The Pakistan Development Review
43 : 4 Part II (Winter 2004) pp. 685–706

Is Pakistan's Manufacturing Sector Competitive?

IFFAT ARA

1. INTRODUCTION

The manufacturing sector of any country bears significant importance. Globalisation, and in particular, enhanced exports are generally believed to benefit developing countries. And with Pakistan's exports concentrated largely in textile and semi-manufactures, the country needs to strengthen this sector. Since the foreign-currency dominated export prices for developing countries are largely determined in the international market, any downward slide in them exerts a downward slide in foreign-exchange export earnings. It is therefore imperative, for a country like Pakistan, to prevent the decline in manufacturing output, not only to sustain but also to increase the export share and hence to gain external competitiveness in this sector.

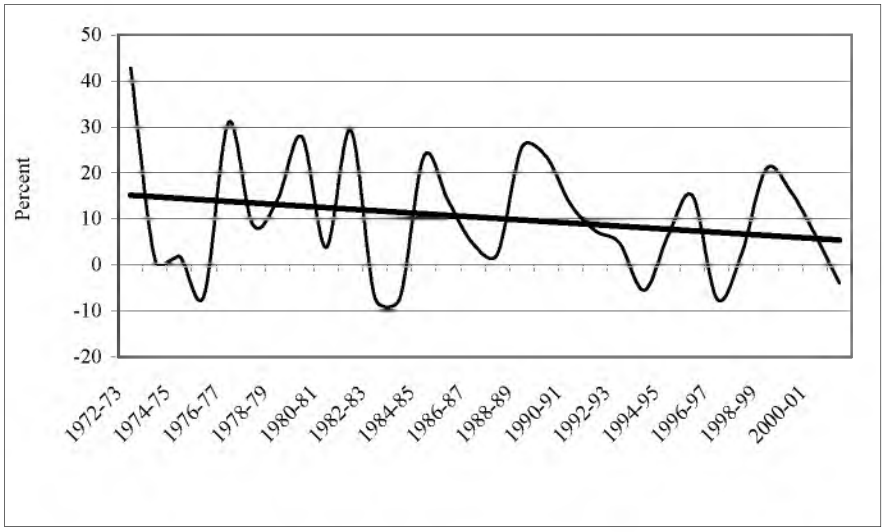
More than 75 percent of Pakistan's exports now comprised of manufactured goods but the data over the period 1974–03, unfortunately, show that real growth in manufactured exports bears a declining trend and very high volatility around the trend (see Figure 1). The data on manufacturing sector GDP (value added) and overall GDP, too, narrates an analogous pattern over the same period (see Figures 2 and 3, respectively). However, in the last three years, there seems slight improvement in the growth of manufacturing output and overall GDP, contrary to the growth of manufactured exports, which continues to show a persistent decline.

A number of studies of have been conducted to assess the performance of manufacturing sector of Pakistan (Section 2 below gives more detail). The findings of these studies generally attribute the lacklustre performance of manufacturing sector to several problems, including too much concentration in industrial products, lack of quality products, less exposure to foreign markets and thus to competition, slow growth of human development, inadequate investment, and lack of research and development. None of these studies explicitly discusses the implications of the problems for cost competitiveness of the manufacturing sector. The present paper attempts to look at the Pakistan's manufacturing sector from this perspective.

Iffat Ara is a Senior Economist at Social Policy and Development Centre (SPDC), Karachi.

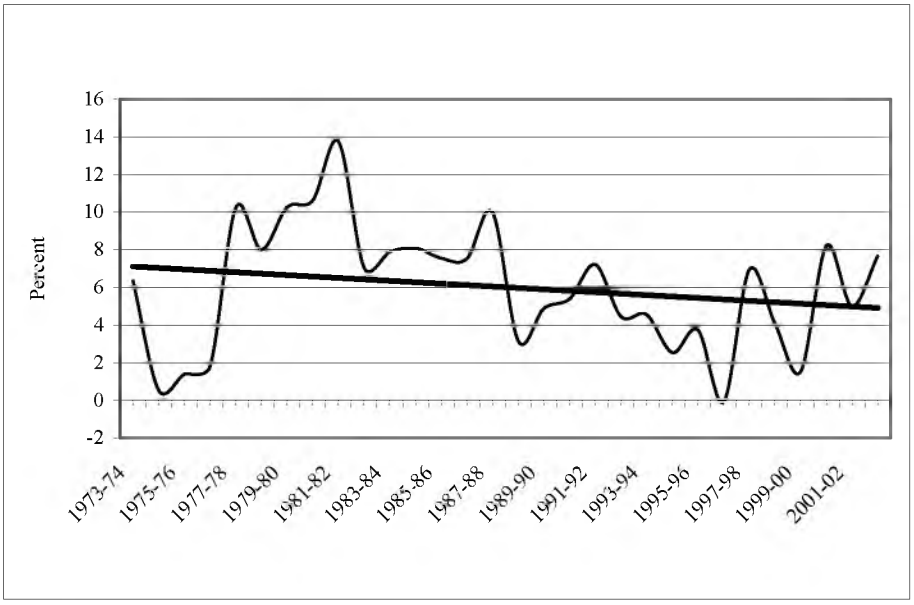
Author's Note: The author is highly indebted to Dr Kaiser Bengali for his guidance in completing this paper. She also gratefully acknowledges the valuable comments and suggestions by Dr Shaghil Ahmed, Mr Mohammad Sabir, and Dr Hafeez A. Pasha on earlier drafts of this paper.

Fig. 1. Growth in Real Manufacturing Export.



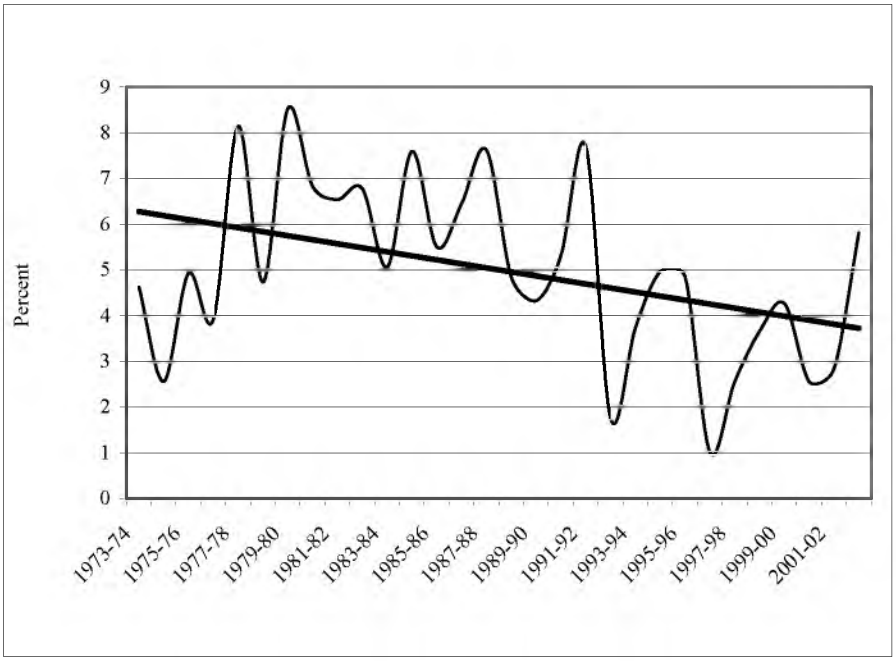
Source: GOP, *Economic Survey.*

Fig. 2. Growth in Real Manufacturing Value Added.



Source: GOP, *Economic Survey.*

Fig. 3. Growth in Real GDP.



Source: GOP, *Economic Survey*.

A country can enhance its external cost competitiveness in any sector, including manufacturing sector, by reducing its unit cost of production relative to those of other countries. This can be achieved either by having lower input prices *or* higher productivity (i.e. getting more output for any given quantity of inputs) *or* a more depreciated domestic currency. This paper focuses on the first two aspects to analyse the competitiveness of manufacturing sector of Pakistan. Note that due to data limitations, the paper does not directly compare cost competitiveness of Pakistan's manufacturing sector with those of its potential competitors. Rather it analyses cost competitiveness by comparing cost/input prices with export [output] price.

A major problem one confronts in doing research on manufacturing sector of Pakistan is the lack of availability of adequate data. The Census of Manufacturing Industries (CMI) is the only major source of detailed data on Pakistan's manufacturing sector and, unfortunately has not been published after 1995-96. Due to this, analyses on manufacturing sector have used data up to that point of time only. This paper, to a certain extent, overcomes this problem by using input prices to construct a composite input price index, rather than the exact unit cost values, which

can be computed only until 1995-96. In this way, the paper is able to conduct an analysis from 1973 up to the present, rather than stopping in 1995-96.

Specifically, this paper has two objectives. The first is to compare the trend of input and output prices. To achieve this, it constructs a composite index of input price and compares it with export price as a proxy for output price, since the main focus is on external competitiveness. The second objective is to compute the total factor productivity (TFP) of the manufacturing sector in order to examine the pattern and to observe whether the growth in it has strengthened the competitiveness of manufacturing sector.

Broadly speaking, the period covered in the paper is characterised by a major shift in economic policies after 1988 since when Pakistan has pursued policies of openness and trade liberalisation. Trade liberalisation included removal of quantitative restrictions, reduction of tariffs and making the exchange rate more flexible. This paper does not directly analyse the impact of these policies on cost competitiveness; rather it looks at how did the variables—that affect cost competitiveness—behave before and after pursuing the openness policies. In fact, the entire period is divided into four sub-periods: 1974–88, a period before trade liberalisation; the rest of the period is divided into three sub-periods of equal length with 1989-93, a period when the implementation of these policies was in the initial stages; 1994-98 and 1999-03, periods when actually the pace of implementation has increased. The paper follows these sub-periods for overtime comparison in the entire analysis.

The remainder of the paper is organised as follows: Section 2 presents the review of existing literature, Section 3 discusses the methodology used in the paper, Section 4 gives the overview of the input cost and prices, Section 5 explains the results and finally Section 6 concludes the paper.

2. PREVIOUS RESEARCH

Most of the research conducted on the manufacturing sector of Pakistan over the last two decades estimates a production function that allows the analysis of elasticities of substitution between different inputs, particularly between capital and labour. These include Khan and Burki (1999); Khan and Rafiq (1993); Zahid *et al.* (1993); Chisti and Mahmood (1991); Batttese and Malik (1987, 1988); Khan (1988, 1989); Kemal (1981). Studies have also focused on protection structure and industrial inefficiencies [Kemal (1998)], analysis of capacity utilisation and its major determinants [Kalim (2001); Pasha and Qureshi (1984)], exploration of employment potential in different industrial categories [Kalim (2001a)]. Little attempt, however, has been made, so far, to directly study the pattern of production cost of the manufacturing sector and to analyse changes that have occurred in this pattern overtime.

Moreover, as far as in TFP is concerned, little research has been done on analysing its trend and on integrating the sources of growth in it. Wizarat (2002) computed TFP of the large-scale manufacturing (LSM) sector for the period 1955–91. Her results show an increase in TFP trend in the period 1955-65, stagnation in the period 1966-70 and a decline in the decades of 1970s and 1980s. Moreover, she found that the contribution of TFP to economic growth has been negative (–27 percent), on average, during the period 1955-91. According to her study economic growth was largely driven by capital (88 percent) and labour (40 percent). IMF (2002) has also computed TFP of the overall economy of Pakistan for the period 1961-2001. The findings indicate that, on average, TFP experienced negative growth in the 1960s (–2.2 percent), positive in the 1970s and 1980s when it peaked to 2.4 percent. However, in the 1990s the growth declined to just 0.6 percent per annum. Furthermore, human and physical capital have primarily bolstered the GDP growth during this period. Pasha, *et al.* (2002) pointed out that the growth of TFP of the manufacturing sector shows a persistence declining trend during the period 1973-98; average annual growth rate of TFP declined from 9.4 percent during 1978-83 to a meagre 1.4 percent during 1993-98. Per annum contribution of TFP in overall economic growth that was 55 percent during 1978-83 declined to as low as 16 percent. They further concluded that human capital has played a leading role in the growth of TFP of manufacturing sector; of the 4.6 percent per annum growth of TFP during 1973-98, 1.8 percent was the contribution by human capital. Sabir and Ahmed (2002) studied the impact of structural adjustment policies on TFP, concluded that, although, the average growth in overall TFP of the overall economy has declined from 2.8 percent in the pre-reform period (1973-88) to 0.7 percent in the post-reform period (1988-02), in the manufacturing sector it declined from 5.9 percent to 1.9 percent, respectively during these two periods. In addition, their results indicate that during pre- and post-reform periods, the relative contribution of TFP to overall value added has declined from 48 percent per annum to 16 percent per annum whereas in the manufacturing value added its contribution has declined from 79 percent per annum to 45 percent per annum. They also noticed that human capital has been the major factor that contributed to TFP growth during these periods.

3. METHODOLOGY

This section discusses the methodologies that are employed to meet the objectives of the paper.

3.1. Composite Input Price Index

The paper analyses the trend in input cost of the manufacturing sector of Pakistan by focusing on input prices. For this, it constructs composite price indices for factor and non-factor inputs separately. The composite input price index is the

aggregate index of different input prices, where each input price is weighted by the share of that input in total cost of the selected sectors of manufacturing (see Appendix A).[1] These shares are obtained from the Census of Manufacturing Industries (CMI), which provides data on large-scale manufacturing constituting over 72 percent of total manufacturing value added. Prices of major factors of production like capital and labour "factor inputs" are considered separately from prices of other inputs "non-factor inputs". Details of the components of cost shares along with the input price that apply to them are given in Box 1.

Box 1

Cost Components with Relevant Input Price

Factor Cost Component	**Relevant Factor Input Price**
Capital	
Depreciation	Import unit value of machinery and transport
Rent paid on fixed assets	Import unit value of machinery and transport
Interest paid on loans	Weighted average rate on advances
Labour	
Employment cost	Wages in manufacturing sector
Non-Factor Cost Component	**Relevant Non-Factor Input Price**
Raw material local	Wholesale price index of raw material
Raw material imported	Weighted average import unit value of crude materials and chemicals
Fuel and electricity	Wholesale price index of fuel, lighting and electricity
Net non-industrial cost*	Implicit GDP deflator

*This includes net of payments for transports; insurance payments; copyrights royalties; post, telegraph and telephone charges; printing and stationary cost; advertising expenses and others.

[1]These selected sectors cover over 84 percent of the value-added in the large-scale manufacturing.

A fixed share methodology is employed to construct the composite input price index for the period 1972-73 to 2002-03. Analysis using variable cost shares is not possible because the CMI has not been published after 1995-96. Cost shares for the year 1985-86 are used as weights because this year is the mid-point of the sample period and is representative in the sense that this year's values are close to the mean over the period for which CMI data are available.

After weighting input price series by the respective cost share a weighted input price index, $WIPI_{j,t}$, for each sector is obtained. That is:

$$WIPI_{j,t} = \sum_{i=1}^{8} \omega_{i,j} P_{i,t} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where $P_{i,t}$ is the price of the input I at time t, $\omega_{i,j}$ is the share of *ith* cost component in total cost of sector j, I=1... 8, j=1... 14 and *t=time period 1972-73, 1973-74, ..., 2002-03*.

A composite input price index, $CIPI_t$, is then constructed for the entire sectors, which can be written as

$$CIPI_t = \sum_{j=1}^{14} \nu_j WIPI_{j,t} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

where v_j is the share of sector *j's* cost in the total cost of entire sectors. Note that there is one $CIPI_t$ for factor input prices and one for non-factor input prices.

3.2. Total Factor Productivity

Gain in output that cannot be attributed to increases in the use of measured inputs (capital, labour) is a result of technical progress, which makes possible the attainment of any given increase in output with a smaller increase in both or any of the inputs. And the measure of this technical progress in production process is called total factor productivity (TFP).

To measure TFP the paper uses the standard growth accounting framework introduced by Solow (1957). He formulated productivity measures in a production function context by focusing on neutral shifts in technical change. If the output is modelled in a Cobb-Douglas production function then

$$Y = AK^{\alpha}L^{\beta} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

where Y = value added, K = capital, L = labour, A = total factor productivity, α and β are capital and labour shares respectively.

With constant returns to scale, that is $\beta = 1-\alpha$, it is apparent from this equation that TFP is the quantity of output per unit of a geometrically weighted quantity of all inputs used in the production process. Put differently, technical change (the growth

rate of TFP) can also be measured as a rate at which production function shifts overtime. For this, Equation (3) can be rearranged to give:

$$g^Y = g^A + \alpha g^K + \beta g^L \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

where g is the growth rate. Since all the variables are observed except g^A, it therefore can be computed by rearranging the production function as follows:

$$g^A = g^Y - \alpha g^K - \beta g^L \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

To compute TFP the postulated shares of capital and labour, α and β respectively, are obtained from the production function estimates of SPDC (2002) Integrated Social Policy and Macroeconomic (ISPM) Model. The Model estimates a production function subject to the constraint that α and β add up to 1.[2]

Data Sources

The series for capital stock has been computed by using the following evolution identity for the capital stock and an initial level of capital stock K_o.

$$K_t = K_{t-1}(1-\delta) + GI \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

where K_t is current capital stock, K_{t-1} is the initial capital stock, GI is gross investment, δ is rate of depreciation (2.5 percent in this case).

Data for input price indices, manufactured export price index, value added, gross investment, manufactured exports and the exchange rate are taken from GOP, *Economic Survey* (Various Issues); interest rate on advances from SBP, *Statistical Bulletin* (Various Issues); labour force and wages from FBS, *Labour Force Survey* (Various Issues).

4. OVERVIEW OF THE INPUT COST AND PRICES

As it is known that output depends on capital, labour and other intermediate inputs and the cost depends on the amount spent on employing these inputs to produce a certain level of output. In this connection, the paper looks at the share of different cost components in the manufacturing sector and also sees the trend of input prices faced by this sector.

4.1. Input Cost Structure

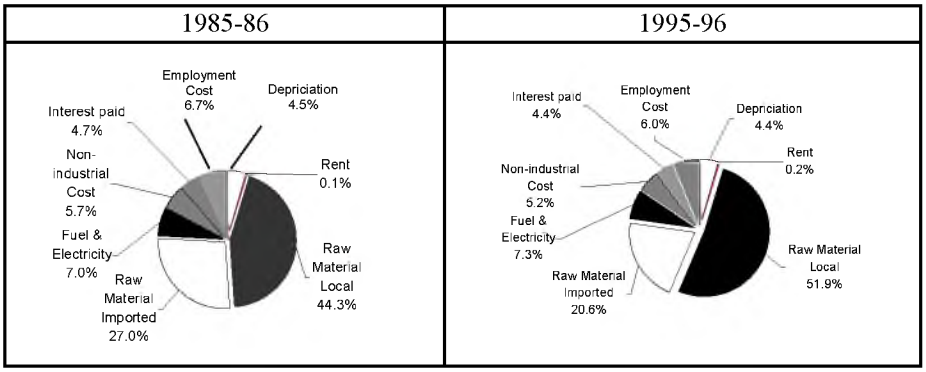
To explain the cost structure the variables and data used are obtained from CMI as discussed in Sub-section 3.1. Different sectors are selected at the 3-digit and

[2]The production function estimated in the ISPM model contains both quantity as well as quality of labour force. The quality is captured by incorporating the total number of employed labour force and the quality by augmenting in production function the human capital index.

5-digit levels, which are then classified into two broad categories. One is the textile and apparel sector and the other non-textile sectors. The non-textile sectors are comprised of those industries that are already exporting part of their output, as well as those where export potential can be created in order to diversify Pakistan's exports (see Appendix A).

To begin with, the paper explains the aggregate cost structure of these selected sectors. The pie charts in Figure 4, which show a comparison of 1985-86 and 1995-96, gives the expenditure (cost) share of each of these components in total production cost. In both the sub-periods, most of the cost expenditure falls within the category of raw materials, as evident from their cost shares. The highest share in the cost of production is occupied by the cost of local raw material followed by imported raw material. Over the period of ten years, the former shows an increase (from 44 percent to 52 percent) while the latter a decline (from 27 percent to nearly 21 percent). However, the combined share of local and imported raw material has not changed much over this period (about 72 percent in both sub-periods). Fuel and electricity is the third largest cost expenditure followed by employment cost. The share of fuel and electricity in total cost has risen slightly from 7 percent to 7.2 percent whereas that of the employment cost has dropped by 0.7 percentage points. The share of non-industrial cost in total cost has declined marginally by 0.6 percentage points. Of the cost components that represent the cost of capital, the shares of interest paid and depreciation have declined while that of rent paid on fixed assets has increased slightly.

Fig. 4. Cost Shares—All Sectors.



Cost structure of textile and apparel sector and non-textile sectors, respectively, are portrayed in Figure 5 and Figure 6. In case of textile sector too, local raw material occupies the highest share (over 66 percent) in total cost followed by imported raw material (over 7 percent). Although, the cost on employment was

Fig. 5. Cost Shares—Textile Sector.

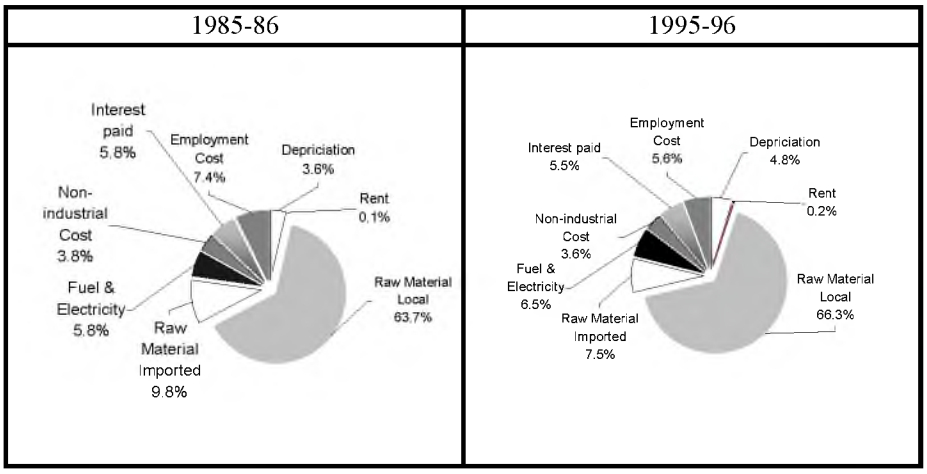
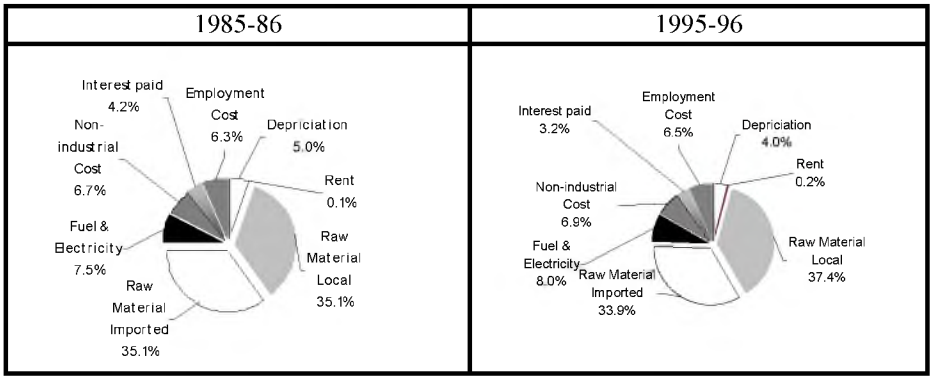


Fig. 6. Cost Shares—Non-Textile Sectors.



the third highest component in the total cost expenditures followed by fuel and electricity in 1985-86, this pattern was reversed in 1995-96. Over the period 1985-86 to 1995-96, a significant decline has occurred in the share of employment cost from 7.4 percent to 5.6 percent. Modest increases in the cost shares of fuel and electricity and local raw material are also seen. The shares of depreciation, rents and interest paid in total cost have increased from 9.5 percent to 10.5 percent, primarily on account of increase in the share of depreciation cost.

In case of non-textile sector, the cost shares of both local and imported raw material were about the same, at 35 percent in 1985-86 while in 1995-96 the cost share of local raw material has increased to over 37 percent and that of imported raw

material has declined to 34 percent. The cost share of fuel and electricity also has gone up by 0.5 percentage points during this period. The shares of depreciation, rents and interest paid declined from 9.3 percent to 7.4 percent whereas the share of employment cost is nearly the same.

4.2. Input Prices

This sub-section examines the growth in input prices for the period 1974-2003, and compares them with the growth in general price level (overall inflation) in the economy as measured by the GDP deflator. Input price indices are taken in accordance with the cost components discussed above. Wholesale price index of raw material is taken to represent the input price of local raw material; import unit value indices of chemicals and crude materials for imported raw material as these are the major imported inputs used by the manufacturing sector; wholesale price index of fuel, lighting and lubricant for input price of energy; rate of advances for interest paid on loans, import unit value of machinery and transport for depreciation and rent and wages for employment cost.

Table 1 gives the average annual growth rates of these input prices for the entire sample period and for different sub-periods. It reveals that the growth in the prices of energy, machinery and transport and wages have stayed higher than that of the overall inflation during the entire period. Maximum growth has occurred in the price of energy i.e. by 13.6 percent per year followed by the price of machinery and transport and wages, which have grown, on average, by 11.6 percent and by 10 percent, respectively. In contrast, the growth in GDP deflator has remained at 9 percent per annum. Prices of other inputs like local raw material has grown by 9 percent, imported chemicals by 8 percent and crude material by 7 percent. However, the growth in rate of advances has been 1 percent per annum.

Table 1

Major Input Prices and GDP Deflator
(*Average Annual Growth Rates*)

	Factor Inputs			Non-factor Inputs				
	Capital				Raw Material Imported			
Period	Machinery and Transport	Rate on Advances	Labour Wages	Raw Material Local	Chemicals	Crude Materials	Energy	GDP Deflator
1974-03	11.64	1.10	10.18	9.36	8.16	7.04	13.57	9.21
1974-88	15.75	3.26	12.42	9.86	8.41	5.62	15.71	10.06
1989-93	10.98	2.18	10.69	8.71	7.78	10.37	8.03	9.37
1994-98	5.44	2.91	12.86	14.30	10.20	10.40	14.91	11.21
1999-03	6.17	–8.27	0.26	3.57	5.74	4.59	11.32	4.49
Prices in 2003 as a Ratio of Prices in 1973								
2003–1973	20.82	1.27	15.49	13.33	9.36	7.25	40.24	13.65

Source: GOP, *Economic Survey* (Various Issues); SBP, *Statistical Bulletin* (Various Issues); FBS, *Labour Force Survey* (Various Issues).

Further insights of the input price pattern emerge when looking at the four sub-periods. In the pre-liberalisation period, 1974-88, the highest growth is observed in the prices of energy and machinery and transport, followed by wages. Both the prices of energy and machinery and transport grew, on average, at a rate of almost 16 percent and growth in wages remained at 12.5 percent per annum. Moreover, the growth rate of these prices was higher than that of the overall inflation in the economy, which grew at 10 percent per annum.

In the initial post-liberalisation period, 1989-93, average annual growth in the prices of all inputs slowed down, except those of crude materials. A massive increase, almost a doubling, occurred in the growth rate of crude materials price. Although, the growth in the price of machinery and transport and wages went down in this sub-period, these were still outstripping the growth in overall inflation. During the period, 1994-98, when the functioning of liberalisation policies got speeded up, the per annum growth in the prices of energy, local raw materials, import price of chemicals and wages went up sharply. A big jump is seen in the average annual growth rates in the price of energy, which on average, grew up by 6.9 percentage point higher than that in the period 1988-93. This is followed by the increase in the rate of growth of local raw material price, which on average rose by 5.6 percentage points higher as compared to that in the period 1989-93. Compared to growth of overall inflation in the economy, the growth in energy price was 3.7 percentage points higher and that of local raw material was 3.1 percentage points higher. Finally, in the recent period 1999-03, almost all the input prices grew considerably less faster. The growth in the rate of advances and wages declined tremendously. The rate of advances depicts a negative growth, on average, which is due to government policy of lowering lending rates since 1999. Similarly, the per year growth in wages from 12 percent moved down to just 0.26 percent. Pace of reforms has increased where the tariff rates have been reduced significantly. This is reflected in the prices of imported raw materials (crude materials and chemicals) whose growth rates show a notable decline. In spite of this, the growth rate in the prices of imported raw materials and energy has remained above to that of the overall inflation. Alarmingly, the average annul growth rate in energy prices is more than double compared to that of the overall inflation in the economy.

The last row of Table 2 sees the increase in current prices of inputs and overall inflation compared to what they were in 1972-73. It shows that inflation in the economy over this thirty-year period has gone up by over 13 times. With respect to this, it is worth mentioning that now energy price is 40 times higher to what it was in 1972-73 (see Figure 7). Comparison of the increase in the price of imported machinery since 1972-73 indicates that at present it has gone up by almost 21 times. It is to be noted that this is the major component of investment and also no substitute for this input is available. The persistent rise in its price explains that how the cost of investment is increasing overtime. The wages in the manufacturing sector have also

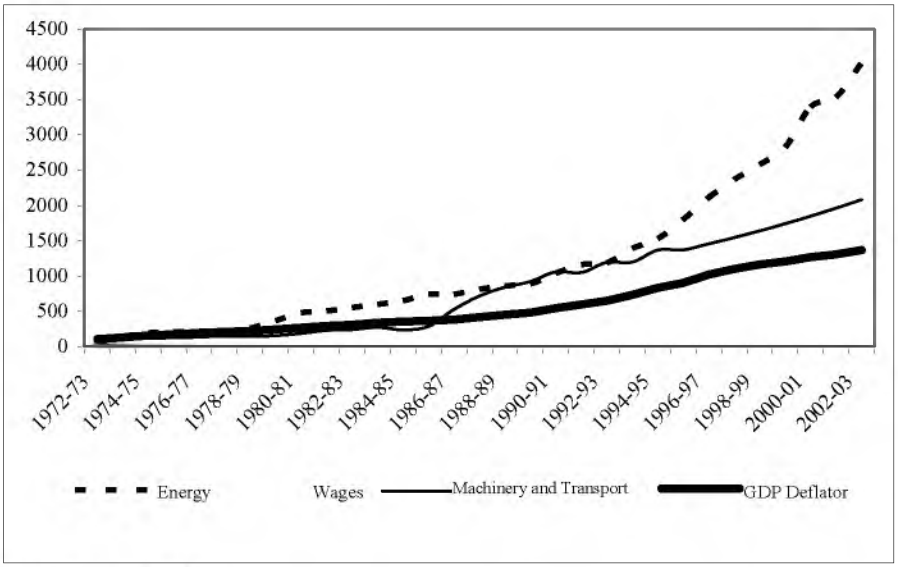
Table 2

Composite Input Price and Export Price and TFP
(Average Annual Growth Rates)

Year	Factor Price Index	Non-factor Price Index	Total Factor Productivity (TFP) Index	Difference in Factor Price and ME Price Growth	Manufactured Export Price Index		Depreciation of Nominal Exchange Rate
					In Rs	In $	
1974-03	8.88	8.88	2.41	0.96	7.93	2.02	7.95
1974-88	10.88	8.89	3.24	2.40	8.48	4.96	8.99
1989-93	9.70	8.69	2.03	1.93	7.77	–0.32	7.44
1994-98	8.32	12.76	1.01	–7.31	15.63	4.78	9.58
1999-03	2.65	4.86	1.52	3.93	–1.28	–7.21	5.71

Source: Author's estimates based on data sources mentioned in Table 1.
Note: Difference in Factor Price and Manufactured Export Price Growth are in percentage points, the rest of the variables are reported in percentages.

Fig. 7. Comparison of Input Prices and GDP Deflator (Index 1972-73=100).



Source: Same as in Table 1.

gone up by 15.5 times. Similarly, the price of local raw material has also increased considerably. Currently it has increased by over 13 times compared to what they were in 1972-73. The interest rates, on the other hand, have gone up by only 1.3 times.

The question now arises: Has the documented faster growth in input prices compared with overall inflation eroded the profitability of Pakistan's manufacturing firms, or has the productivity increases more than offset this? Answer to this is presented in the next section.

5. RESULTS AND EXPLANATION

This section discusses the results of the comparison of input prices to the export price and of the computation of TFP.

5.1. Composite Input Price Index and Export Price Index

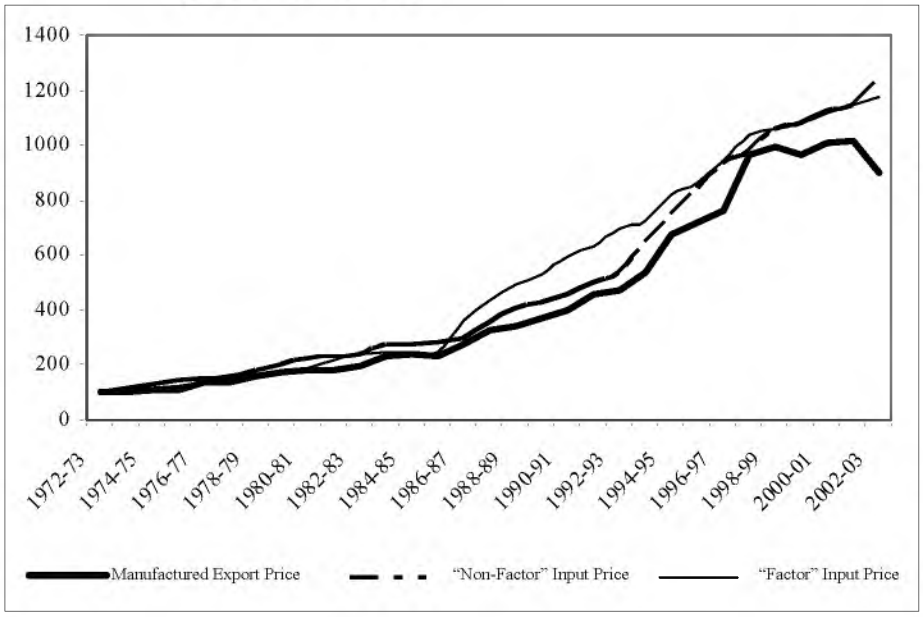
This analysis relies on input and output price indices to examine the trend in input cost and return on output, respectively, which obviously cannot provide any information about absolute cost and return. However, these indices do provide a comparison, in relation to a base year, of the movement of cost and return over the period 1972-73 to 2002-03.

Since this paper attempts to assess the external competitiveness of manufacturing sector it, therefore, focuses on export price (rather than output price) of manufactured goods, which is determined in the international market. Export price index in terms of Pak-rupee is considered here.

Figure 8 depicts the composite price index of both factor and non-factor inputs along with manufactured export (ME) price index for the period 1972-73 to 2002-03. It is telling that in almost all the years of this period the index of both factor and non-factor input price has remained higher than the index of export price. This indicates that the growth rate of input prices, both factor and non-factor has been higher than that of the export price during this period. More than that it says that at each point in time after 1972-73 "cumulative growth" in factor and non-factor input prices has been greater than that in manufactured export price. This difference in the indices of input and export price was somewhat marginal up till 1986-87 but after that both the factor and non-factor input price indices are significantly higher than the export price index where the gap between the two has been swelling overtime. Relative to their levels in 1972-73, the factor price index has risen by about 35 times in 2002-03, non-factor price index by almost 38 times while ME price index has increased by nearly 28 times.

Other things equal, higher growth in input prices relative to that of the export price points towards the squeezing of profit margins in the manufacturing sector. And this creates the concern that if this situation goes on, over the course of time, the profits eventually will become negative and put some out of business. But other things are not equal. And the paper investigates whether the changes in TFP have more than offset the erosion of profits implied by the differential growth rates of input price and export price. To this end, the paper computes TFP of the manufacturing sector and then adjusts the differential between factor price index and export price index by TFP index so as to incorporate, into this differential, the effect of change in productivity.

Fig. 8. Composite Input Price and Manufactured Export Price (Index 1972-73 = 100).



5.2. Total Factor Productivity (TFP) Index

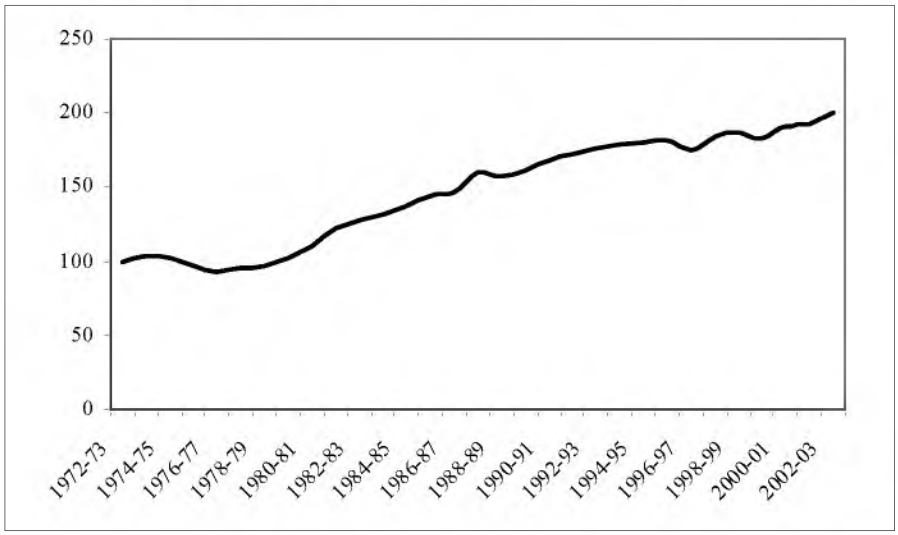
For the computation of TFP of manufacturing sector the estimated factor share for capital is 0.75 and for is labour is 0.25. These shares are obtained from ISPM model, as mentioned in Section 3.

Figure 9, which portrays the series of TFP index, shows that although TFP is increasing over the period 1973-03, its rate of growth has slowed down. The question arises: have productivity increases kept pace to the extent to which input prices have risen faster than export price. The paper turns to this question below.

5.3. Movement of Input and Export Prices and TFP

Period-wise growth in composite indices of factor and non-factor input price, ME price index and TFP index is considered in Table 2. In the pre and earlier liberalisation policies periods the growth, on average, in the factor and non-factor input prices was higher than that in the rupee export price. In the pre-reform period, 1974-88, the average annual growth in factor and non-factor price was, respectively, 2.4 and 0.5 percentage points higher than that in the rupee export price. In the period, 1989-93, the gap in the growth rate of factor price and export price, on average, reduced to 1.9 percentage points while that in the growth rates of non-factor price and export price increased to 0.9 percentage points. However, the situation reversed

Fig. 9. Total Factor Productivity Index (Index 1972-73=100).

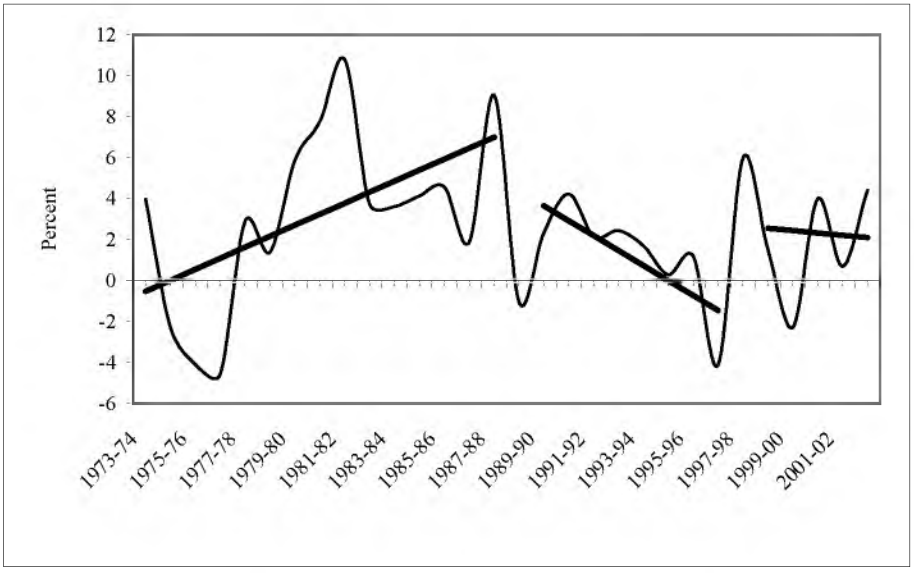


in the period 1994-98 when export price increased relatively faster than the input prices. Recently, the period 1999-03 although yield a significant decline in the growth of factor and non-factor input prices but at the same time there has also been negative growth in export price.

Table 2 also shows that the average growth in TFP has declined after the period 1974-88, albeit sharply, on average, in the period 1994-98. It does, however, pick up after 1999 but is still modest in contrast to that it was in the period 1974-88. Compared to the average annual growth in the period 1974-88, the growth in TFP declined by 1.2 percentage points (38 percent) in the 1989-93, by 2.2 percentage points (69 percent) in 1994-98 and by 1.6 percentage points (49 percent) in 1999-03. Figure 10 depicts the trend of the TFP growth. It shows that growth in TFP acquires an upward trend till 1987-88 and a persistent downward trend afterwards. However, in the period 1999-03, the trend line has rotated in the upward direction which indicates an improvement in TFP growth. Note that, earlier studies also have illustrated a declining trend of TFP growth, although their exact magnitudes are different.[3]

[3]The difference in the magnitude of TFP growth rate might have arose because of the difference in capital stock series employed by these studies. Wizarat (2002) took gross investment from Census of Manufacturing Industries (thus for large-scale manufacturing only) and applied 5 percent rate of depreciation on it. She used capital at end of the year as gross investment. Pasha, *et al.* (2002); Sabir and Ahmed (2002) took private investment in the entire manufacturing sector with a depreciation rate of 10 percent to compute capital stock series.

Fig. 10. Growth in TFP along with Trend Line.



Source: Author's Estimates.

5.4. Net Productivity

Knowing that although the growth in TFP is slowing down overtime, it remains to see whether it has backed up in sucking up the faster growth in the prices of factor inputs. This can be illustrated with the help of "net productivity" growth. Given the growth in TFP, factor input price (FIP) and manufactured export price (MEP), the paper defines net productivity (NP) growth as:

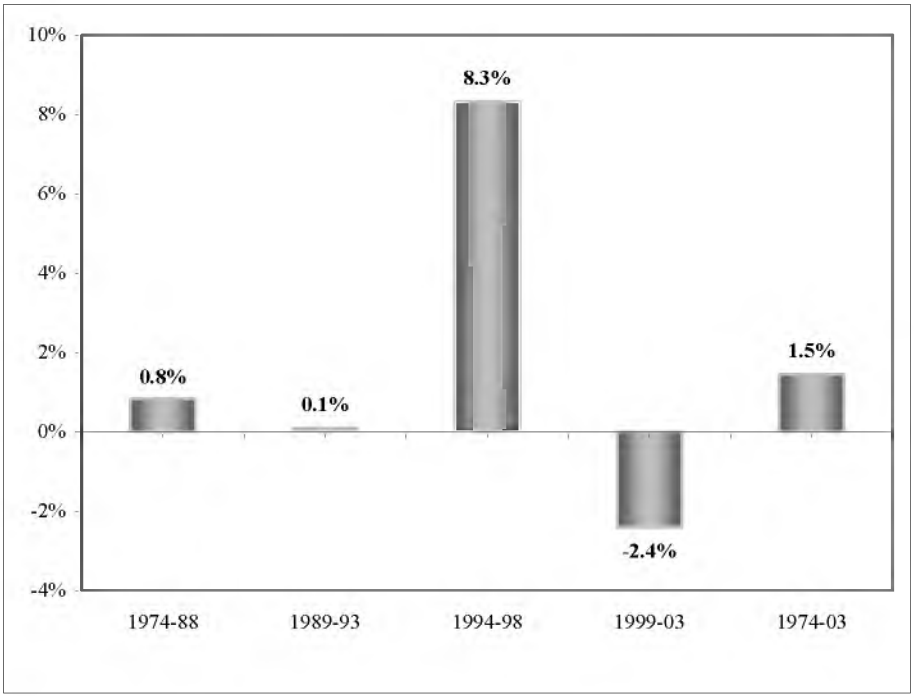
$$g^{NP} = g^{TFP} - \left(g^{FIP} - g^{MEP}\right)$$

where g represents the growth rate.

The idea behind the computation of net productivity is primarily to see how much the growth in productivity is offsetting the factor input price growth over export price growth. It may possibly be said that any increase in productivity beyond this would off course be advantageous for producers.

The growth in net productivity is depicted in Figure 11. Over the entire period 1974-03, the difference between factor input and export price has been 0.96 percentage points per annum (see Table 2), which entail that TFP must grow, at least, by 0.96 percent to offset this differential. As it turned out that TFP has grown, on average, by 2.4 percent over this period and so a positive growth in net productivity has been maintained. The picture, nonetheless, is very much diverse over different

Fig. 11. Growth in Net Productivity.



Source: Author's Estimates.

sub-periods. In the sub-periods 1974-88 and 1989-93, the difference in the growth rates of factor input and export price is less than the growth rate of TFP, which resulted in positive net productivity growth although at less that one percent per annum. In the period 1994-98, the net productivity grew by 8.3 percent per annum. This growth nonetheless could not be attributed to the growth in TFP as it grew, on average, by only one percent in this period. The force that derived this was the faster growth in export price relative to factor price. The sharp increase in the rupee export price happened due to significant growth in US dollar (international) export price (4.8 percent) accompanied by a massive growth in the depreciation of nominal exchange rate (9.6 percent). The period 1999-03 indicates an alarming situation when the growth in net productivity has been negative 2.4 percent per annum. Despite the fact that growth in TFP has picked up, it has grown by only 1.5 percent which has not been sufficient to offset the differential between factor input and export price (3.9 percentage points). If the growth in TFP is less than the differential between factor price and ME price growth, it can be said that somewhere in the manufacturing sector the profits are declining.

5.5. Trend in TFP and Manufacturing Value Added

The historical overview of TFP and manufacturing sector value added indicates that among others one major component that derives the growth of value added in the manufacturing sector of Pakistan is the growth of TFP. This is depicted by year-to-year movements of TFP and large-scale manufacturing value added in Figure 12. These movements show that they are highly correlated with correlation coefficient stands at 0.89.

Fig, 12. Trends in TFP and Real Manufacturing Value Added.

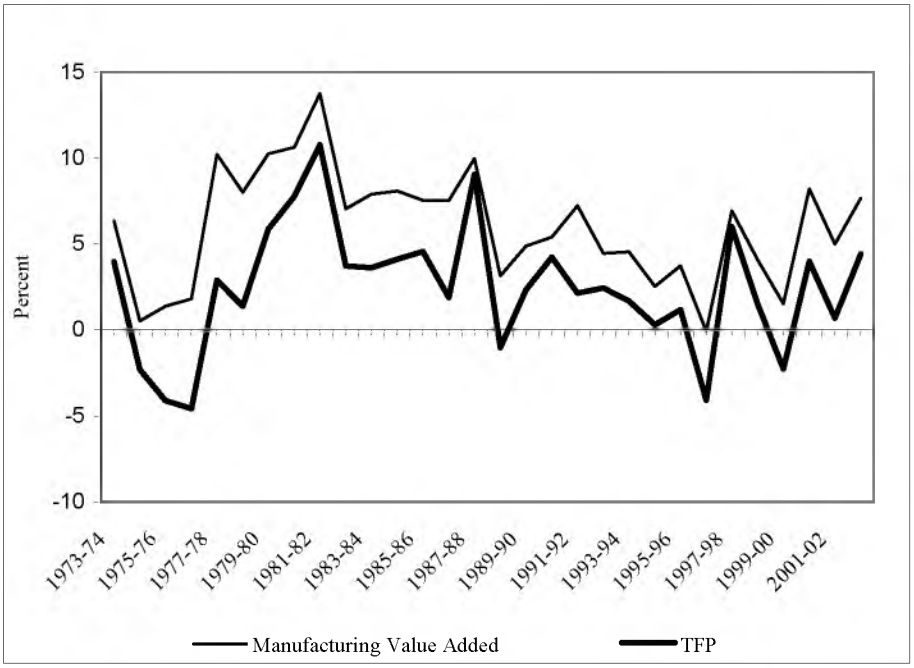


Table 3 points out that average growth in both TFP and value added has been highest in the period 1974-88 when they grew at a rate of 3.3 percent and 7.4 percent respectively. Later their growth, on average, declined in the two subsequent periods and then picked up in the period 1999-03. The decline in the growth of TFP and value added in the sub-period 1989-93 over 1974-88 was by 33 percent and 32 percent respectively while in the sub-period 1999-03 they both increased by almost 50 percent. This finding again strengthens the need to concentrate on the growth of TFP.

Table 3

TFP and Real Manufacturing Value Added

Period	Rate of Growth (%)		% Change in Rate of Growth	
	TFP	Value Added	TFP	Value Added
1974-03	2.42	6.01	–	–
1974-88	3.29	7.40	–	–
1989-93	2.20	5.02	–33.13	–32.19
1994-98	1.02	3.53	–53.48	–29.58
1999-03	1.52	5.30	48.93	49.87

Source: Author's estimated based on data sources mentioned in Table 1.

6. CONCLUSION

The paper has assessed the competitiveness of manufacturing sector of Pakistan by comparing the trend in the growth of factor and non-factor input prices with that of overall inflation in the economy and export price. To make this comparison more meaningful the paper has also looked at the trend in the growth of productivity. It has found that over the period 1972-73 to 2002-03, the price of energy, price of machinery and transport and wages have grown faster than the general price level. Moreover, both the composite factor input price index and composite non-factor input price index have grown at a rate higher than that of export price index. This raises the cancers that profits in the manufacturing sector are eroding over the sample period. And if it continues then it is likely that with the passage of time it becomes very hard for exporters to stay in business—especially in the new quota free environment. In this regard steps should be taken to curtail the growth in input prices, particularly the price of energy and raw material. For instance, growth in energy prices can be addressed through proper government policies. It can be said that increase in petroleum price, to an extent, comes from outside (as linked to international price) but increase in electricity price is a burden created as a result of domestic policies, which creates a burden on manufacturing sector.

The analysis further suggests that even though the growth in productivity is offsetting the negative impact of the growth in input factor prices, over the sample period as a whole, the growth in productivity itself depicts a declining trend. And, for the most recent period, 1999-03, TFP growth has failed even to offset the extent to which input price increases have outpaced increase in the export price index.

Appendix A

Selected Industries from CMI Capturing Over 84 Percent of Value Added

Food
Canning of Fruits and Vegetables
Canning of Fish and Sea Food
Biscuits
Beverage Industries
Cigarettes
Textile and Apparel
Textile (includes Carpets)
Apparels
Ginning and Bailing of Fibers
Leather and Products
Tanning and Leather Finishing
Leather Products
Leather Footwear
Printing and Publishing
Medicines and basic Drugs
Chemicals
Industrial Chemicals
Other Chemical Products
Petroleum Refining and Products
Rubber and Plastic
Non-metallic Mineral Products
Pottery, China and Earthenware
Glass and Glass Products
Other Non-metallic Mineral Products
Basic Metal
Iron and Steel
Non-ferrous Metal Basic Inds.
Metal Products, Machinery, and Equipment
Fabricated Metal Products
Non-electrical Machinery
Electrical Machinery and Supplies
Transport Equipment
Scientific and Measuring Insts.
Photographic and Optical Goods
Handicrafts
Sports Goods

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