior belief that owing to the differences in underlying factor intensities and the rates of capacity utilization, the productive efficiency levels differ markedly "between industries" and that they have been changing at different rates "within industries".

The numerical values of the trend rates based on value added are higher than those based on output for all industries. This was primarily due to the effect of raw materials which were excluded in the former case and included in the latter. The results in Table I show that out of a total of sixteen industries value added productivity showed an upward trend in thirteen and a declining trend in three industries. The rate of increase was highest in the leather industry (9.09%) and the rate of decline maximum in the paper industry (-8.09%) contrary to this there was only one industry which showed declining output productivity while in all others the output productivities showed upward trends. Growth rate was highest in the Rubber industry (5.96%) and lowest in the peper industry (-1.82%). Chemical and chemical products and the non-metallic mineral products were two such industries which showed declining trends for value but rising trends for output productivities.

TABLE I

TREND GROWTH RATES OF TOTAL PRODUCTIVITY BASED ON VALUE ADDED AND OUTPUT

1959-60 To 1969-70(Percentages)

INDUSTRY	VALUE ADDED	OUTPUT
Food Manufactures	.53	.78
Tobacco Manufactures.	3.43	4.61
Manufacture of Textile	6.20	3.15
Manufacture of Footwear and other wearing Apparel.	1.47	1.56
Manufacture of Paper and Paper Products.	-8.09	-1.82
Printing Publishing and Allied Products.	5.85	2.41
Leather and Leather Products.	9.09	.24
Rubber Products except Rubber Footwear	8.66	5.96
Manufacture of Cehmicals and Chemical Products.	-1.58	.04
Manufacture of Non-Metallic Mineral Products.	-3.60	.97
Basic Metals Industries	8.60	2.12
Manufacture of Metal Products	2.40	.86
Machinery except Electrical Machinery.	3.52	.84
Electrical Machinery	6.76	3.13
Manufacture of Transport Equipment	3.16	.97
Miscellaneous	11.51	1.35

The first glance at the table creates some doubts about the validity of the results, but if we look at the productivity indices given in appendix tables (1) and (2), it becomes quite evident that differences in growth rates were actually due to differences in productivity levels which in some cases showed wild fluctuations from year to year in a particular industry and from industry to industry in a particular year. Output productivity indices are on the whole much more consistent as compared to those based on value added. Larger annual fluctuations and the resulting trend rates in the case of value added can be attributed partially to the form of algebraic relationship between the variables used here to prepare indices. Looking at the two formulas for productivity, we find that the only difference between them is that in the case of output productivity a constant term (i.e. the value of raw materials) is added to the numerator and the denominatior. If initially the numerator and the denominator are not equal then as a result of this addition the two term will be increased by different percentages and the ratio of these terms will also change[1].

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[1] A numerical example will illustrate the point. In the case of Leather industry the two productivity estimates for 1960-61 were as follows:

$$P = \text{Value added} / (\text{Labour Input} + \text{Capital Input}) = 21227 / (3924.85 + 6292.78) = 2.07$$

$$P' = \frac{\text{Value added} + \text{Raw Materials.}}{\text{Labour Input} + \text{Capital Input} + \text{Material Inputs.}} = \frac{21227 + 47221}{3924.85 + 6292.78 + 47221} = 1.19$$

Thus the value added productivity was as high as 1.73 times the output the output productivity. In terms of percentages whereas P' increased

only by 19%, P showed 107% increase in productivity over the previous year. Changes in productivity levels thus take place on account of disproportionate increases in the output and the inputs. And among the inputs it is mostly the capital input which suddenly shoots up in some years thus tilting the overall balance. Inspite of the fact that the available capital has never been fully utilised [5, 12] there is an increasing tendency in some of the industries to adopt more and more capital intensive techniques of production. A recent visit to a woolen mill revealed that some of the older machines which were still in a perfectly good shape had been replaced by some very sophisticated but highly expensive machines. The result was that although at current prices the output/input ratio was quite high, yet valued at base year prices there was a much greater increase in the capital input than the resulting output. This is exactly what seems to have happened in the paper industry. Uptil 1964-65 total productivity was above the initial years level but the decline started after 1965 when corresponding to a 44% increase in output (from Rs. 109333 thousands in 1964-65 to Rs. 157981 thousands in 1965-66) there was a 79% increase in the capital input (from Rs. 21384 thousands to Rs. 38264 thousands). This phenomenon of comparatively greater increase in capital input continued till the last year.

There was almost no increase in the output productivity in the chemical industry. Except for three years (from 1963-64 to 1965-66) the productivity index remained clost to 100. In the case of leather manufacturing the output productivity was 29% higher in 1969-70 as compared to 1959-60. But the large yearly fluctuations were mainly responsible for the low trend rate. When only one year i.e. 1962-63 (for which the productivity was exceptionally high), was excluded the annual trend rate

increased from .24% to .74%. In the transport equipment industry the overall rate of growth was low because of declining production levels after 1967-68. The trend growth rate of output productivity in this industry was 3.01% till 1967-68, but the last two years pulled down the trend rate as low as .97%.

In short the results of this study as given in table I suggest that the total productivity has been increasing at quite high rates in rubber, tobacco, textile, printing & publishing and electrical (machinery) industries, and at rather moderate rates in the footwear and miscellaneous industries. In all other industries the trend growth rates were less than 1% per annum. With the exception of paper, leather, chemical and transport industries growth rates of output total productivities were significant at 5 % level in other industries. Footwear industry was the only instance where the rate was found significant at 10% level.

It is extremely difficult to identify with exactitude the factors which caused fluctuations in the input output levels of different industries, as this is possible in only indepth case studies of individual production units. Irrespective of the nature of industry one major factor that determines and controls the behaviour of other variable is the "management". It would not be too wrong to attribute some of the changes in production and productivity levels to management decisions. An ILO productivity study by Kilby [8, p. 305] the results of which are also quoted by Leibenstein [9, P. 400] shows that in the textile industry alone in Pakistan was there a dramatic increase in the labour productivity when only a few minor management decisions were taken in this regard. These decisions which included simple technical alterations, payments by

result and workers training and supervision programmes, resulted in a 14% increase in labour productivity in the weaving unit of the mills and 59% in the bleaching unit. The production costs in terms of labour and capital were reduced by 29% and 37% in weaving and bleaching units respectively. The study also gives some interesting results about the effect of labour relations on the productivity level. The quote from the report "In one of the ILO missions to Pakistan an improvement of labour relations in a textile mill in Lyallpur resulted in a productivity intrease of 30%. Nothing else was changed except that labour turnover was reduced by one-fifth". [9, p. 401]. But it appears that this increased productivity was not appreciated by the management for some unknown reasons. To their great surprise when some members of the ILO mission revisited some of the firms they found a reversion to previous met and productivities. The cotton textile industry being one of the largest industries in Pakistan, any generalisation based on the experience of that industry will not be too wrong and it is believed that what is true for textile is by and large also true for other industries.

In general, it was noticed that during the ten year period covered by this study total productivity levels increased at fairly high rates during the first half and showed variations of different degrees during the second half. Year 1962-63 did not seem to be a normal year for many industries as the previously smooth trends showed a sudden change in this year. War with India in 1965 resulted in lower productivities in eleven out of sixteen industries either in 1965-66 or 1966-67. Unsettled political conditions in the country after 1967 to some extent also reflected themselves in lower productivities during the latter years of 1960's.

III. Distribution of Productivity Gains

Total productivity gains and their distribution between labour and capital are given in table 2. The overall distribution seems to be quite uneven, rather quite unfair. But before we go into further details of the evenness or fairness of the distribution of gains, let us for a moment look at table 3 and appendix table 3. Table 3 given the shares of labour and capital in the increase in total input from 1959-60 to 1969-70 and appendix table 3, shows the ratios of labour and capital to total input.

It is generally believed that a major share of all gains is invariably taken away by the capital while labour hardly gets what is actually deserves. This view does not seem to be far from reality. Out of a total of sixteen industries, in nine industries capital received more than 60% of the productivity gains, Take for example the first industry i.e. food manufacturing industry. Out of the total gains of Rs. 1721161 thousands, labour received only 9.8 % while the rest went to capital. Table 3 shows that during the period covered by this study labour input in the food manufacturing industry was 15.65% of the total increase in inputs. Productivity gains received by labour were thus 6.47% less than what it shoul have received under an proportionate distribution. The increase in capital input on the other hand, was 84.35% of the total input increase but capital received 90.82% of the gains because of two reasons. Firstly, capital had a very large share in the food industry in 1969-70 (78.78% to be exact), and there was every reason to expect 78.78% of the gains going to capital; secondly, as is clear from the factor price indices, the price of capital increased

much more than of labour thereby tilting the balance in favour of capital.

Except in the chemicals, metal products, machinery except electrical, machinery and transport equipment industries in all other industries the distribution of productivity gains was in favour of capital. In eleven industries capital's share of gains far exceeded its share in the incremental input ranging from 4.77 % in the basic metal industry to 60% in the tobacco manufacturing industry.

In absolute terms, productivity gains were maximum in the textile industry (approximately Rs.619270.91 thousands) but labour got only one-third of it as its share (about 10.99% less than its due share) on account of higher proportion of capital in the total input in 1969-70 and price of capital relatively higher than the price of labour.

In general productivity gains are positive in all those industries where in the price of output increased more than the price of input. Among these industries the factor whose price increased more than the price of the other received a bigger share.

The results for paper and paper products, chemicals and chemicals products, non-metallic mineral products and transport equipment industries look quite unreal. Since the quality of the data cannot be guaranteed an element of error may be present there but the results are still quite amazing. Paper industry had a downward trend in its total productivity as shown in table 1. During the period 1959-60 to 1969-70 the value added in this industry increased only by 39216 thousands while corresponding increase in input cost was Rs. 62579 thousands. The industry thus ran a loss

TABLE 2

DISTRIBUTION OF PRODUCTIVITY GAINS (1959-60 to 1969-70) (Value in 000 Rs.)

	TOTAL			LABOUR				CAPITAL		
	Change in Value Added Δ V.A	Change in Input Δ I	Productivity Gain G	Change in Labour Income Δ W	Change in Labour Input Δ L	Productivity Gain G_L	G_L/G%	Change in Cap. Income Δ R	Change Cap. Input Δ K	Productivity Gain G_K
FOOD	464651	232490.14	172169.86	52189.73	36377.15	15812.58	9.18	352461.27	196112.99	156348.28
TOBACCO	232973	96032.32	136940.68	25376.39	44376.78	-19000.39	-13.87	207596.61	51655.54	155941.07
TEXTILE	955510	336239.09	619270.91	341749.57	144228.69	197520.97	31.90	613760.43	192010.49	421749.94
FOOTWEAR	161701	92637.36	69143.64	60754.45	40137.91	20616.54	29.82	101026.55	52499.45	48527.10
PAPER & PRODUCTS	39216	62579.68	-23363.68	22489.79	21716.86	772.93	3.31	16726	40862	-2413661
PRINTING	227438	90894.69	136543.31	72591.45	41781.12	30810.33	22.56	154846.55	49113.57	105732.98
LEATHER	100100	13351.60	86756.40	7505.60	7502.91	2.69	.0031	92802.40	5848.69	86753.71
RUBBER	31176	10603.18	20572.81	7709.43	4775.98	2933.45	14.26	23466.57	5027.21	17639.36
CHEMICAL	294433	291620.10	2812.90	94757.11	51659.43	43097.28	1532.13	199673.89	239960.26	-40284.26
NON-METALLIC MINERALS	51763	127489.48	-75726.48	23339.67	24488.14	-1148.47	- 1.52	28423.33	103001.34	-74570.01
BASIC METALS	62070	29625.78	32446.22	20121.00	10342.14	9779.66	30.14	41950.20	19283.64	22666.56
METAL PRODUCTS	136695	112369.23	24325.77	76079.85	51527.08	24552.77	100.93	60615.15	60842.15	-227.00
MACHINERY EXCEPT ELECTRICAL	164964	126307.69	38656.31	83515.49	52799.10	30716.39	79.46	81448.51	73508.59	7939.92
ELECTRICAL MACH	98255	72221.62	26033.38	45190.30	32378.25	12812.05	49.21	53064.70	39843.37	13221.33
TRANSPORT EQUIPMENT	39278	41164.60	-1886.60	39517.91	28398.11	11119.80	589.41	-239.91	12766.49	-13006.40
MISCELLANEOUS	309649	-62881.24	372539.24	-21480.19	-26913.48	5433.29	1.46	331129.19	-35967.76	359163.32

TABLE 3

INCREMENTAL INPUT
(1959-60 to 1969 - 70.)

INDUSTRY	Increase in Labour input △ L	Increase in Capital input △ K	Increase in Total input △ I	△L/ △I %	△ K/ △ I %
Food Manufactures	36377.15	196112.99	232490.14	15.65	84.35
Tobacco Manufactures	44376.77	51655.54	96032.32	46.21	53.79
Manufacture of Textile	144228.60	192010.49	336239.09	42.89	57.11
Manufacture of Foot-wear and other Wearing Apparel	40137.91	52499.45	92637.36	43.33	56.67
Manufacture of Paper and Paper Products	21716.86	40862.82	62579.68	34.70	65.30
Printing, Publishing and Allied Products	41781.12	49113.57	90894.69	45.97	54.03
Leather and Leather Products	7502.97	5848.68	13351.59	56.19	43.81
Rubber Products except Rubber Foot Wear	4775.97	5827.21	10603.18	45.04	54.96
Manufacture of chemicals and chemical products	51659.83	239960.27	291620.10	17.71	82.29
Manufacture of Non-Metallic Mineral Products.	24488.14	103001.34	127489.48	19.21	80.79
Basic Metals Industries	10342.14	19283.64	29625.78	34.91	65.09
Manufacture of Metal Products	51527.08	60842.15	112369.23	45.86	54.14
Machinery except Electrical Mach.	52799.10	73508.59	126307.69	41.80	58.20
Electrical Machinery	32378.25	39843.37	72221.62	44.83	55.17
Manufacture of Transport Equipment	28398.11	12766.49	41164.60	68.99	31.01
Miscellaneous Industries	-26913.48	-35967.76	-62881.24	42.80	57.20

of Rs 23364 thousands due to decline in productivity. But this loss was not shared by both the factors. Labour income actually exceeded labo input by Rs. 773 thousands. Productivity loss to capital was Rs.24137 thousands. i.e. Rs. 773 thousands more than the total loss to the industry the amount paid to labour at the cost of capital.

In the chemical industry, though the total productivity was .72% higher in 1969-70 than what it was in 1959-60 the trend rate of productiv was -1.58%. But inspite of this negative trend, the productivity gains, though very nominal, were still positive. There was an incredible gain to labour and loss to capital. The gain to labour was Rs.43097 thousands which is about 15.32 times the total gain to the industry as a whole, while the loss to capital was 14.32 times the industry gains. This probably happened due to the following reasons. We estimated productivity gains at constant prices. For labour and capital incomes current figures were deflated by the relevant output indices, and inputs were calculated at constant rates of compensation. A look at the price indices shows that whereas the price of chemicals and chemicle products in 1969-70 had increas by 22%, the wage rate during the same period had increased by more than 100% in this industry and the price of capital had increased only by 4.05% The labour input at constant wage rate therefore, was less than the labour i at constant prices, resulting in a 1532% gain to labour. Similarly the big gap between changes in capital income and capital input was because of the fact that the increase in the price of capital (i.e. 4.05%) was much less than the increase in the price of output (22.41) which was used to defl capital income. This difference of prices coupled with the fact that capital formed 80.14% of the total factor input in the chemical industry resulted in the distribution of gains which were unbelievably in favour

of labour and against capital.

The third abnormal industry was the non-metallic mineral products industry. The total factor productivity in this industry in 1969-70 was 22.09% less than its initial level. Over the ten year period from 1959-60 to 1969-70 the productivity declined at a rate of 3.60%. During this period the value added increased only by Rs.51763 thousands while to produce that much worth of output a cost of Rs.127489.48 thousands was incurred. The net loss was Rs.75726.48 thousands. Of this loss 98.48% was borne by capital while 1.52% was absorbed by labour. This unequal sharing of loss was again due to unequal changes in the factor prices. Although capital input was about 80% of the total factor input in 1969-70 in the non-metallic mineral products industry, the reason for having absorbed 98.48% of the loss was a 32.46% fall in the capital price index-form 100 in 1959-60 to 67.54 in 1969-70. The price of labour and output in the meantime had increased by 79.93% and 46.14% respectively.

Lastly, the transport equipment industry needs a little bit of explanation. Inspite of the fact that in 1969-70 the total factor productivity in this industry was 2.44% less than its initial level, there was on the whole an upward trend in the productivity. A comparison of the figures of initial and the terminal years shows that there was an increase of Rs.39278 thousands in the value added and a corresponding increase of Rs. 41170 thousands in the input cost. But even though the industry experienced a loss of Rs.1886.6 thousands, labour managed to secure a gain of Rs.11119.8 thousands, which is almost six times the total loss to the industry. This gain to labour, as in some earlier cases was at the expense of capital

which suffered a productivity loss of Rs.13006.- thousands. The explanation here again is the same though the degree of our measures (i.e. the price indices) is a little bit different. There was an increase of 25.3% in the price of transport equipments and of 63.36% in the price of labour but a decline of 46.59% in the price of capital over the entire period.

CONCLUSION

It is believed that in order to achieve economic development over a shorter historical period the developing countries will have to increase employment and productivity at the same time [1, p. 12]. From the development point of view increased productivity becomes even more important than the increased production if we keep in mind the scarcity of the productive resources. Most of the industries included in this study showed significant growth in their productivity levels during 1959-70. Paper industry was the only case where a declining productivity rate was observed. The available statistical data has, however, led us to conclude that there were no significant changes in the output productivity levels of leather, chemical and transport equipment industries. Decline in productivity should be a cause of concern to the government which must take proper steps to see that productivity does not fall below a minimum level. The magnitudes of the productivities as given in this paper may not be all true mainly on account of the poor quality of data for some of the industries, and especially so for the paper, chemicals, non-metallic minerals and leather industries. Guisinger [2, p. 22] also makes a passing reference to it. But inspite of all these weaknesses this exercise still gives us a fairly adequate idea about the direction of productivity changes.

For actually taking measures to raise productivity, the conclusions of "the Meeting of Experts on productivity in the Manufacturing Industries", held under the auspicies of the ILO in Geneva in 1952 [3, p. 175] can be of great help to the government. The measures suggested in this report are three fold ; firstly, about plant and equipment. secondly, about organisation and control of production, and thirdly, about personnel policy. Side by side with this the Hawthorne experiment [9, p. 401-10] which was a compl te success in the textile mills in Lyallpur, can also be tried in other industries.

In the end, a few words of caution of the policy makers may not be out of place. Although higher productivity is an extremely desirable thing, the government must see to that it does not aggrevate the problem of unemployment and that there is an adequate rate of capital formation providing new employment opportunatics. To see that the "higher productivity" efforts do not lose their effectiveness in the long run, equitable distribution of productivity gains should be ensured. To quote again from the ILO report [3, p. 177] "these are matters both of social justice and economic necessity: failure to distribute widely the benefits of higher productivity and to maintain demand and employment would mean that the conditions for continuing increases in productivity would not exist".

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VALUE ADDED

	1959-60	1960-61	1961-62	1962-63
Food Manufactures.	100	112.11	142.98	166.93
Tobacco Manufact r.	100	117.63	134.50	131.32
Manufacture of Textile	100	89.75	76.99	113.62
Manfuacture of Foot Wear and other wearing Apparel	100	92.41	82.82	68.03
Manufacture of Paper & Paper Products.	100	136.61	150.04	172.18
Printing Publishing and Allied Products	100	127.49	146.90	186.02
Leather & Leather Products	100	223.52	363.51	524.01
Rubber products except Rubber Foot Wear	100	92.89	86.72	80.30
Manufacture of Chemicals and Chemical products	100	112.89	116.63	112.68
Manufacture of Non-Metallic Mineral Products	100	103.39	99.56	94.34
Basic Metal Industries	100	83.04	84.33	80.94
Manufacture of Metal Products	100	97.83	99.30	106.35
Machinery except Electrical Machinery	100	-	-	-
Electrical Machinery	100	96.58	96.70	92.48
Manufacture of Transport equipment	100	106.42	99.71	98.84
Miscellaneous Industries	100	86.43	96.71	93.71

ENDIX TABLE 1

PRODUCTIVITY INDICES

1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
137.88	120.07	129.17	107.71	103.94	121.72	153.63
112.53	107.99	135.97	94.97	130.72	158.35	186.91
102.90	114.37	111.46	102.32	137.76	159.71	178.42
80.25	118.47	73.60	60.10	59.00	110.09	157.42
151.39	134.40	78-58	76.09	72.90	68.78	71.19
158.44	154.23	155.74	158.14	201.01	210.70	214.73
439.82	324.24	529.29	382.38	337.35	429.76	500.55
234.97	250.26	141.87	196.02	211.55	223.22	229.21
142.80	160.43	126.77	104.50	98.13	88.14	100.72
145.42	94.00	107.00	97.96	106.43	107.44	113.26
142.41	157.83	159.35	155.24	211.63	187.63	149.72
124.26	112.64	114.26	119.61	132.74	122.54	115.45
-	112.54	129.65	124.52	135.57	129.11	124.88
96.55	140.08	150.82	164.42	189.83	189.37	125.25
167.91	150.94	143.58	139.62	184.56	144.27	97.66
210.12	186.52	281.60	163.97	205.13	233.04	273.06

Appendix Table 2

	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Food Manufacturing except Beverages	100	102-85	109-36	114-68	111-62	110-67	112-15	108-73	107.18	112,30	114.32
Tabacco Manufactures	100	109.06	119.52	123.65	118.66	123.14	132.93	132.29	149.22	158.84	169.85
Textiles	100	97.78	100.40	109.35	106.57	113.29	113.65	114.55	124.50	131.35	134.41
Footwear and other Wearing Apparel	100	97.63	94.28	87.75	93.92	111.11	92.88	90.60	95.36	109.51	126.26
Paper & Paper Products	100	113.78	117.83	123.49	117.00	111.65	96.73	99.88	98.31	95.95	96.71
Printing & Publishing	100	114.19	123.56	140.03	123.51	121.46	122.52	122.79	137.07	140.38	143.01
Leather & Leather Products	100	119.17	139.78	160.61	135.11	122.05	137.34	123.09	1 15.09	121.68	129.03
Rubber & Rubber Products	100	97.74	95.78	94,54	143,93	144.35	141,89	162.68	152.77	157.10	154.97
Chemicals & Chemical Products	100	103.85	104.57	103.66	114.99	119.36	109.23	101.62	100.73	101.68	105.98
Non-Metallic Mineral Products	100	97.56	100.76	101.52	95.80	107.81	108.42	113.34	111.97	105.63	101.75
Basic Metals	100	93.76	95.35	95.15	110.93	113.76	114.68	114.07	118.94	114.69	109.78
Metal Products	100	99.45	99.99	102.70	108.24	105.57	106.61	107.98	1D .38	107.44	105.35
Machinery Except Electrical	100	101.83	104.85	105.69	98.36	104.73	111.11	108.79	111.19	108.13	106.81
Electrical Machinery	100	99,68	100.80	100.37	103.11	117.10	123.20	126.96	135.56	128.62	120.27
Transport Equopment	100	103.00	101.42	102.78	123.48	117.37	122.23	1D .39	125.17	109.53	98.59
Miscellaneous Industries	100	98.40	99.82	98.88	107.69	107.85	116.55	105.20	109.31	110.48	111.66

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APPENDIX TABLE 3.1

FACTOR PROPORTIONS IN THE TOTAL INPUT

	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
FOOD											
Labour	25.85	19.38	31.38	32.69	27.94	28.29	24.47	20.56	23.35	22.59	21.22
Capital	74.15	69.62	68.62	67.31	72.06	71.71	75.53	79.44	76.65	77.41	78.78
TOBACCO											
Labour	13.15	14.19	15.10	16.98	21.31	27.97	24.26	23.19	26.88	30.06	33.30
Capital	86.85	85.81	84.90	83.02	78.69	72.13	75.74	76.09	73.12	69.94	66.70
TEXTILES											
Labour	41.30	40.96	39.73	38.47	36.33	37.05	36.18	37.87	45.33	44.03	41.98
Capital	58.70	59.04	60.27	61.53	63.67	62.95	63.82	62.13	54.67	55.97	58.02
PAPER											
Labour	25.55	29.51	32.88	35.64	35.53	30.06	25.70	28.19	30.78	30.99	32.61
Capital	74.45	70.49	67.12	64.36	64.47	69.94	74.30	71.81	69.22	69.01	67.38
PRINTING											
Labour	53.73	52.79	52.66	49.71	51.16	46.64	44.75	42.26	47.00	48.18	47.80
Capital	46.27	47.21	47.33	50.29	48.84	53.36	55.25	57.74	53.00	51.82	52.20
LEATHER											
Labour	43.70	45.46	48.87	51.13	51.75	51.74	56.80	52.18	55.32	54.51	51.40
Capital	56.30	54.54	51.13	48.87	48.25	48.06	43.20	47.88	44.68	45.49	48.60
RUBBER											
Labour	51.95	51.10	48.07	48.93	53.64	40.29	36.67	39.34	36.60	42.71	47.35
Capital	48.05	48.90	51.93	51.07	46.36	59.71	63.33	60.66	63.40	57.29	52.65
CHEMICALS											
Labour	26.35	17.55	18.01	18.52	31.82	23.15	20.97	16.52	18.70	20.78	19.86
Capital	73.65	82.45	81.99	81.48	78.18	76.85	79.03	83.48	81.30	79.22	80.14
NON-METALLIC MINERALS											
Labour	22.47	21.90	22.55	23.50	16.62	23.55	21.30	22.83	21.41	21.25	20.38
Capital	77.53	78.10	77.45	76.50	83.38	76.45	78.70	77.17	78.59	78.75	79.02

	I95°-60	I960-6I	I96I-62	I962-63	I963-64	I964-65	I965-66	I966-67	I967-68	I968-69	I969-70
BASIC METALS											
Labour	40.63	38.97	4I.64	4I.62	40.55	45.87	34.46	37.63	44.36	40.99	38.03
Capital	59.37	6I.03	58.36	58.38	59.45	54.I3	65.54	62.37	55.64	59.0I	6I.97
METAL PRODUCTS											
Labour	52.73	52.57	44.87	45.78	48.28	50.53	49.59	46.33	49.66	48.54	47.82
Capital	47.27	47.43	55.I3	54.22	5I.72	49.65	50.4I	53.67	50.34	5I.46	52.I8
MACHINERY EXCEPT ELEC											
Labour	39.26	36.64	34.68	32.57	34.98	38.89	39.58	37.82	40.39	4I.34	3I.33
Capital	60.74	63.36	65.32	67.43	65.02	6I.II	60.42	62.I8	59.6I	58.66	58.67
ELEC MACHINERY											
Labour	43.8I	53.40	59.69	66.27	58.08	50.42	50.33	5I.92	53.47	58.00	44.53
Capital	56.I9	46.60	40.3I	33.73	4I.92	49.58	49.67	48.08	46.53	42.00	55.47
TRANSPORT											
Labour	56.I3	55.56	53.24	5I.80	5I.03	5I.37	59.83	55.29	60.37	6I.97	62.7I
Capital	43.87	44.44	46.76	48.20	48.97	48.63	40.I7	44.72	39.63	38.03	37.29
MISCELLANEOUS INDUSTRIES											
Labour	37.09	33.I8	27.93	2I.89	36.59	33.95	29.63	32.75	40.04	38.26	35.42
Capital	62.9I	66.82	72.07	78.II	63.4I	66.05	70.37	67.25	59.95	6I.74	64.58

Table 4.1 FACTOR PRICE INDICES

	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
FOOD											
Labour	10.00	100.23	98.11	124.69	141.97	121.84	266.50	228.45	269.60	326.08	382.92
Capital	100.00	163.73	251.64	293.28	233.67	395.79	520.28	403.29	581.82	631.84	923.08
TABACCO											
Labour	100.00	124.98	139.38	167.86	250.62	257.91	327.74	358.10	365.71	624.54	702.34
Capital	100.00	137.39	179.42	235.48	249.24	296.01	442.13	310.16	423.85	544.51	671.24
TEXTILE											
Labour	100.00	103.01	107.76	107.53	120.42	135.98	147.87	176.43	245.01	263.70	303.89
Capital	100.00	9.24	67.41	138.85	120.65	141.68	145.29	138.33	257.33	312.11	332.94
FOOTWEAR											
Labour	100.00	97.45	96.72	96.96	137.03	261.40	231.18	290.30	386.76	496.94	607.29
Capital	100.00	91.67	90.14	90.14	108.26	329.92	197.32	168.82	156.80	471.65	687.10

TABLE 4.2 FACTOR PRICE INDICES

	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Paper & Paper Products											
Labour	100.00	123.14	146.81	169.42	229.69	268.24	396.13	561.64	699.47	697.89	890.51
Capital	100.00	157.64	217.78	277.58	232.86	252.41	215.81	216.28	196.17	277.03	257.16
Printing, Publishing Allied Products											
Labour	100.00	152.18	202.89	305.77	266.29	316.58	388,43	413.52	529.59	567.81	604.39
Capital	100.00	165.56	229.78	364.15	480.67	586.39	803.35	879.10	1241.20	1302.00	1340.36
Leather & Leather Products											
Labour	100.00	106.97	140.43	143.43	174.52	226.82	340.07	321.29	472.80	545.30	533.41
Capital	100.00	290.81	635.49	895.78	636.58	485.70	1209.61	1066.89	1344.09	2195.21	2892.23
Rubber											
Labour	100.00	92.29	89.12	80.63	139.90	247.02	209.46	193.20	195.39	184.96	177.86
Capital	100.00	92.94	80.66	77.93	339.88	268.78	116.62	232.09	286.60	332.77	370.72
Chemicals											
Labour	100.00	103.01	101.69	101.93	114.30	123.76	141.84	153.73	152.73	152.54	200.93
Capital	100.00	104.99	108.11	108.56	143.54	166.26	135.58	117.40	103.20	95.38	104.05
Non-Metallic Mins											
Labour	100.00	105.25	107.63	119.23	126.64	126.80	136.33	133.48	137.79	177.61	179.93
Capital	100.00	94.24	95.24	93.08	70.95	86.58	76.28	97.28	82.86	66.67	67.54

Table 4.3 FACTOR PRICE INDICES

	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
BASIC METALS											
Labour	100.00	102.10	104.64	110.33	127.73	134.75	176.68	147.77	164.35	171.37	174.03
Capital	100.00	78.89	75.63	64.84	143.33	230.76	233.14	217.23	316.20	261.56	182.87
METAL PRODUCTS											
Labour	100.00	101.60	104.69	104.60	133.57	121.79	132.88	149.76	146.16	155.86	165.56
Capital	100.00	105.21	102.12	114.70	106.43	144.88	173.91	145.05	165.38	138.02	113.56
M.CH.EXCEPT.ELEC											
Labour	100.00	-	-	-	-	134.20	151.72	148.59	152.35	158.84	168.76
Capital	100.00	-	-	-	-	103.69	127.64	125.30	143.30	133.02	120.36
ELEC MACHINERY											
Labour	100.00	76.94	63.75	53.26	70.21	123.00	120.07	142.12	147.19	163.94	174.60
Capital	100.00	113.37	138.07	163.79	143.07	174.26	218.38	230.30	305.20	325.88	146.02
TRANSPORT											
Labour	100.00	96.67	97.22	91.30	165.46	132.20	91.00	117,71	138.09	147.53	163.36
Capital	100.00	102.33	108.09	124.57	199.27	212.65	280.18	223.85	355.97	243.43	53.41
MISCLLANCOCTES											
Labour	100.00	98.88	92.58	85.60	146.90	127.21	177.63	138.93	128.18	141.51	162.98
Capital	100.00	79.21	99.70	102.31	271.94	237.31	376.18	217.65	330.73	402.07	478.32

REFERENCES

1. Goncd , P. "Productivity and Economic Planning" OECD. Paris, 1970.

2. Guisinger, Stephen E. "Pattern of Industrial Growth in Pakistan". Pakistan Development Review Vol. xv, No. 1 Spring 1976.

3. IIO. "Higher Productivity in Manufacturing Industries". Genevs, 1967.

4. Kemal, A.R. "Consistent Time Series of Data Relating to Pakistan's Large Scale Manufacturing Industries" Pakistan Development Review. Vol. xv No. 1. Spring 1976.

5. _____"Sectoral Growth Rates and Efficiency of Factor use in Large Scale Manufacturing Sector in West Pakistan". Pakistan Development Review. Vol. xv, No. 4. Winter, 1976.

6. _____"Capacity utilization in Manufacturing Industries of Pakistan" Pakistan Development Review. Vol. XIII, No. 3 Autemn 1974.

7. Kendrick, John W. "Postwar Productivity Trends in the United States, 1948-1969". National Bureau of Economic Research. New York, 1973.

8. Kilby, P. "Organization and Productivity in Backward Economies". Quarterly Journal of Economics. May, 1962.

9. Leibenstein, Harvey. "Allocative Efficiency vs. X-Efficiency". American Economic Review 1966.

10. Roethlisherger, F.T. and W.J. Dickson, "Management and the worker" Cambridge 1939.

11. Sinha, J.N. and P.K. Sawhney. "Wages and Productivity in selected Indian Industries". Institute of Economic Growth, Dehli 1970.

12. Winston, G.C. "Capital utilization in Economic Development" the Economic Journal. Vol. 81. March 1971.