Trends in Productivity and Competitiveness Indicators , 1990 to 1997

Introduction

This is the second issue of data series on productivity and competitiveness presenting indicators for the years 1990 to 1997. The first issue, released in July 1997 provided statistics for the period 1982 to 1996. Due to data constraints, indices have been worked out for the total economy and for the overall manufacturing and EPZ sub sector only. Figures for the years 1995 and 1996 have been updated using the revised national accounts and employment data now available while those for 1997 are still provisional.

2. Concept and definition

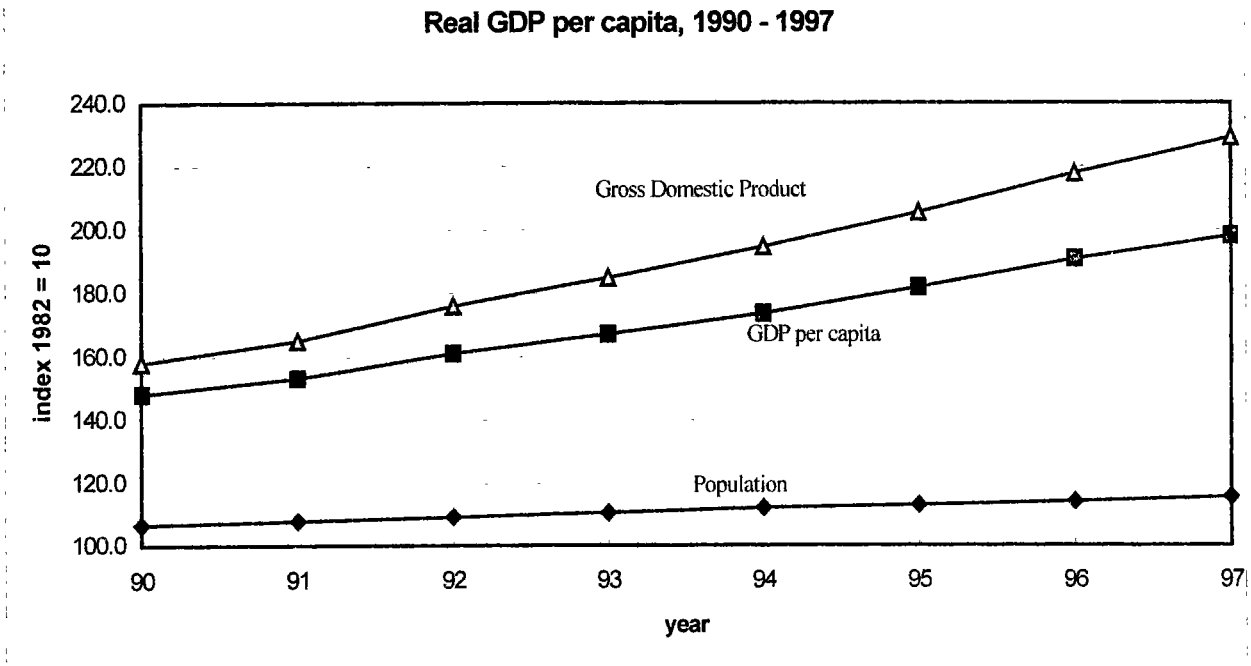
There are many ways of defining and measuring productivity. At national or sectoral level, productivity is measured as the ratio between output as given by value added at constant factor cost and input of labour , by total employment and capital, by the stock of fixed capital used (constant price estimates). Whilst the ratio of output to labour input gives a partial labour productivity, and output to capital, the partial capital productivity, multifactor productivity measures output against both labour and capital. More details are given at section on concept and definition.

Labour productivity and unit labour costs have an inverse relationship. An increase in labour productivity represents a decrease in the amount of labour input needed to produce a unit of output. Thus growth in productivity reduces unit labour costs which in turn may lead to an increase in output and hence, to an increase in competitiveness. A wide range of indicators can be used to measure competitiveness, namely, unit labour cost, real effective exchange rate, net export ratios. The emphasis in the present study is on unit labour cost.

Since productivity statistics are derived from ratios, they should be used and interpreted with caution. The emphasis should be on a study of trends as opposed to levels.

3. Gross Domestic Product per capita

The total value of goods and services produced in the country in a year is given by the Gross Domestic Product (GDP). Growth in GDP per capita is commonly used as an indicator of improvement in the standard of living. GDP recorded an average growth rate of 5.4 % over the period 1990 to 1997. As during this period, population increased at the rate of 1.2 % per annum, GDP per capita therefore improved by 4.2 % per annum.



4. Trends in labour, capital and multifactor productivity - total economy.

4.1 Labour productivity

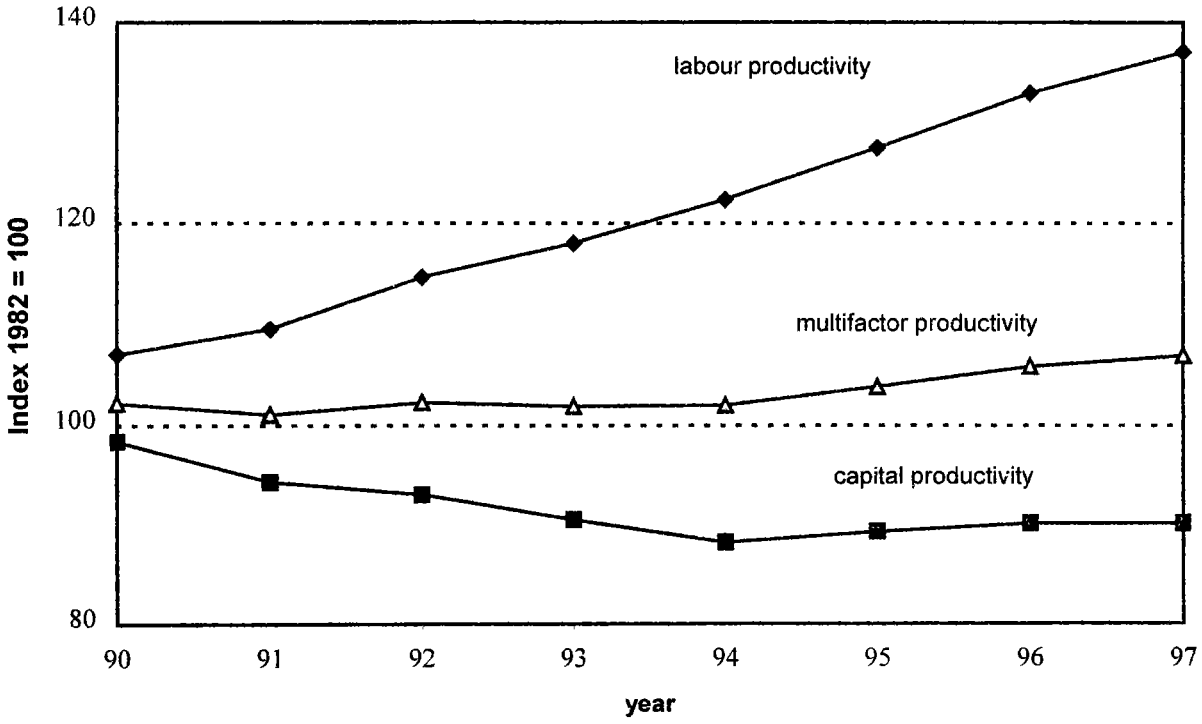
Labour productivity as measured by GDP per worker grew by 3.6 % over the period 1990 to 1997. It is recalled that during this period, employment increased by 1.8 % and total output, that is, GDP at factor cost ,by 5.4% per annum.

The capital labour ratio gives an indication of the capital intensity of the process. Between 1990 and 1997, the capital labour ratio, at national level, increased by 4.9% annually showing that more capital per worker was used to produce one unit of output.

4.2 Capital Productivity

Capital productivity measured by output per unit capital used in the production process shows how efficiently capital assets are being utilised. During the period 1990 to 1997, the capital productivity index dropped from 98.4 to 90.1 showing an average decline of around 1% per annum. The index dropped to 88.2 in 1994 but started increasing thereafter, moving up to 89.3 in 1995 and stayed at 90.1 in 1996 and 1997. It should be noted that capital investment usually has a lagged effect and the low average growth in capital productivity could be an indication of a consolidation phase.

Trends in productivity in the total economy, 1990 - 1997



4.3 Multifactor productivity

Multifactor productivity ,MFP, is defined as the amount of output created by both capital and labour employed in the production process. Growth in multifactor productivity

typically flows from investment in human capital, improved technology, better management systems and optimal resource allocation. As shown in table 2, multifactor productivity shows positive growths of 1.8% in 1995 and 1.9 % in 1996 but on average the increase over the period 1990 to 1997 was 0.6 % .

4.4 Growth accounting

An analysis of the main factors contributing to economic growth also known as growth accounting shows that the overall growth rate was 5.4% per annum over the period 1990 to 1997 ,while capital and labour inputs increased by 6.8 and 1.8 % respectively. A simple average of the weights of input factors was calculated and applied to arrive at weighted factor growth rates. It is found that capital contributed to 67 % and labour, 16% . The share of all other qualitative variables such as management, technology, environment represented by growth in multifactor productivity was 17 %.

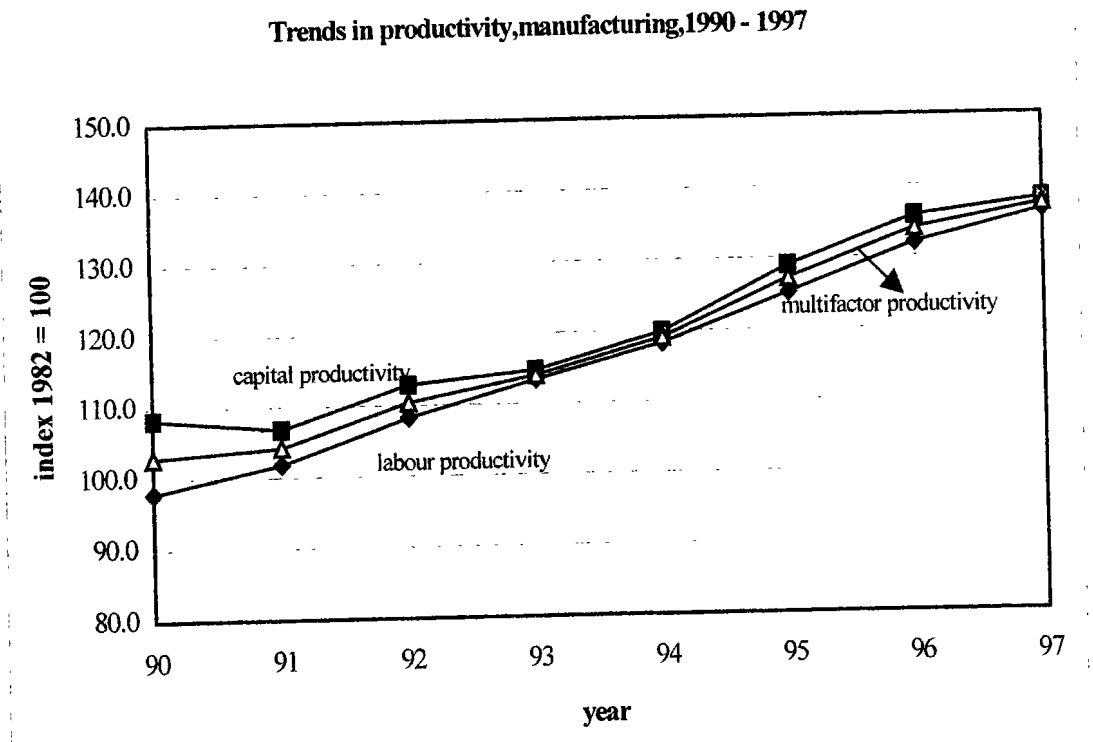
4.5 Unit labour cost, total economy

Unit labour cost is computed as labour cost (compensation of employees) in nominal terms divided by real output. Changes in unit labour cost are determined by changes in labour productivity and changes in compensation per worker. Unit labour cost provides an indication of how competitive the country is in producing goods and services.

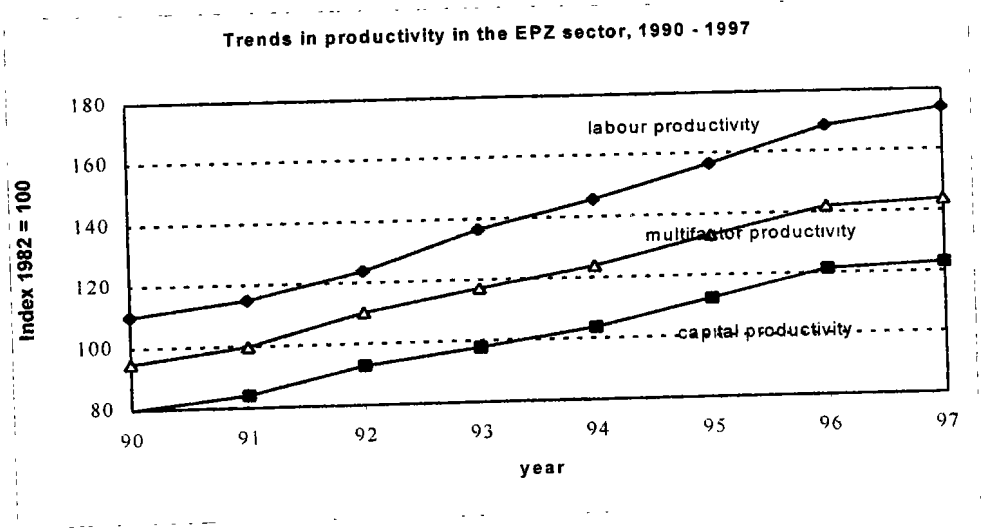
Between 1990 and 1997,unit labour cost at national level increased by 6.2% in mauritian rupees but 1.1% in US dollar. While average compensation rose by 10.1% annually, the labour productivy gains of 3.6% helped to bring down unit labour cost to 6.2%.

5. Trends in labour, capital and multifactor productivity-Manufacturing

Between 1990 and 1997,output of the overall manufacturing sector grew at an annual rate of 5.5 % and the EPZ sub-sector, 5.6 %. This period was marked by a stabilisation in employment with employment at overall manufacturing increasing marginally by 0.6 % annually and that in the EPZ declining by 1.1%. Growth in the stock of capital input was also low recording increases of 1.9 % for all manufacturing enterprises and 0.7% for EPZ industries.



This stabilisation in the two main inputs, labour and capital , resulted in high labour, capital and multifactor productivity performance. Labour productivity for the manufacturing and EPZ sub sector improved by 4.8% and 6.8 %. respectively. Capital productivity also registered high growth rates of 3.5 % and 6.4 % .The combined effect of favourable increases in both labour and capital productivity led to improvement of multifactor productivity which progressed by 4.2 % for manufacturing and 6.1 % for EPZ.

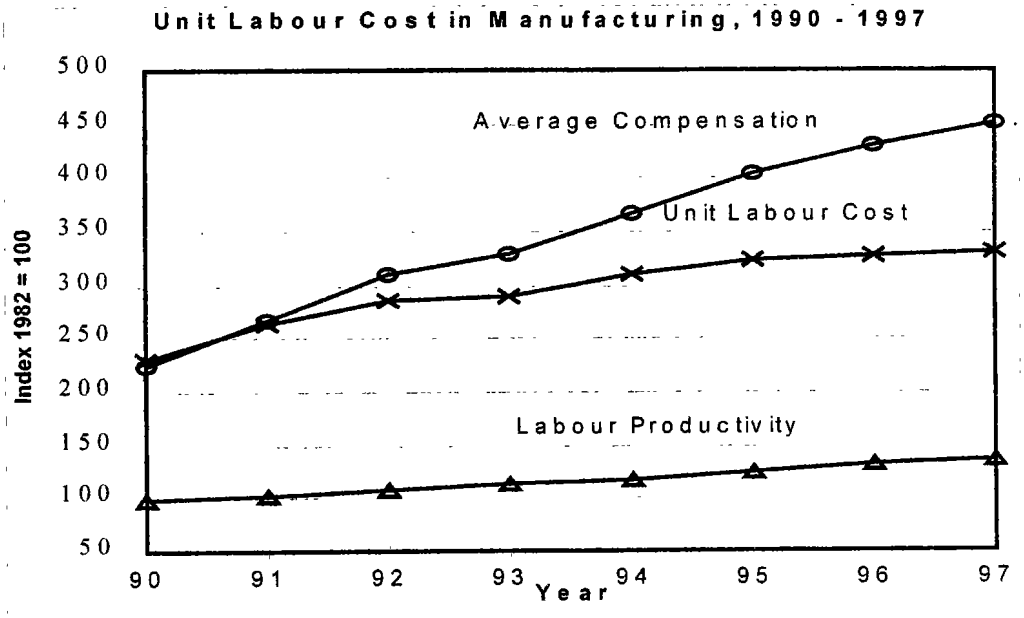


These gains in productivity are a positive sign for our industrial development. It also denotes maturity of the industrial structure and growth that is driven by factors such as efficiency, enhanced product quality ,better management and better economic policy.

6. Unit labour cost-manufacturing

Unit labour cost which is the remuneration of labour required to produce one unit of output increased at an annual rate of 5.3 % in the manufacturing enterprises and by 4.9% in the EPZ sub sector.

Changes in ULC are determined by changes in labour productivity and changes in compensation per employee. Compensation of employees per worker on average increased by around 10 % at overall manufacturing level and 12.0 % in the EPZ enterprises. Gains in labour productivity has definitely helped to bring down unit labour cost. The 6.8 % increase in labour productivity in the EPZ sector contributed to reduce unit labour cost to 4.9% and thereby helped to maintain the competitiveness of our exports.



Relative currency values play an important role in international competitiveness. In examining trends in competitiveness, it is advisable to analyse unit labour cost both in national currency and in US dollar. The US dollar is chosen as it is the currency in which most international transactions are priced.

Between 1990 and 1997, while unit labour cost in manufacturing industries, in mauritian rupees, registered an average increase of 5.3 % , in US dollar, the growth rate works out to only 0.2 % . It is also noted that unit labour cost in national currency , increased by an average of 1.2% during 1996 and 1997 but ,in US dollar , it decline by 6.9%.

The depreciation of the rupee vis a vis the US dollar ,an average of 5.1% annually over the period 1990 and 1997 has to some extent mitigated the loss in competitiveness as measured in national currency .

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Concept and definition.

1.Real output is given by value added at constant prices.

$$\text{Output index} = \frac{\text{Value added (constant price), year n}}{\text{Value added in base year}} \times 100$$

2. Labour input

Labour refers to the total number of persons engaged, that is employers, self employed, contributing family workers and employees in any type of economic activity. Employment for year n is the average number of persons engaged in June of year (n) and year (n+1).

$$\text{Employment index} = \frac{\text{Employment year n}}{\text{Employment in base year}} \times 100$$

3.Capital input

Capital refers to the net stock of investment in reproducible fixed assets. Reproducible fixed assets are investments in residential and non-residential building (excluding land), infrastructural work, machinery and equipment.

$$\text{Capital input index} = \frac{\text{Stock of fixed capital year n}}{\text{Stock of capital in base year}} \times 100$$

4.Labour Productivity

Labour productivity index shows the rate of change in output per person engaged.

$$\text{Labour Productivity Index} = \frac{\text{Output index}}{\text{Employment index}} \times 100$$

5.Capital productivity

The capital productivity index shows the rate of change in output per unit of capital.

$$\text{Capital Productivity Index} = \frac{\text{Output index}}{\text{Capital input index}} \times 100$$

6.Multifactor productivity

Multifactor productivity index shows the rate of change in "productive efficiency", and is obtained as the ratio of the output to a weighted combination of labour and capital inputs. The limitation of partial productivity measures is that they attribute to one factor of production, changes in efficiency that are attributable to other factors. A measure of

growth in efficiency which takes account of changes in the most important factors ; labour and capital is given by the **MFP** growth.

Multifactor productivity index

$$\text{MFP index} = \frac{\text{Output index}}{\text{Multifactor input index}} \times 100$$

$$A(t) = \frac{Q(t)}{\{WL(t) \times L(t)\} + \{WK(t) \times K(t)\}} \times 100$$

WL(t) = Labour's input share in time t

L(t) = Labour input in time t

WK(t) = Capital/gross operating surplus share in time t

K(t) = Capital input in time t

$$WL(t) + WK(t) = 1$$

7.Capital - labour ratio

The Capital - labour ratio gives the proportion of stock of fixed capital to labour inputs. If the ratio increases, capital deepening takes place whilst, when it declines capital widening occurs.

$$\text{Capital - labour ratio} = \frac{\text{Real fixed capital utilised in an industry}}{\text{Number of persons engaged in the industry}}$$

8.Capital -output ratio

The capital - output ratio is the units of capital required to produce one unit of output . This ratio indicates how efficiently investment is contributing to economic growth.

$$\text{Capital - output ratio} = \frac{\text{Real fixed capital stock in a specific year}}{\text{Real GDP at factor cost for the same year}}$$

9. Unit Labour Cost Index (ULC)

Unit labour cost is the remuneration of labour to produce one unit of output. It is computed as the ratio of the labour cost index to an index of production. The index shows the rate of change in labour cost per unit of output.

$$\text{Unit Labour Cost} = \frac{\text{Labour Cost Index}}{\text{Output Index}} \times 100$$

Summary table: main productivity and competitiveness indicators-average growth 1990 to 1997

	Total Economy	Manufacturing	EPZ
	%	%	%
Population	1.2	...	...
GDP/Value added	5.4	5.5	5.6
GDP per capita	4.2	...	...
Labour input	1.8	0.6	-1.1
Capital input	6.8	1.9	0.7
Capital/labour ratio	4.9	1.3	0.4
Capital/output ratio	1.2	-4.4	-6.0
Labour productivity	3.6	4.8	6.8
Capital productivity	-1.3	3.5	6.4
Multifactor productivity	0.6	4.2	6.1
Compensation per worker	10.1	10.5	12.0
Unit labour cost (MUR)	6.2	5.3	4.9
Unit labour cost (US $)	1.1	0.2	-0.2

International comparison of Unit Labour costs in Manufacturing - Annual Growth rate 1990 -1996

The table below gives an international comparison of unit labour cost in national currency and US dollar for the period 1990 to 1996 relating to manufacturing sector.

Country	USA	France	Germany	Italy	UK	Mauritius	South Africa	Taiwan	Korea
National currency	0	0.2	2.6	2.2	1.9	6	9.4	0.8	0.8
US $	0	1.2	3.9	-2	-0.4	1.1	4.4	0.5	-1.3

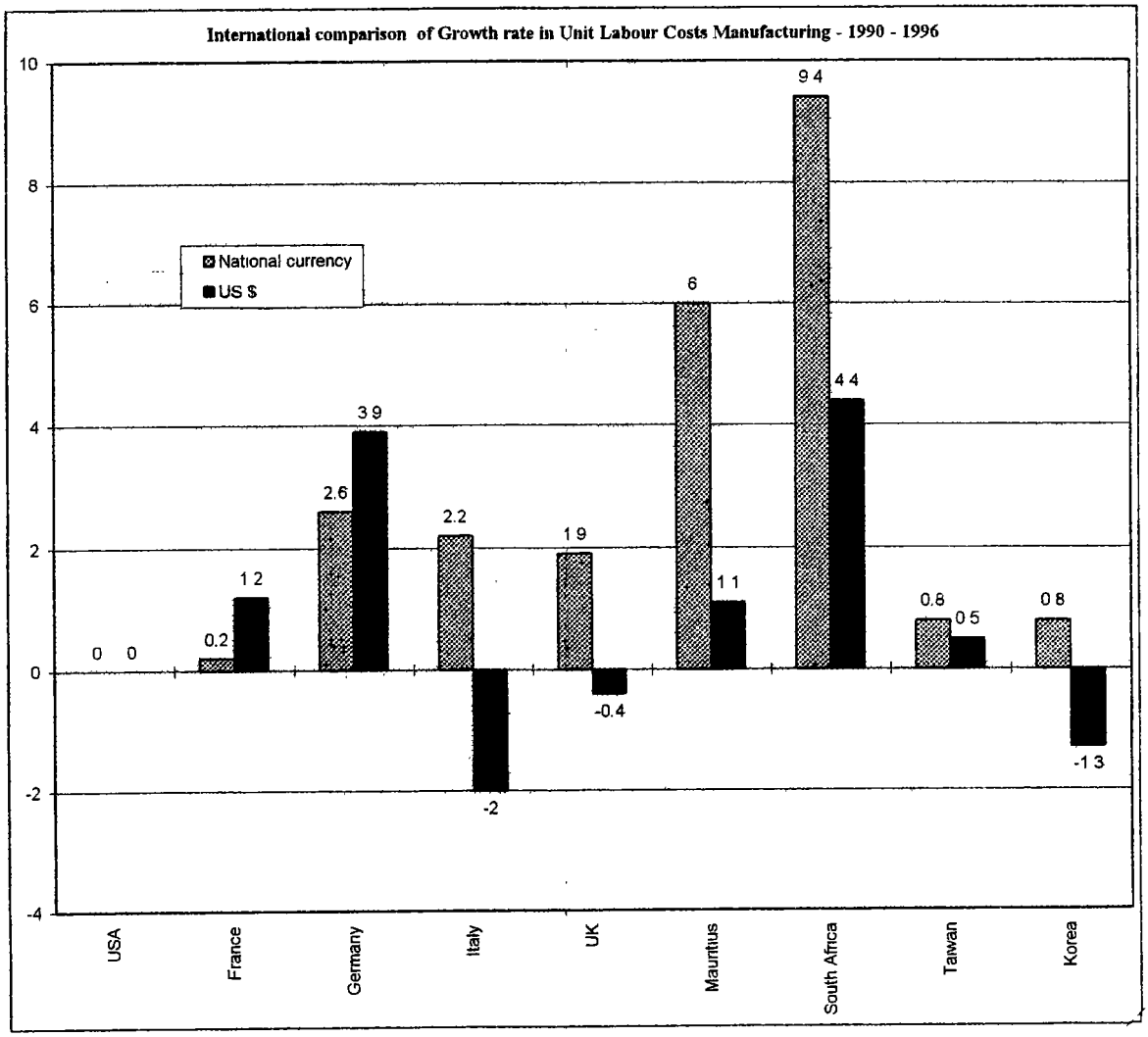

Table 1 – Trends in real output and inputs - Total economy , 1990 – 1997
(Index 1982 = 100)

Year	Real output		Labour input		Capital input	
	Index	Growth rate (%)	Index	Growth rate (%)	Index	Growth rate (%)
1990	158.1	7.3	147.8	2.8	160.8	10.4
1991	165.1	4.4	150.8	2.0	175.0	8.8
1992	176.1	6.7	153.7	1.9	189.3	8.2
1993	184.8	4.9	156.6	1.9	204.1	7.8
1994	194.6	5.3	159.1	1.6	220.2	7.9
1995	205.5	5.6	161.1	1.3	230.2	4.5
1996	217.8	6.0	163.7	1.6	241.7	5.0
1997	229.1	5.2	167.1	2.1	254.2	5.2

Table 2 : Trends in productivity - Total economy, 1990 – 1997
(Index 1982 = 100)

Year	Labour productivity		Capital productivity		Multifactor productivity	
	Index	Growth rate (%)	Index	Growth rate (%)	Index	Growth rate (%)
1990	107.0	4.3	98.4	-2.8	102.2	0.4
1991	109.5	2.3	94.3	-4.2	101.1	-1.1
1992	114.6	4.7	93.0	-1.4	102.3	1.2
1993	118.0	3.0	90.5	-2.7	101.9	-0.4
1994	122.3	3.6	88.2	-2.5	102.0	0.1
1995	127.5	4.3	89.3	1.2	103.8	1.8
1996	133.0	4.3	90.1	0.9	105.8	1.9
1997	137.1	3.1	90.1	0.0	106.9	1.0

Table 3 : Capital Output Ratio, Capital Labour Ratio and Labour Productivity - Total economy, 1990 – 1997

(Index 1982 = 100)

Year	Capital Output Ratio		Capital Labour Ratio		Labour Productivity Index	
	Index	Growth Rate (%)	Index	Growth Rate (%)	Index	Growth Rate (%)
1990	101.7	2.8	108.8	7.4	107.0	4.4
1991	106.0	4.2	116.1	6.7	109.5	2.3
1992	107.5	1.4	123.2	6.1	114.6	4.7
1993	110.5	2.8	130.3	5.8	118.0	3.0
1994	113.2	2.4	138.4	6.2	122.3	3.6
1995	112.0	-1.1	142.9	3.3	127.6	4.3
1996	111.0	-0.9	147.6	3.3	133.0	4.2
1997	111.0	0.0	152.1	3.0	137.1	3.1

Table 4 : Average Compensation, Unit Labour Cost and Labour Productivity – Total economy, 1990 - 1997

(Index 1982 = 100)

Year	Average Compensation		Unit Labour Cost		Labour Productivity	
	Index	Growth Rate (%)	Index	Growth Rate (%)	Index	Growth Rate (%)
1990	211.2	13.6	197.5	8.9	107.0	4.4
1991	242.4	14.8	221.4	12.1	109.5	2.3
1992	266.2	9.8	232.3	4.9	114.6	4.7
1993	295.7	11.1	250.6	7.9	118.0	3.0
1994	331.5	12.1	271.1	8.2	122.3	3.6
1995	353.9	6.8	277.5	2.4	127.6	4.3
1996	383.3	8.3	288.1	3.8	133.0	4.2
1997	413.9	8.0	301.9	4.8	137.1	3.1

Table 5 : Trends in real output and inputs - Manufacturing sector, 1990 – 1997
(Index 1982 = 100)

Year	Real output		Labour input		Capital input	
	Index	Growth rate (%)	Index	Growth rate (%)	Index	Growth rate (%)
1990	219.6	7.7	224.4	1.2	202.7	7.1
1991	229.7	4.6	225.6	0.5	215.1	6.1
1992	244.6	6.5	226.0	0.2	216.6	0.7
1993	256.4	4.8	226.1	0.0	223.6	3.2
1994	268.2	4.6	226.9	0.4	223.8	0.1
1995	284.0	5.9	226.9	0.0	220.3	-1.6
1996	301.9	6.3	228.9	0.9	222.5	1.0
1997	318.8	5.6	233.8	2.1	231.0	3.8

Table 6 : Trends in productivity - Manufacturing sector, 1990 – 1997
(Index 1982 = 100)

Year	Labour productivity		Capital productivity		Multifactor productivity	
	Index	Growth rate (%)	Index	Growth rate (%)	Index	Growth rate (%)
1990	97.9	6.4	108.3	0.5	102.9	3.3
1991	101.8	4.0	106.8	-1.4	104.2	1.3
1992	108.2	6.3	112.9	5.7	110.4	6.0
1993	113.4	4.8	114.7	1.6	114.0	3.3
1994	118.2	4.2	119.8	4.4	119.0	4.4
1995	125.1	5.8	128.9	7.6	127.1	6.8
1996	131.9	5.4	135.7	5.3	133.9	5.4
1997	136.4	3.4	138.0	1.7	137.3	2.5

Table 7 : Capital Output Ratio, Capital Labour Ratio and Labour Productivity - Manufacturing sector, 1990 – 1997

(Index 1982 = 100)

Year	Capital Output Ratio		Capital Labour Ratio		Labour Productivity Index	
	Index	Growth Rate (%)	Index	Growth Rate (%)	Index	Growth Rate (%)
1990	92.3	-0.5	90.3	5.9	97.9	6.5
1991	93.6	1.4	95.3	5.5	101.8	4.0
1992	88.5	-5.4	95.8	0.5	108.2	6.3
1993	87.2	-1.5	98.9	3.2	113.4	4.8
1994	83.5	-4.2	98.6	-0.3	118.2	4.2
1995	77.6	-7.1	97.1	-1.5	125.1	5.8
1996	73.7	-5.0	97.2	0.1	131.9	5.4
1997	72.4	-1.8	98.8	1.6	136.4	3.4

Table 8 : Average Compensation, Unit Labour Cost and Labour Productivity - Manufacturing sector, 1990 – 1997

(Index 1982 = 100)

Year	Average Compensation		Unit Labour Cost		Labour Productivity	
	Index	Growth Rate (%)	Index	Growth Rate (%)	Index	Growth Rate (%)
1990	225.2	19.1	230.2	11.9	97.9	6.5
1991	268.4	19.2	263.6	14.5	101.8	4.0
1992	309.7	15.4	286.1	8.5	108.2	6.3
1993	328.6	6.1	289.8	1.3	113.4	4.8
1994	366.9	11.7	310.4	7.1	118.2	4.2
1995	404.7	10.3	323.3	4.2	125.1	5.8
1996	430.8	6.4	326.6	1.0	131.9	5.4
1997	451.5	4.8	331.2	1.4	136.4	3.4

Table 11 : Capital Output Ratio, Capital Labour Ratio and Labour Productivity - EPZ sector, 1990 – 1997

(Index 1982 = 100)

Year	Capital Output Ratio		Capital Labour Ratio		Labour Productivity Index	
	Index	Growth Rate (%)	Index	Growth Rate (%)	Index	Growth Rate (%)
1990	125.4	-3.2	137.8	4.1	109.9	7.5
1991	119.0	-5.1	136.6	-0.9	114.7	4.4
1992	107.7	-9.5	133.3	-2.4	123.7	7.8
1993	102.3	-5.0	139.5	4.7	136.4	10.3
1994	96.6	-5.6	140.5	0.7	145.4	6.6
1995	89.2	-7.7	139.5	-0.7	156.3	7.5
1996	82.4	-7.6	138.6	-0.6	168.3	7.7
1997	81.3	-1.3	141.3	1.9	173.8	3.3

Table 12 : Average Compensation, Unit Labour Cost and Labour Productivity - EPZ sector, 1990 – 1997

(Index 1982 = 100)

Year	Average Compensation		Unit Labour Cost		Labour Productivity	
	Index	Growth Rate (%)	Index	Growth Rate (%)	Index	Growth Rate (%)
1990	287.6	19.4	261.6	11.0	109.9	7.5
1991	337.5	17.4	294.2	12.5	114.7	4.4
1992	410.6	21.7	331.8	12.8	123.7	7.8
1993	453.9	10.5	332.8	0.3	136.4	10.3
1994	510.2	12.4	350.8	5.4	145.4	6.6
1995	566.1	11.0	362.3	3.3	156.3	7.5
1996	610.3	7.8	362.7	0.1	168.3	7.7
1997	634.1	3.9	364.8	0.6	173.8	3.3