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Manufacturing, services and premature deindustrialization in developing countries: A Kaldorian analysis

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Research Paper No. 2006/49

Manufacturing, Services and Premature Deindustrialization in Developing Countries

A Kaldorian Analysis

Sukti Dasgupta[1] and Ajit Singh[2]

May 2006

Abstract

This paper uses a Kaldorian framework to examine the evidence of deindustrialization in developing countries at low levels of income, the jobless growth in these economies and the fast expansion of the informal sector. The questions are specifically examined for the Indian economy, using state level data but the analysis has a wider application for economic policy in developing countries.

Keywords: deindustrialization, manufacturing, services, jobless growth, developing countries
JEL classification: 014

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1 Introduction

It is entirely befitting that this brief piece of Kaldorian empirics should be considered for inclusion in a volume dedicated to the memory of Lal Jayawardena. Lal regarded Nicholas Kaldor as his mentor and both shared an abiding interest in issues of economic policy. Kaldor was renowned as an apostle of industrialization. For both rich and poor countries alike, he regarded manufacturing as the engine of growth.[1] The present paper examines this central Kaldorian theme in relation to the recent experience of today's leading developing countries. In a number of these countries, certain long-term structural tendencies have become manifest, prima facie challenging Kaldor's theses. These tendencies which will be documented more fully in subsequent sections are as follows:

- Evidence of deindustrialization (the fall in the share of manufacturing employment or an absolute fall in such employment) in several developing countries at a much lower level of per capita income than observed historically in today's advanced countries during their period of industrialization.
- The related phenomenon of 'jobless growth' in the formal manufacturing sector both in slow-growing economies (as in Latin America) as well as more surprisingly in fast-growing economies (for instance, India).
- Evidence that manufacturing may no longer be as steadfast an engine of growth as has been the case in the past. Contrary to widespread past experience, in the last decade or so services have often grown at a faster long-term rate than manufacturing, as for example in India.

These phenomena are analytically inter-related, but all run contrary to the historical pattern of structural change observed in what are now developed countries. An important question is whether these new structural tendencies in developing countries should be viewed negatively or positively with respect to long-term industrialization and economic development in these countries.[2] Non-conformity with the past observed pattern could indicate that a country's industrial development will not progress very far. This is because the non-conforming structures may be unable to satisfy changes in consumer demand or the required changes in production technique or the institutional arrangements that normally occur during the process of industrialization. On the other hand, departures from the historical trajectory could suggest that there has been a

[1] For rich countries, the case for the primacy of manufacturing is best presented in Kaldor (1966); that for developing countries is put forward in Kaldor (1967).

[2] Simon Kuznets derived generalizations concerning the structural changes that occurred in today's advanced countries during their process of industrialization. These generalizations were subsequently broadly confirmed in the more comprehensive analysis of Chenery et al. (1986) that contained data on both industrialized and industrializing countries.

fundamental break with past regularities, owing, perhaps, to the introduction of revolutionary new technology such as that of information and communications technology (ICT). This may lead to the service sector (particularly that related to ICT, telecommunications, business services and finance) replacing or complementing manufacturing as a new or as an additional engine of economic growth in emerging countries.[3]

The three phenomena of the last decade or so referred to above—namely, premature deindustrialization, jobless growth of manufacturing in the formal sector, and faster growth of services than of manufacturing—are examined in this paper both with respect to a large cross section of developing countries and of states in the Indian economy.

This paper is a sequel to Dasgupta and Singh (2005). In that paper a preliminary analysis of these issues in a Kaldorian framework was carried out. The present paper takes the empirical analysis further in the following respects. First, in the main analysis it uses an extended dataset of 48 instead of 30 developing countries for the period 1990-2000. The larger dataset uses the maximum number of countries for which relevant data on sectoral employment is available. Second, this paper provides a fuller analysis of manufacturing growth in the Indian economy in both the formal and informal sectors. Third, unlike the previous paper it examines inter-country differences in the manufacturing share of employment in developing countries.

The paper is organized as follows. Section 2 outlines Kaldor's reasons for considering manufacturing to be the engine of growth for both developed and developing countries. Section 3 provides a preliminary broad-brush analysis of the empirical relationship between manufacturing growth and GDP growth. Section 4 examines more formally the relationships between sectoral and GDP growth rates. In Section 5, the relationship between expansion in manufacturing and the growth of overall productivity in the economy is explored. We also examine the effects on the latter of the reallocation of resources from low productivity to high productivity sectors. Section 6 attempts to explain the inter-country differences in the share of manufacturing in total employment for a small group of developing countries for which there is reasonable data. Section 7 reports on the statistical analysis of the dataset for Indian states separately for the formal and the informal sectors. Section 8 concludes with a discussion of premature deindustrialization.

[3] Alternatively, the service sector embodying new technologies may be regarded as a means of technological leapfrogging for a developing country to catch up with advanced economies.

2 Manufacturing as the engine of growth: the Kaldorian approach

Kaldor, in seminal contributions (1966, 1967) provided the intellectual basis for regarding manufacturing as the leading sector in economic growth. Here, Kaldor was following a long line of classical economic analysis, and was particularly influenced by Young (1928) who emphasised the overall macroeconomic spillover effects of the extension of manufacturing industry, the so-called macroeconomies of scale. Kaldor extended these ideas in the papers mentioned earlier and, importantly as an economic adviser to the British government in the late 1960s, proposed a selective employment tax to promote manufacturing in Britain. The underlying argument was that, for Britain to grow faster, manufacturing had to grow faster still and this required the transfer of labour from services to manufacturing. To encourage such a shift, a selective employment tax on services was introduced on Kaldor's recommendation.[4]

In Kaldor's opinion, the British economy was at a disadvantage in relation to its continental rivals because, as a result of its relatively earlier maturity, there was little surplus labour in agriculture that could be transferred to industry. Moreover, unlike in continental Europe, agricultural wages were nearer the average level of industrial wages. So that there was little incentive for labour to leave agriculture for industry.

Kaldor introduced the concept of dynamic economies of scale, such that the faster the growth of manufacturing output, the faster the growth of manufacturing productivity. He ascribed these dynamic economies to Arrow (1962) notion of 'learning by doing' and argued that this occurred principally in industry and not in services or agriculture. Unlike the 'total factor productivity' concept of neoclassical economics, which is entirely based on the supply side, Kaldor's model considered both the demand and supply sides. As demand and supply conditions differ between sectors, Kaldor believed that it was not adequate to formulate a theory of economic growth based on a single product economy. His distinction between industry, agriculture and services may be summarized as follows. On the demand side, he suggested that the income elasticity of demand for manufacturing products was greater than that for agriculture, while being more or less similar to that of services. On the supply side, manufacturing was thought to have greater potential for productivity growth for the reasons outlined above. Notwithstanding the problem of the measurement of services production, the productivity growth of services tended to be considerably less than that of manufacturing.

On the basis of these stylized tendencies concerning demand and supply conditions in agriculture, manufacturing and services, Kaldor derived generalizations concerning the relationship between the growth of output, employment and productivity in different

[4] This is in striking contrast to the recent proposal by French President Chirac that the value added tax on restaurant meals should be reduced in order to encourage employment in the catering industry.

sectors of the economy. These generalizations are known as 'Kaldor's laws', which will be examined first on a preliminary informal basis in the next section. Section 4, however, will provide an econometric examination of these laws using the dataset for 42 developing countries mentioned earlier.

In an early contribution Singh (1977) noted that for examining issues of industrialization and deindustrialization in an open economy it is not adequate to consider the characteristics of domestic economy alone. It is also essential to examine the interactions of the economy with the rest of world. In that context he drew attention to the crucial significance of the manufacturing sector for external balance. The case of a developed country like the UK, where the manufacturing sector is now quite small in terms of output and employment (each of which accounts for less than 20 per cent of total GDP or total employment) and which is also a leading exporter of knowledge-based services, provides a striking illustration of the continuing significance of manufacturing for the trade balance. Manufacturing still accounts for 60 per cent of the UK's foreign trade (exports and imports) and thus the importance of the sector for the whole economy cannot be exaggerated. However, for a developing country in the early stages of development, the contribution of agriculture to the balance of payments may be as, if not more, important as that of manufacturing. But as per capita income rises towards the level of middle-income countries, the role of manufacturing in maintaining external equilibrium becomes critical. This is because of the very high income elasticity of demand for manufactured products at these income levels, which means that, if this demand cannot be met from domestic sources, there will be an increasing burden of manufactured imports on the trade balance.

3 Growth of manufacturing and of GDP: preliminary analysis evidence

The relationship between the rate of growth of manufacturing and that of GDP is captured in Kaldor's first law that states that the faster the rate of growth of manufacturing in the economy, the faster will be its growth of GDP. Instead of simply being a correlation between two variables, Kaldor regarded the relationship as fundamentally a causal one, the causation running from the growth of manufacturing production to growth of GDP. In its stronger form, Kaldor's first law states that the greater the excess of manufacturing growth over GDP growth, the greater will be GDP growth. This implies that the growth of manufacturing would normally be much faster than the growth of GDP.

Table 1 provides interesting information on the behaviour of these two variables for the leading industrial countries. Between 1950 and 1973 manufacturing growth exceeded GDP growth for each of these countries. However, between 1973 and 1984, this was reversed for every one of the six countries. Such a comprehensive reversal across all leading industrial countries must indicate a major change in consumer preferences as countries and individuals become richer and as technology changes. It has been argued

that, as per capita income increases beyond a certain point, the income elasticity of demand for services becomes greater than that for manufactures.[5] It is nevertheless much less likely that the rate of growth of demand for manufactures and services would vary a great deal. This is because, although in rich countries the income elasticity of demand for services may be greater than that for manufactures, this effect is counterbalanced to a greater or smaller degree by the fact that the prices of manufactures rise much more slowly or actually fall compared with those for a wide range of services. The underlying reason for the different price movements in these two sectors is that productivity growth in the manufacturing sector tends to be much faster than that for most services (Howes and Singh 2000).

Table 1: The excess of rate of growth of manufacturing over the rate of growth of GDP, leading OECD countries (annual percentage growth rates)

	1950-73	1973-84
UK	0.2	-2.4
France	1.3	-1.7
West Germany	1.1	-1.1
Italy	4.2	-0.5
US	0.8	-0.1
Japan	5.7	-1.3

Source: Mathews and Bowen (1988).

Table 2 provides some basic information for developing countries in Asia and Latin America. The table indicates that in the ten Asian countries manufacturing production exceeded that of GDP in all countries except one in each of the three time periods; 1970-80, 1980-93, and 1993-2003.[6] However, in Latin America, during these three decades GDP growth exceeded manufacturing growth for an ever larger number of countries, so that by the third decade, 1993-2003, there was only one country, Mexico, for which GDP growth did not exceed manufacturing growth. As noted earlier, it is well established that at a high level of per capita income the share of manufacturing in GDP begins to fall, indicating faster growth of other sectors, particularly services. However, most recent literature, in line with the information given in Table 2 suggests that the turning point for the share of manufacturing output and employment is now taking place at a much lower level of per capita income that hitherto (Rowthorn and Coutts 2004; Palma 2005; and Pieper 2003). In the past this historical turning point occurred at a per capita of almost US$10,000 in current prices; it is now being estimated to take place at levels of income as low as US$3,000 in some countries.

[5] See, for example, Rowthorn and Ramaswamy (1999) and Thirlwall (2002)

[6] The exceptions were Sri Lanka, 1970-80; the Philippines for each of the last two decades.

Table 2: Difference in the rate of growth of manufacturing versus rate of growth of GDP and the rate of growth of services versus the rate of growth of GDP, selected Asian and Latin American Countries

	Difference in average annual growth rate (%)					
	Manufacturing *vs* GDP			Services, etc. *vs* GDP		
	1970-80	1980-93	1993-2003	1970-80	1980-93	1993-2003
Asia						
China	5.3	1.5	1.9	-0.2	1.5	-0.6
India	1.2	1.1	0.8	1.2	1.2	1.8
Indonesia	6.8	6.0	1.7	0.5	1.1	0.5
Korea	7.6	3.2	1.7	0.3	-0.8	0.1
Malaysia	3.8	4.1	1.4	1.2	-0.7	0.2
Pakistan	0.5	1.3	0.9	1.4	0.3	0.8
Philippines	0.1	-0.6	-0.3	-0.9	1.5	0.8
Sri Lanka	-2.2	2.7	1.1	1.6	-0.6	0.6
Thailand	3.4	2.6	2.1	-0.1	-0.5	-0.6
Latin America						
Argentina	-1.2	-0.4	-1.2	0.4	0.2	0.3
Bolivia	1.5	-	-0.1	3.1	-	0.3
Brazil	0.9	-1.9	-0.3	-0.3	1.2	-0.1
Chile	-2.6	-0.7	-1.6	1.1	0.3	0.0
Colombia	0.4	-0.2	-4.3	0.5	-0.3	2.4
Ecuador	1.0	-2.1	-0.6	-0.1	0.0	1.2
Mexico	0.7	0.5	0.1	0.0	0.0	-0.1
Peru	-	-	-0.6	-	-	-0.3
Venezuela	2.2	-0.8	-1.1	2.8	-0.5	1.0

Source: Compiled from World Bank (2004).

The important question is whether the kind of premature deindustrialization outlined above is necessarily harmful to a country's long-term prospects. This question will be discussed more fully in the final section. However we note here that it is, for example, perfectly possible to deindustrialize in terms of employment and yet not do so in terms of output. It is also pertinent to note that deindustrialization in either sense may not be a pathological condition if it is a normal response to changes in tastes and technology. Nevertheless, it is a worrying sign when so many developing countries at a low level of per capita income exhibit symptoms of deindustrialization in terms of output and employment (in the sense of their respective shares either remaining constant or falling). This would imply that much of the excess labour in agriculture in the reference countries will either remain in agriculture or will inevitably end up in low-productivity informal manufacturing and informal services.

4 Sectoral and GDP growth in Kaldorian analysis: the econometric approach

This section tests Kaldor's first law concerning the relationship between manufacturing growth and GDP growth. It also examines the analogous relationships for the other two

sectors, agriculture and services. It then goes on to consider Kaldor's second and third laws while examining the determinants of productivity growth in Kaldorian terms. The empirical analysis here is carried out for 48 countries for the period 1990-2000.[7] This is the maximum number of developing countries for which we could obtain data for the main variables considered in this exercise. There is however no reason to believe that there is any serious sample selection problem here. The countries excluded are of all shapes and sizes, at all levels of income per capita—they simply have not reported the data for the variables used in the study. The results of the present study may be compared with those for the period 1980-90 and 1990-2000 reported in Dasgupta and Singh (2005) where a similar approach is followed, however it may be noted that the earlier study was based on a random sample of 30 developing countries, rather than the total sample with the available data considered here.

On Kaldor's first law, results of estimating the simple econometric equation for the period 1990-2000 normally used in this type of analysis are given below.[8]

Equation 1

gGDP = 0.022 + 0.473 gManf.VA R^2 = 0.9833

(13.98) (67.53) $F_{Stat}(1,46)$ = 2710.01

Diagnostic Tests			Critical Values
Functional Form F(1, 44)	0.90	<	9.71
Normality JB Test ~ CHSQ (2)	0.79	<	5.99
Heteroscedasticity CHSQ (2)	0.17	<	3.84
No. of observations	48		

[7] The countries are: Algeria, Argentina, Bangladesh, Barbados, Belize, Bolivia, Botswana, Brazil, Burkina Faso, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Ghana, Grenada, Guaetamala, Honduras, India, Indonesia, Jamaica, Kenya, Korea, Malaysia, Mauritius, Mexico, Namibia, Nepal, Nicaragua, Pakistan, Pananma, Paraguay, Peru, Philippines, Saint Lucia, Singapore, Sri Lanka, Suriname, Thailand, Trinidad and Tobago, Uruguay, Venezuela, Vietnam, Zambia. The number of countries studied in this section is limited to 48 because of data constraints, especially data on sectoral employment, for this period, which is required for the productivity analysis in the next section. Data on GDP is taken from World Bank (2004) World Development Indicators, and data on employment is taken from ILO (2004) Key Indicators for the Labour Market.

[8] As noted in Dasgupta and Singh (2005) and Thirlwall (2002) Kaldor's propositions are empirically best examined in relation to cross sectional data rather than in terms of time series or normal panel data analysis. The reason for this is that one needs to abstract from cyclical movements to arrive at the long term relationship between the variables. The cyclical relationships between output employment growth and productivity growth are studied under Okun's law (1962: 98-104). It is important that the methodology used to examine Kaldor's laws should not conflate Okun's law with Kaldor's. A referee has rightly pointed out that a panel data analysis could have been done using ten year averages of data so as to skirt the problem of cyclical changes. Further work could carry this suggestion forward. A fuller analysis would need to go beyond the panel data methodology as there are good reasons to believe that the hypothesis of slope coefficients being the same in different countries in unlikely to be true as has been emphasised in Pesaran and Smith (1995).

The estimated regression equation indicates a close association between manufacturing growth and GDP growth on a cross section basis for the 1990s. The diagnostics in terms of functional form normality and heteroscedasticity are all satisfactory. It is also notable that the beta coefficient has a value of about 0.5, considerably less than one, which suggest that the greater the difference between manufacturing growth and GDP growth, the greater the GDP growth. In order to establish that manufacturing is the engine of growth, it is necessary to carry out a similar exercise to that above, for the agriculture and service sectors as well and compare the respective outcomes. The results for agriculture are reported below.

Equation 2

gGDP = 0.167 + 1.421 gAgr.VA R^2 = 0.6966
(2.31) (10.44) $F_{Stat}(1,46)$ = 108.92

Diagnostic Tests			Critical Values
Functional Form F(1, 44)	30.63	>	9.71
Normality JB Test ~ CHSQ (2)	14.33	>	5.99
Heteroscedasticity CHSQ (2)	11.89	>	3.84
No. of observations	48		

The estimated equation has a smaller R-square compared with that of manufacturing value added. The relevant diagnostics are also poor for this equation as is evident above. Turning to the growth of services and the growth of GDP, equation 3 indicates a close relationship between these two variables. Growth of services accounts for 85 per cent of the inter-country variation for the period 1990-2000. The diagnostic tests are all satisfactory.

Equation 3

gGDP = 0.015 + 0. 58g Ser.VA R^2 = 0.9811
(8.53) (48.85) $F_{Stat}(1,46)$ = 1576.34

Diagnostic Tests			Critical Values
Functional Form F(1, 44)	7.12	<	251.0
Normality JB Test ~ CHSQ (2)	3.85	<	5.99
Heteroscedasticity CHSQ (2)	1.04	<	3.84
No. of observations	48		

It may however be noted that the value of beta coefficient in relation to services is much higher than that of corresponding beta coefficient related to manufacturing. In Kaldor's analysis, a strong positive correlation between GDP growth and sectoral output growth

is necessary but not sufficient for that sector to be the 'engine of growth'.[9] It suggest that in terms of casual interpretation of the model, the difference between growth of services and growth of GDP is relatively less potent in causing inter country variation in economic growth than that between manufacturing and GDP growth. In the Kaldorian analysis, it is customary to argue that the close relationship between many of the services and GDP growth is due to the fact that both variables are related to the growth of manufacturing. Service activities like retailing and transportation clearly depend on the expansion of manufacturing production. However this consideration is much less applicable to a service activity such as software and computer programming or indeed to a general purpose technology such as ICT. Indeed, it will be more reasonable to suggest that expansion of manufacturing depends on the services linked with the ICT rather than the other way round. The scatter diagrams underlying equations 1-3 are given in the Appendix. In view of the special discussion of the Indian case in this paper, it may be useful to note that the observations for India lie close to the respective regression lines in each case, neither consistently above nor consistently below the line.

Finally, it will be useful to compare the results of the above analysis with those reported in Dasgutpa and Singh (2005). The main difference is that with a bigger sample in the present analysis, the results are much more robust and the diagnostics are much more satisfactory than before.

5 Manufacturing, Structural change and economic growth

In Kaldor's view of economic growth, the rate of growth of productivity in the economy as a whole depends on the expansion of the manufacturing sector, which not only leads to faster growth of productivity in manufacturing (due to the operation of Verdoorn's law), but also has spillover effects on the whole economy. It also, however, depends on the shrinkage of the decreasing returns, inefficient activities, such as agriculture or other non-manufacturing sectors. The release of labour and other resources from these to the dynamic manufacturing sector has a double gain for productivity growth in the economy as a whole: it increases productivity by releasing surplus labour from the non-dynamic sectors, and also by the expansion of the dynamic sectors. Both these effects are incorporated in the following regression equation, estimated on the datasets for 48 developing countries.

[9] A reviewer has raised the point about why the obvious interpretation of the results in terms of the higher value of beta coefficient indicate a greater effect of the independent variable on the dependent variable. The reason for this apparently paradoxical conclusion is the causal model used by Kaldor where he regards manufacturing growth as causing, or, being essential to GDP growth. So lower the value of the coefficient, the greater has to be the difference between GDP growth and manufacturing growth in order to achieve the same percentage increase in GDP growth.

Equation 4

gProductivity = 0.0162 + 0.4984g Manf.VA – 0.7054gNon Manf.Emp R^2 = 0.9701
(3.71) (22.62) (10.93) $F_{Stat}(1,46) = 731.69$

Diagnostic Tests				Critical Values
Functional Form	F(1, 44)	4.57	<	9.71
Normality	JB Test ~ CHSQ (2)	167.2	>	5.99
Heteroscedasticity	CHSQ (2)	0.06	<	3.84
No. of observations		48		

This was the equation used by Cripps and Tarling (1973) to examine Kaldor's engine of growth hypothesis. It performs well but the normality test is not met. It is interesting that, if non-manufacturing is replaced by agricultural employment, the results are much more robust and pass the diagnostic tests.

Equation 5

gProductivity = 0.003 + 0.4087g Manf.VA – 0.286g Agri.Emp R^2 = 0.7641
(0.526) (5.18) (8.96) $F_{Stat}(1,40) = 63.51$

Diagnostic Tests				Critical Values
Functional Form	F(1, 38)	4.0	<	4.08
Normality	JB Test ~ CHSQ (2)	1.25	<	5.99
Heteroscedasticity	F(1,40)	0.852	<	4.08

In order to examine the hypothesis that some service activities may help to make the service sector an additional engine of growth, the following equation makes productivity growth a function of the growth of services and agricultural employment. The estimated parameters of the equation and the relevant diagnostic tests are reported below.

Equation 6

gProductivity = -0.0207 + 0.9059g Ser.VA – 0.276g Agri.Emp R^2 = 0.8259
(3.09) (7.09) (10.04) $F_{Stat}(1,40) = 92.51$

Diagnostic Tests				Critical Values
Functional Form	F(1, 38)	8.09	>	4.08
Normality	JB Test ~ CHSQ (2)	6.53	>	5.99
Heteroscedasticity	F(1,40)	0.382	<	4.08

These results suggest that the service sector as a whole is much like manufacturing. Its expansion leads to a positive effect on the overall growth of productivity and it is the agricultural sector which is not dynamic. Even though the normality test is not strictly satisfied, it is a close approximation. This confirms the result, reported above, that the

appropriate specification of the Kaldor structural change equation will nowadays work better for developing countries with the non-manufacturing sector being replaced by agriculture.

6 Inter-country variations in industrial employment

As the title indicates, this section reports on inter-country variations in industrial employment in developing economies. The analysis is made on a pooled time-series, cross-sectional basis, with the dependent variable being the share of industrial labour force in total employment. This investigation is conducted on a small subset of 14 developing countries for which the relevant data are available for the period 1986-2000. Apart from per capita income and the square of per capita income (to encompass the non-linear relationship between the share of industrial employment and per capita income which the theory predicts), the independent variables include gross fixed capital formation expressed as a percentage of GDP, trade openness (measured as exports plus imports as a percentage of GDP), a dummy for Latin America, and also one for China.[10]

Table 3: Explaining cross country differences in share of manufacturing employment

Variable	Coefficients
Constant	-12.29
Log GDP	1.00 (2.50)*
Log GDP square	-0.02 (-2.47)*
Fixed capital formation	0.004 (1.70)*
Openness	0.001 (2.09)*
Dummy for Latin America	0.082 (5.09)***
Dummy for China	-0.059 (-1.16)
R square	0.14
Ramsey RESET test Ho: model has no omitted variables	F (10, 180)= 2.56
No. of observations	196

Note: Dependent variable = share of manufacturing in total employment.

Source: Authors' estimation based on data from World Bank (2004); IMF Balance of Payments Statistics on http://www.imf.org/external/bopage.

Table 3 provides the estimated regression equation results. The regression results are reasonably satisfactory. Although the regression equation explain only 14 per cent of the inter-firm variations in the share of industrial employment, all the independent variables have appropriate signs and are statistically significant at the 5 per cent level. The diagnostics are also generally satisfactory. The squared-term for per capita income has a negative sign (not unexpected in view of the range of per capita incomes of the sample countries), per capita income itself has the expected positive sign, is statistically

[10] Rowthorn and Ramaswamy (1999) use similar independent variables in a study of developed countries.

significant and also economically very important. Other things being equal, the share of industry in employment does vary monotonically with per capita income until the turning point is reached. Industry, therefore, continues to be directly important as a source of employment and structural change for at least low- to middle-income countries.

The coefficient of the variable for gross fixed capital formation has a positive sign. This implies that the greater the capital investment in a country, which is generally biased towards manufacturing because gross capital formation takes place most in the manufacturing sector, the more does the employment structure shift towards manufacturing. The coefficient of the openness variable also has a positive sign implying that economies which are more open are also more likely to have relatively larger employment shares in manufacturing. However in economic terms the size of the coefficient quite small.

It is also interesting that the dummy variable for China is negative and for Latin American countries it is positive, other things being equal. The result for Latin America is highly statistically significant indicating that Latin American share of manufacturing in total employment is greater than other countries, including specifically China. One interpretation of this result is that China is much more competitive than Latin American countries (even though China's coefficient is not statistically significant, its size in economic terms is quite large). The implication here is that the Chinese productivity growth is likely to be faster than that of Latin American countries because of its loss of labour force from the manufacturing sector. Another interpretation is that the Chinese began their reform programme with a lop sided industrial sector and a much less developed service sector compared with other countries and what our results indicate is simply a correction. It is not possible for us to discriminate between these two interpretations but this could be a useful subject of further research.

7 Growth and employment in manufacturing: Indian states

To complement the earlier analysis on the nature of the relationship between sectoral and GDP growth in a large cross-section of developing countries, this section carries out a similar investigation for a cross-section of Indian states. It will be appreciated that with a billion people overall, some of the Indian states like Uttar Pradesh (with population of more then a hundred million) are bigger in size than countries like Germany and France. However it is also important to note that the range of variation in per capita income for the Indian states is likely to be much smaller than the inter-country variation for the 48-country sample of developing countries employed in Sections 4 and 5.

Since the late 1990s, the Indian economy has been growing quite impressively, but employment has failed to expand at a proportionate rate (GDP growth accelerated from

5.2 per cent between 1983/84 to 1993/94 to 6.7 per cent between 1993/94 to 1999/2000, while employment growth slowed from 2.7 per cent in the first period to 1.07 per cent in the latter period). The slow growth of employment has added to increased unemployment rates, especially amongst the youth. Open unemployment rates increased from 5 per cent to 7.2 per cent in the respective periods, and youth unemployment was about 13 per cent in 1999/2000. The latest annual round of the National Sample Survey Organization (NSSO) based on a smaller sample size estimates unemployment to be at 9.1 per cent in 2004.[11]

This fall in overall employment growth rates however has been mainly in agricultural, mining, electricity and community and social services sector—those that are numerically the larger employers. In manufacturing, employment growth increased during this period from 1.23 per cent in the first period to 2.58 in the second or post-reform period. However, the organized manufacturing sector has had almost no growth in employment during the post reform period (0.87 per cent). Therefore the bulk of employment increase in manufacturing has been in the informal (or unregistered) manufacturing sector (2.95 per cent). Along with employment, GDP in the informal manufacturing sector also rose at 8.66 per cent. In contrast GDP in the organized or formal manufacturing sector, which has had almost no employment growth, increased to 7.31 per cent. This implies high productivity gains for workers in the organized manufacturing industry especially.[12]

However, when Kaldor's law is tested for the Indian states for the registered (formal) and non-registered (informal) manufacturing sectors (results reported in Table 4) we find a positive and significant relation with the overall manufacturing sector, for the formal manufacturing sector (though for the formal manufacturing sector the coefficient is not significant at the 10 per cent level), as well as for the unregistered manufacturing sector. The Kaldor coefficient for manufacturing on a cross section of states is 0.6, while that for formal manufacturing is 0.45 and informal manufacturing is 0.75. In fact, the relation between state GDP growth and unregistered manufacturing GDP growth is statistically more robust than that in the registered or formal sector.[13]

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[11] All figures calculated from the NSSO surveys 1987/88, 1993/94 and 1999/2000. The unemployment rate here is measured as 'current daily status'. For limitations of the reported unemployment rates in developing economies see Singh (2000). Data on employment and value added on registered manufacturing is from *Annual Survey of Industries*, and that on unregistered manufacturing from the NSSO Enterprise surveys.

[12] Figures from Government of India (2002: 135).

[13] The 14 states are Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. Data for the formal sector has been taken from the Annual Survey of Industries and for the informal or unregistered manufacturing sector from the NSSO, Enterprise surveys in 1994/95 and 2000/2001.

Table 4: Relationship between state GDP growth and growth in manufacturing sector

	All manufacturing	Formal manufacturing	Informal manufacturing
Constant	0.36 (4.205)	0.45 (6.05)	0.30 (5.62)
Coefficient	0.61 (2.684)	0.45 (1.754)	0.75 (3.92)
R-square	0.32	0.14	0.53
F test	7.204	3.078	15.441
F (Ramsey)	4.36	3.35	5.12
Ho: model has no omitted variables			
No. of observations	14	14	14

Note: It is assumed that informal manufacturing is the same as unregistered manufacturing.

Eqn. used is Growth (State GDP) = $a + b_1$ (Growth Sectoral VA) + u_i

Source: Authors' estimation, based on data in Government of India, Central Statistical Organisation, National Accounts Statistics.

On the question of productivity too, its clear from Figures A1-3 (in annexe) that defined as per worker value addition, productivity in the manufacturing sector as whole has gone up in 2000/01 as compared to 1994/95 in most of the 14 states studied. Disaggregating the manufacturing sector by formal and informal, we find huge productivity gains in the formal manufacturing sector for most states, and positive gains, but relatively less in the informal manufacturing sectors at the state level, barring some exceptions such as the state of Gujarat and Karnataka. These two states have witnessed productivity gains in the informal manufacturing sector and productivity declines in the formal manufacturing sector.[14] In general, huge productivity gains in the formal sector are a mixed blessing as it implies no gain in employment despite the fast growth of manufacturing production. It is therefore fortunate that India has a dynamic informal manufacturing sector which is growing at a relatively fast pace even though its productivity growth, in general, is small or stagnant. This sector does the important job of maintaining an increasing employment while increasing production. The informal manufacturing sector accounts for 83 per cent of total employment in manufacturing. However, in the informal segment of manufacturing, full labour flexibility is the norm and labour protection does not exist. Therefore while the quantity of employment generated in the informal manufacturing sector is very important, the often poor quality of employment in this segment of the manufacturing sector is a matter of concern.[15] Moreover, there is much heterogeneity in this sector—about 80 per cent of enterprises in informal manufacturing are 'own account enterprises', or enterprises run at the household level and do not hire any workers (use only family labour), while there are those which hire workers and operate as an extension of the formal sector.

[14] Gujarat, which shows high productivity gains in the informal sector, witnessed job losses in the informal sector, whereas Karnataka witnessed moderate employment increases in the informal manufacturing sector along with productivity increases.

[15] The NSSO data only gives numbers of workers, and does not distinguish between part time, full time or contract workers.

The results in Figures A1-3 imply that growth in the manufacturing sector drives economic growth in the Indian states. However, the informal manufacturing sector has because of its relatively larger size and inefficient activities needs to grow at fast rate to realize productivity gains that percolate to the workers. Moreover, since the informal manufacturing sector is a major employer, policies need to be devised to tap the dynamism in this sector so that it leads to both growth of employment and growth of productivity. Thus, notwithstanding, the virtual jobless growth in formal manufacturing in India in the recent period, the statistically and economically significant relationship that exits between the growth of the manufacturing sector and growth of GDP at the state level for India indicates the importance of growth of formal and informal manufacturing and its linkages with all other sectors of the economy. It is also possible that the jobless growth in manufacturing is a once and for all effect of increased competition in the world markets as a consequence of entry by China, India itself, as well as other countries (Dasgupta and Singh 2005).[16]

5 Conclusions: premature deindustrialization and industrial policies

This paper has examined the role in developing countries of manufacturing and services using a Kaldorian framework. The results indicate that manufacturing continues to be a critical sector in economic development, but services overall, as well as many individual services, including those connected with ICT, also make a positive contribution in a number of developing countries such as India.[17] Because of a lack of data, we are unable to test separate hypotheses for individual services such as telecommunications, finance, ICT or tourism. Dasgupta and Singh (2005) provided some information on individual service sectors for the Indian economy. They found that apart from ICT-related services (back office activities and software), many other services including those mentioned above have a faster rate of growth than either manufacturing or GDP. Services also improve the balance of payments.[18] They fulfil requirements of dynamic sectors in the Kaldor sense and could therefore be regarded as an additional engine of growth. In the specific case of India with the kind of primacy the country has achieved in ICT, the new engine might help India leapfrog in technological development to catch up with advanced countries.

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16 The stagnant employment growth in the formal manufacturing sector has been attributed to rigid labour laws in India by some commentators. An alternative hypothesis is that these labour laws are ineffective except in the public sector and hence there have been significant job losses in sections of the formal manufacturing sector over the last few years in India. This is a controversial subject, which requires deeper analysis.

17 For other modern services which also are important as dynamic activities in the Kaldorian sense, see Dasgupta and Singh (2005). For Taiwan, see Amsden and Chu (2003).

18 In the Indian case, exports of software amount to 20 per cent of total Indian exports and expect to rise to 30 per cent in the next few years.

We turn now to the question of premature deindustrialization in many countries in developing world. Although the fall in the share of manufacturing in total employment is occurring at a much lower level of per capita income than in the case of today's developed countries, the important point to note is that this is not necessarily a pathological phenomenon. In some developing countries, it may be so, but in others it could be benign or advantageous. The question is both a conceptual and empirical one.

In a seminal contribution, Cairncross (1979) suggested that the best conceptualization of deindustrialization is what he called the 'Cambridge View', which he identified with that of Singh (1977). This argued that deindustrialization represents a pathological state when it stops the economy from being able to achieve its full potential of growth, employment, and resource utilization. The Cambridge analysis had been developed in relationship to the weaknesses of British manufacturing in the 1970s and 1980s, but it has current application to the advanced developing world. There are two ideal types of deindustrialization that are occurring in the developing world. First there is the Indian kind, where manufacturing employment is not expanding in the formal sector but is growing at a respectably fast rate in the large informal sector. It is notable that manufacturing's share in Indian employment, including both the informal and formal sector, has not declined. Further, there has been a large expansion of manufacturing products including that in the formal sector.

The second ideal type, which more likely suggests pathological deindustrialization, has occurred in several Latin American and African countries in the 1980s and 1990s. As a result of Washington Consensus policies of international financial institutions (IFIs), which Latin American as well as many African countries were obliged to follow in response to the debt crisis, there has indeed been considerable structural change in these countries. But Ocampo (2005a, b) and Shafeaeddin (2005) have persuasively argued that this change has been of the wrong kind. Countries have begun to specialize according to their current comparative advantage instead of their long-term dynamic comparative advantage. Furthermore, these economies have become more vulnerable to external economic shocks. UNCTAD's studies indicate that Latin American economies have now become balance of payments constrained at a much lower growth rate than before. As a consequence, the main Latin American countries are still not reverting to their long-term trend rate of growth under import-substitution industrialization which they experienced from 1950 to 1980. Latin American deindustrialization exhibits all the signs of industrial failure, and the ability to develop modern services.

In conclusion, it must be reiterated that at the level of per capita incomes prevailing in the low- and middle-income developing countries, the income elasticity of demand for manufactures will continue to be very high. This suggests that countries such as India should use ICT to modernize other services as well as manufacturing, whose role must

remain critical for a long time to come.[19] The experiences of the second category of countries during the last two decades raise in an acute form the question of industrial policy. These countries virtually abandoned industrial policies under the Washington Consensus. As suggested above, deindustrialization in these countries has all the hallmarks of being of a pathological kind since the long-term prospects for creating a modern manufacturing or service sector have worsened. These countries need to re-evaluate their approach to industrial policies. Instead of laissez faire and regarding industrial policies as a relic of the past, many of these countries need to adopt a more creative and energetic but different industrial policies than they had done before. They also need to establish new institutions to support these policies.[20]

It is interesting in this overall context to note that institutional renewal of industrial policies in East Asia is far along the way with the focus being on government support of science and technology to knowledge-based industries and services. East Asia's mature high-tech industries and advanced services have benefited from a reformed type of industrial policy. Legal under the WTO, subsidies to high-tech businesses and services have taken the form of support to science and technology. The first category countries, despite the benign character of their deindustrialization, should therefore continue with their industrial policies and adapt them to correspond to the changed economic circumstances. East Asia still provides an extremely useful role model for these countries.

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[19] For a full analysis of these issues see Dasgupta and Singh (2005).

[20] For fuller analysis of these issues see Singh (2005).

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