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Manufacturing Productivity, Deindustrialization, and Reindustrialization

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Abstract

In considering pathways to industrialization in the twenty-first century, cognisance needs to be taken of the fact that many countries have actually been deindustrializing. This paper analyses deindustrialization experiences internationally, by decomposing changes in the level and share of manufacturing employment. The results indicate that in most countries the decline in manufacturing employment is associated mainly with rising labour productivity in manufacturing. Reindustrialization is likely to be important for long-term economic growth, yet it is difficult and is not common. This highlights the importance of robust industrial policies if countries are to move from deindustrialization to reindustrialization.

Keywords: deindustrialization, reindustrialization, manufacturing, employment

JEL classification: E23, E24, J21, L16, L52, L60, 014

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1 Introduction

The challenge of industrialization in the twenty-first century differs in several ways from the experiences of developed countries when they initially industrialized in the nineteenth century, as well as developing countries that rapidly industrialized in the twentieth century. One important difference is that many countries have in fact experienced *deindustrialization* in recent times. Deindustrialization occurred in most upper-income countries over the past few decades, but it has become increasingly prevalent in middle-income countries as well. The challenge of industrialization in the twenty-first century is thus, in reality for many countries, actually a challenge of *reindustrialization*.

Industrialization, deindustrialization and reindustrialization refer here to changes in the share of the manufacturing sector in GDP and/or employment. Manufacturing is of course not synonymous with 'industry' (which includes mining and usually construction as well). However, it is the specific characteristics of the manufacturing sector which are regarded as having 'special characteristics' that make it important as an 'engine of growth' and hence make industrialization important for growth. (Furthermore, the share of mining in countries' employment of GDP is, to a significant extent, outside of their control given that it derives in part from a country's mineral endowments.) The analysis here is thus specifically of the manufacturing sector and of changes in its share in employment and GDP.

In recent decades there has been a significant decline in the share of manufacturing in GDP—and even more so of the share of manufacturing in employment—especially in advanced economies. The fall in the share of manufacturing in employment has been characterized in the literature as deindustrialization. The levels of manufacturing employment corresponding to particular levels of GDP per capita have fallen over time in upper- and middle-income economies (Palma 2005), and there is increasing evidence of deindustrialization in some middle-income developing countries, especially in Latin America. International value added and employment data clearly show a generalized trend towards a relative decline in manufacturing and a relative increase in services, particularly in the case of employment.

Does this matter at all for growth? From Kaldorian (Kaldor 1978; 1980), and structuralist (see Blankenburg, Palma, and Tregenna 2008) perspectives, manufacturing has special properties as an engine of growth. In this thinking, characteristics that are particularly strongly associated with the manufacturing sector include: dynamic economies of scale in manufacturing; strong backward and forward linkages between manufacturing and other sectors of the domestic economy; strong properties of learning-by-doing; innovation and technological progress; and the importance of manufacturing for the balance of payments.[1] According to Kaldor's laws faster growth in manufacturing is (causally) associated with faster aggregate growth, productivity growth in manufacturing is endogenous to the growth of manufacturing output, and aggregate productivity growth is positively related with the growth of manufacturing output and employment. A number of empirical studies, using various techniques and testing across a range of countries and time periods, have found support for the validity of Kaldor's laws and/or for the role played by the manufacturing

[1] See Tregenna (2009) for further discussion of these characteristics.

sector as an engine of growth.[2] This paper does not empirically investigate the validity of Kaldor's laws and the extent to which there is evidence for a special role of manufacturing in the growth process, as the focus is on the dynamics of deindustrialization and the prospects of reindustrialization. To the extent that the existing evidence supports the role of manufacturing as an engine of growth, deindustrialization would be of concern from a growth perspective and reindustrialization could be seen as desirable.

This paper analyses episodes of deindustrialization and considers the prospects of reindustrialization. The next section reviews some of the literature on deindustrialization. Section 3 is an empirical analysis of periods of deindustrialization internationally. This emphasizes the diversity of deindustrialization experiences internationally, and focuses in particular on trends in labour-productivity in manufacturing. Section 4 considers the challenge of moving from deindustrialization to reindustrialization. Section 5 concludes and draws out some broad policy implications.

2 Literature on deindustrialization

The literature on deindustrialization emerged primarily in the UK, and was concerned with explaining the slowdown in growth. A prominent early contribution was that of Singh (1977), who conceptualizes deindustrialization in terms of an 'efficient' manufacturing sector, in the sense of it being 'able to provide (currently and potentially) sufficient net exports to meet the country's overall import requirements at socially acceptable levels of output, employment and exchange rate' (1977: 134). On this basis Singh identifies a structural disequilibrium in the UK in that the competitive position of manufacturing was deteriorating despite increasing productivity and increasing cost and price competitiveness. Singh argues that 'deindustrialization is a symptom or a consequence of this "inefficiency" or of disequilibrium, rather than its cause' (ibid). Singh thus regards deindustrialization as problematic insofar as it is a manifestation of structural disequilibrium in the economy, in the sense of manufacturing being unable to not only satisfy domestic demand at least cost but also to export enough to pay for the full employment level of imports (at a 'reasonable' exchange rate).

Rowthorn and Wells (1987) is a seminal study on deindustrialization. In addition to a comprehensive analysis of deindustrialization in the UK, they develop an influential distinction between positive and negative deindustrialization. Positive deindustrialization is regarded as

> … the normal result of sustained economic growth in a fully employed, and already highly developed, economy. It occurs because productivity growth in the manufacturing sector is so rapid that, despite increasing output, employment in this sector is reduced, either absolutely or as a share of total employment. However, this does not lead to unemployment, because new jobs are created in the service sector on a scale sufficient to absorb any workers

[2] Some recent studies include those by Atesoglu (1993), Bairam (1991), Beheshti and Sadighnia (2006), Bernat (1996), Diaz Bautista (2003), Drakopoulos and Theodossiou (1991), Felipe (1998), Fingleton and McCombie (1998), Hansen and Zhang (1996), Harris and Lau (1998), Harris and Liu (1999), Knell (2004), Leon-Ledesma (2000), Necmi (1999), Pons-Novell and Viladecans-Marsal (1999), and Wells and Thirlwall (2003).

> displaced from manufacturing. Paradoxically, this kind of de-industrialization is a symptom of economic success. (Rowthorn and Wells 1987: 5).

This is contrasted with negative deindustrialization, which is 'a product of economic failure and occurs when industry is in severe difficulties … labour shed from the manufacturing sector—because of falling output or rising productivity—will not be reabsorbed into the service sector. Unemployment will therefore rise.' (ibid.). Note that their typology actually brings in two different issues: the cause of the relative decline in manufacturing employment, and whether or not displaced workers are absorbed into the services sector. There could thus be other permutations of these two dimensions than the ones that they include in their definitions. Rowthorn and Wells also identify a third type of deindustrialization, in which 'the pattern of net exports shifts away from manufactures towards other goods and services', which can 'lead to a transfer of labour and resources from manufacturing to other sectors of the economy'. (ibid.: 6).

Several recent studies have empirically analysed the causes of deindustrialization in developed countries. Saeger (1997) finds evidence that imports from the south contributed to lower manufacturing employment in 23 OECD countries between 1970 and 1990. In contrast, Rowthorn and Ramaswamy (1997) find that deindustrialization in 18 OECD countries between 1963 and 1994 is primarily explained by the systematically higher productivity growth in manufacturing than in services; furthermore, they argue that deindustrialization is a natural result of industrial dynamism in advanced economies. Rowthorn and Ramaswamy find trade to account for a quite small proportion of deindustrialization. In an updated and extended analysis for 23 OECD countries over the period 1963–2002, Rowthorn and Coutts (2004) find that trade with less developed economies contributed significantly to deindustrialization in the North, although domestic factors such as productivity growth and shifting patterns of demand were even more important. Alderson (1999) finds an outflow of direct investment, as well as import penetration from the South, to have contributed to deindustrialization in OECD countries between 1968 and 1992. Kucera and Milberg (2003) attribute deindustrialization in ten OECD countries between the late 1970s and the mid-1990s primarily to North-South trade.

Palma (2005; 2008), in analysis that includes both developed and developing countries, identifies four 'sources' of deindustrialization, drawing on Rowthorn's earlier work. First, an inverted-U relationship between manufacturing employment and income per capita, referring to the decline in the share of manufacturing as economies mature. Second, a declining relationship over time between income per capita and manufacturing employment. Third, changes in the level of income per capita at which the share of manufacturing employment is expected to decline (i.e. changes in the turning point of the income per capita—manufacturing employment regression). Fourth, Palma suggests that Dutch Disease could be considered an additional form of deindustrialization. This refers to an additional degree of deindustrialization in cases where a country discovered significant natural resources, developed export finance or tourism, or as a result of policy 'liberalization' in middle-income countries.

Rowthorn and Coutts (2004) summarize five explanations of deindustrialization that have been advanced in the literature. The first of these is specialization, referring to the domestic outsourcing of activities previously performed in house in manufacturing to specialized service providers, resulting in an apparent decline in manufacturing employment that is a 'statistical artefact' rather than real. Second, a fall in the relative prices of manufactures

means that they account for a smaller share of consumer expenditure. Third, the higher rate of productivity growth in manufacturing relative to services is associated with slower employment growth in manufacturing than in services, even if output increases at the same rate. Fourth, international trade might negatively affect manufacturing employment in advanced economies by increasing productivity through higher competitive pressures, eliminating low-value added activities or inefficient firms, and by replacing relatively labour-intensive activities subject to import pressures with less labour-intensive activities producing sophisticated exports. Finally, decreases in the rate of investment will tend to decrease the share of manufacturing (in both employment and GDP), since a disproportionately large share of investment expenditure is accounted for by manufactures. To these explanations we might add Palma's explanation of Dutch Disease, as discussed above.

3 Empirical analysis of changes in manufacturing employment internationally

This analysis is of periods of deindustrialization internationally, in order to get a better understanding of the dynamics involved. In particular, we investigate the role of changes in labour-productivity in manufacturing. There are two steps of the empirical analysis: a two-way dynamic decomposition of changes in the level of manufacturing employment, and a three-way decomposition of changes in the share of manufacturing in total employment.

Data are drawn from the Groningen Growth and Development Centre 10-sector database, which provides standardized data on countries' employment and (real) value added by sector over the period 1950–2005 (see Timmer and Gaaitzen 2009). South Africa was added to the sample, with data extracted from the South African standardized industry database (SASID) availed by Quantec. The sample for the analysis thus includes 12 high-income countries (of which ten are OECD members), 11 upper-middle-income countries, and five lower-middle-income countries. Geographically, ten of the countries are from Asia, seven from Europe, nine from Latin America and the Caribbean, one from North America, and one from Africa. The sample includes both countries that did and did not experience deindustrialization during the period of analysis. The focus of the analysis is on the period 1985–2005.

Table 1 summarizes the trends in value added (level and share in total value added), employment (level and share in total employment), and productivity in the manufacturing sectors of the sample countries. In 23 out of the 28 countries manufacturing declined as a share of total employment—these are the instances which would be classified as deindustrialization as conventionally defined. The exceptions in this regard are the relatively low-income cases of Bolivia, India, Indonesia, Malaysia, and Thailand. In 17 of the 23 cases this decline in the share of manufacturing in total employment was accompanied by a decline in the share of manufacturing in total value added. There are no instances in which the share of manufacturing in total value added declined concomitant with an increase in the share of manufacturing in total employment. In the majority of these cases in which manufacturing declined as a share of total value added and total employment, the absolute level of manufacturing employment (though not of manufacturing value added) also fell. Declines in manufacturing as a share of total employment and value added were particularly strong and generalized among the developed countries of the sample, as would be expected. However, Argentina, Brazil, Chile, Colombia, Hong Kong, Peru, Philippines, Taiwan, Venezuela, and South Africa are the developing countries (in the sample) in which manufacturing declined both as a share of value added and employment. These might be regarded as instances of 'premature deindustrialization' in that they are deindustrializing at levels of income per capita

which are significantly lower than the levels at which advanced countries deindustrialized earlier.

In analysing changes in manufacturing employment internationally, we begin by decomposing changes in the level of manufacturing employment into two components: changes in the value added of the sector, and changes in the labour-intensity of that sector. The object is to understand how much of each country's change in manufacturing employment is associated with changes in the overall size of manufacturing, and how much with changes in the labour-intensity of that production. The separation of these two vectors is useful in distinguishing different types of deindustrialization where it has occurred. For instance, a given fall in manufacturing employment could be associated with either a falling labour-intensity of production, or with a shrinkage of manufacturing as a whole (or, of course, with a combination of these factors). These two processes would be very different, even if associated with the same change in manufacturing employment.

Let L_{ijt} be the employment in sector *i* in country *j* at time *t*, i.e. $L_{jt} = \sum_{i=1}^{n} L_{ijt}$, where sector *i* is manufacturing throughout. Then as an identity, $L_{ijt} \equiv \phi_{ijt} Q_{ijt}$, where Q_{ijt} is manufacturing value added, and ϕ_{ijt} is the labour-intensity of manufacturing, measured as $\frac{L_{ijt}}{Q_{ijt}}$. This is the inverse of the labour-productivity in the manufacturing sector (that is, labour-productivity in terms per person and not per hour). Then the change in employment in a given sector over a given period *h* is given as follows

$$\Delta L_{ij} = \phi_{ijt} Q_{ijt} - \phi_{ijt-h} Q_{ijt-h}$$

$$= \underbrace{(\phi_{ijt} - \phi_{ijt-h})\left(\frac{Q_{ijt-h} + Q_{ijt}}{2}\right)}_{\text{labour-intensity effect}} + \underbrace{(Q_{ijt} - Q_{ijt-h})\left(\frac{\phi_{ijt-h} + \phi_{ijt}}{2}\right)}_{\text{sector growth effect}}.$$

The labour-intensity effect is the change in the number of manufacturing jobs associated with the changing labour-intensity of manufacturing. Since labour-intensity is defined as the inverse of labour-productivity, this is equivalent to the change in manufacturing employment associated with changes in productivity in manufacturing. The 'sector growth effect' is the change in the level of manufacturing employment that is associated with a change in the level of manufacturing value added. Where $\Delta L_{ij} < 0$, the labour-intensity, and the sector growth effects can be thought of as the two components of 'absolute deindustrialization' (referring to a fall in the level of manufacturing employment).

Deindustrialization associated predominantly (at least in this 'accounting' sense) with one or other of the two effects could have different causes and implications. On the one hand, a loss of manufacturing jobs associated primarily with the sector growth effect might suggest that the issue is primarily one of the manufacturing sector as a whole and its lack of dynamism. On the other hand, a loss of manufacturing jobs associated primarily with the labour-intensity effect might suggest that the manufacturing sector as a whole is not necessarily in decline, but that the 'problem' pertains more to its labour-absorbing capacity.

The cross-country results from this decomposition are summarized graphically in Figure 1. Each point in the scatterplot denotes the combination of the labour-intensity effect (x-coordinate) and sector growth effect (y-coordinate) for a particular country. Two points are shown for each country: the initial point, indicated with a square marker, is for the period 1985–95, while the second point is for the period 1995–2005. It should thus be noted that the length of a line of course does not indicate the size of the effects (these can be observed from the coordinates of the points), but just the extent of how different the country's dynamics are between the two periods. The values are normalized in terms of the country's manufacturing employment at the beginning of the period, meaning that the coordinates of each point represent the contribution of that effect to the percentage change in manufacturing employment for that country. That is, the labour-intensity effect is shown as $(\phi_{ijt} - \phi_{ijt-h})\left(\frac{Q_{ijt-h} + Q_{ijt}}{2}\right)\left(\frac{100}{L_{ijt-h}}\right)$ and the sector growth effect as $(Q_{ijt} - Q_{ijt-h})\left(\frac{\varphi_{ijt-h} + \varphi_{ijt}}{2}\right)\left(\frac{100}{L_{ijt-h}}\right)$, summing to the percentage change in sectoral employment $\frac{100\Delta L_{ij}}{L_{ijt-h}}$. Developed countries are shown in black and developing countries in grey.

The results shown in the chart can be elucidated with the example of Korea. The initial coordinates of Korea (-89; 126) indicate that between 1985 and 1995 the fall in manufacturing labour-intensity accounted for a 89 per cent fall in the level of Korea's manufacturing employment, and the growth of manufacturing value added accounted for a 126 per cent increase in manufacturing employment. The sum of these two effects, 37 per cent, is the actual percentage increase in the level of manufacturing employment in Korea over the period 1985–95. The coordinates of Korea for the period 1995–2005, denoted by the end point of the line for Korea, are (-80; 68). Korea experienced a 12 per cent decline in the level of manufacturing jobs over this period, which is the sum of these coordinates. Decomposing this decline, the reduction in the labour-intensity of manufacturing accounted for an 80 per cent decline in Korea's manufacturing employment which was mostly mitigated by a 68 per cent increase in employment associated with growth in manufacturing value added.

The position of a point in the north-east quadrant indicates that both the labour-intensity and sector growth effects were positive, such that the change in the labour-intensity of manufacturing and the growth in manufacturing value added each accounted for manufacturing employment creation, with unambiguously positive manufacturing employment growth. Conversely, the location of a point in the south-west quadrant indicates that the change in labour-intensity and the change in manufacturing sector size each accounted for negative manufacturing employment growth, with an unambiguously negative change in manufacturing employment. A point in the north-west quadrant indicate that the drop in labour-intensity accounted for a negative change in manufacturing employment while the sector growth accounted for a positive change in manufacturing employment. The position of a point in this quadrant lying above the diagonal y=x line would indicate that the positive sector growth effect outweighed the negative labour-intensity effect, hence net manufacturing job creation, as with the example of the initial point of Korea (1985–95). Below the line in this quadrant indicates the reverse, and thus net manufacturing job loss, as with Korea in the period 1995–2005. Finally, a point in the south-east quadrant points to a

case where the rise in labour-intensity accounted for a positive change in manufacturing employment while the change in sector size accounted for a negative change in manufacturing employment. A country in the quadrant above the diagonal y=x line would have had net manufacturing employment creation, with the positive labour-intensity outweighing the negative sector growth effect, with a country below the diagonal line having had net manufacturing employment loss. Overall, any point falling below/to the left of the dashed diagonal line shows manufacturing employment loss for that country, while any point above/to the right of the diagonal line shows manufacturing employment growth.

Bolivia is the only country that in which both the labour-intensity and sector growth effects were positive in both periods, 1985–95 and 1995–2005. That is, both an increase in labour-intensity in manufacturing and growth in manufacturing value added contributed to growth in the level of manufacturing employment. Note that Bolivia has the second lowest levels of income per capita in the sample. Both components were positive in the first period, but not the second in Colombia, Peru, and (marginally) in Costa Rica. Somewhat surprisingly, Spain is the only country in which both components were positive in the second period, but not the first.

The paucity of observations in the north-east quadrant suggests that, as a stylized fact, it is unusual for manufacturing to grow (in real value added) while simultaneously becoming more labour-intensive. This is especially the case at higher levels of income per capita. This may be related to the fact that labour-intensity is essentially the inverse of labour-productivity, and high and increasing labour-productivity is central to sustainable growth in manufacturing value added. A possible policy implication arising out of this, where countries wish to maximize job creation in manufacturing, may be that a focus on accelerating value added in manufacturing may be a preferable route to go rather than trying to maximize the labour-absorbing capacity of any given level of manufacturing value added. This could have implications *inter alia* for the specific types of manufacturing activities that a country may choose to prioritize, given the typically high degree of heterogeneity among manufacturing subsectors.

There is a clustering of points in the north-west quadrant, for both periods and among both developed and developing countries. For points in this quadrant, there was real growth in manufacturing value added, but manufacturing became less labour-intensive. Within this quadrant, most developing countries fall above the dotted diagonal line, indicating that the positive sector growth effect outweighed the negative labour-intensity effect such that there was net growth in the level of manufacturing employment—with the reverse evident for developed countries.

A clear regional clustering is evident. Developing Asian countries are grouped towards the top left of the chart, with large and positive sector growth effects and large and negative labour-intensity effects. This is indicative of their strong manufacturing performance, both in value added and in productivity. Apart from Japan, the one Asian country that is an exception to this pattern is the Philippines. The Philippines has been dubbed an ‘honorary Latin American country’ due to its economic structure and development trajectory being more akin to Latin America than Asia, and indeed here the Philippines fits in well with most Latin American countries. A common trend is also evident when comparing the two periods for Asian countries. Recall that the square point marks each country’s observation for the initial period. In the second period (1995–2005), the sector growth and labour-intensity effects are both relatively smaller (as a percentage of the initial level of employment in each period) than

in the first period (1985–95). While India—the lowest-income and least industrialized Asian country in the sample—fits the general pattern of the Asian countries, the only difference is that in the second period the labour-intensity effect becomes a bit more negative than in the first period (note how the line for India slopes down and to the left, whereas the lines for the other Asian countries slope down and to the right). A further commonality to the developing Asian countries (excluding the Philippines) is in the magnitude of the difference between the two periods, as shown by their relatively lengthy lines.

Latin American countries are clustered towards the right. Compared to the developing Asian countries, they have relatively low sector growth effects and the labour-intensity effects are either positive or less negative than in the case of Asian countries. Recall that the labour-intensity effect can be thought of as an inverse labour-productivity effect. The difference between the results for Asia and Latin America fits in with the fact that the former generally had higher growth in both value added and productivity in manufacturing than the latter. The contrast between Latin American and Asian countries can be illustrated with a comparison of manufacturing performance in Korea and Venezuela. As can be seen from Table 1, these two countries experienced roughly similar trends in the level of manufacturing employment between the two periods. However, the performance is vastly different when it comes to manufacturing value added and productivity, with growth of these variables multiple times higher in the case of Korea than in the case of Venezuela. South Africa—the only African country in the sample, and with a level of income per capita and economic structure similar to Brazil—fits close to the Latin American countries.

Unlike most developing countries, all developed countries in both periods (except Spain) fall below the dotted diagonal line, indicating an absolute contraction in manufacturing employment. For all these countries—except Denmark and Italy in the second period where even the sector growth effect was negative—the positive sector growth effect was outweighed by a larger negative labour-intensity effect. This would be associated with the generally more advanced deindustrialization at higher levels of income per capita. Although the inverted-U relationship between manufacturing employment and income per capita refers to the share of manufacturing in total employment, in advanced deindustrialization even the level of manufacturing employment is likely to fall, as is evident amongst almost all developed countries shown here.

Next, we analyse changes in the *share* of manufacturing in total employment, by decomposing changes in manufacturing employment share into components associated with changes in manufacturing labour-intensity, share of manufacturing in GDP, and aggregate labour-productivity. As noted earlier, deindustrialization is conventionally defined as a decline in the share of manufacturing in total employment.

Therefore, defining σ_{ijt} as the share of manufacturing in total employment and with the following terms as previously defined L_{ijt} and Q_{ijt} as employment and value added respectively (in sector *i* manufacturing) in country *j* at time *t*, and ϕ_{ijt} is the labour-intensity of manufacturing, measured as $\frac{L_{ijt}}{Q_{ijt}}$. We further define $\theta_{jt} = \frac{Q_{jt}}{L_{jt}}$, aggregate labour-productivity and δ_{ijt} is the share of manufacturing in total value added in country *j* at time *t*,

measured as $\frac{Q_{ijt}}{Q_{jt}}$ and Q_{jt} is the total value added (which can proxy GDP) of country *j* at time *t*.

Then the following identity can be set up to express the share of manufacturing in total employment as a product of the labour-intensity of manufacturing, the share of manufacturing in total value added and aggregate (economy-wide) labour-productivity

$$\sigma_{ijt} \equiv \frac{L_{ijt}}{L_{jt}} \equiv \phi_{ijt}\delta_{ijt}\theta_{jt}$$

This allows for a separation of changes in the share of manufacturing in total employment into components associated with changes in manufacturing labour-intensity, share of manufacturing in total value added, and economy-wide labour-productivity respectively, as follows[3]

$$\sigma_{ijt} \equiv \underbrace{\frac{1}{6}(\phi_{ijt} - \phi_{ijt\ \ h})\{(\delta_{ijt\text{-}h}\theta_{jt\ \ h} + \delta_{ijt}\theta_{jt}) + (\theta_{jt\text{-}h} + \theta_{jt})(\delta_{ijt\ \ h} + \delta_{ijt})\}}_{\text{labour-intensity effect}} +$$

$$\underbrace{\frac{1}{6}(\delta_{ijt} - \delta_{ijt\ \ h})\{(\phi_{ijt\ \ h}\theta_{jt\text{-}h} + \phi_{ijt}\theta_{jt}) + (\theta_{jt\text{-}h} + \theta_{jt})(\phi_{ijt\text{-}h} + \phi_{ijt})\}}_{\text{sector share effect}} + \underbrace{\frac{1}{6}(\theta_{ijt} - \theta_{ijt\ \ h})\{(\phi_{ijt\text{-}h}\delta_{jt\text{-}h} + \phi_{ijt}\delta_{jt}) + (\delta_{jt\text{-}h} + \delta_{jt})(\phi_{ijt\text{-}h} + \phi_{ijt})\}}_{\text{aggregate labour-productivity effect}}$$

The labour-intensity effect measures the contribution of changes in the labour-intensity of manufacturing (that is, the inverse of labour-productivity in manufacturing) to changes in the share of manufacturing in total employment. The sector share effect measures changes in the share of manufacturing in total value added to changes in the share of manufacturing in total employment. The aggregate labour-productivity effect measures the contribution of changes in aggregate labour-productivity to changes in the share of manufacturing in total employment. This is something of a residual in this decomposition and the results are not of primary interest here.

The labour-intensity and sector share effects of the sample countries and shown in Figure 2, in percentage form. Each point shows the combination of the labour-intensity effect (x-coordinate) and sector share effect (y-coordinate) for a country. For each country, the initial point, denoted with a square marker, is for the period 1985–95, while the second point is for the period 1995–2005. As in Figure 1, the length of a line shows the change for a country between the two periods and not the size of the two effects, it is the coordinates of the two points that indicate the relative size of the effects in each period. Again, developed countries are shown in black and developing countries in grey.

For example, in the UK during the period 1985–95, the labour-intensity effect was -7.3, the sector share effect was -1.2, and the aggregate labour-productivity effect was 4 (all in percentage points). These sum to -4.5; this is the actual decline in the share of manufacturing in total employment this period (from 21 per cent to 16.5 per cent of total employment). The values of the labour-intensity and sector share effects can be read off the coordinates in Figure 2: for the UK for the period 1985–95, the coordinates of the square marker are (-7.3; -1.2) indicating the labour-intensity and sector share effects, respectively. For the period 1995–2005, as can be seen from the terminal point of the line of the UK, the labour-intensity

3 See the Appendix for the derivation of these terms.

and sector share effects were -3.8 and -3.6 respectively. Combined with the aggregate labour-productivity effect of 2.1, these sum to -5.3, which is the percentage points by which manufacturing declined as a share of total employment in the UK during this period.

Since the decomposition of employment shares is three-dimensional, the location of a point in this two-dimensional figure (which excludes the aggregate labour-productivity effect) cannot be as neatly interpreted as in the first decomposition, which decomposed changes in the level of manufacturing employment into just two dimensions. In Figure 2, the location of a point in the north-east quadrant indicates that both the labour-intensity and sector share effects contributed positively growth in the share of manufacturing in total employment. The net change in the share of manufacturing in total employment would, however, depend on the sign and relative magnitude of the aggregate labour-productivity effect as well.[4] Only in Peru and Bolivia—which are two of the lowest-income countries in the sample—and only for the first period 1985–95 are points located in the north-east quadrant. This is indicative of the low probability of a country's manufacturing sector simultaneously becoming more labour-intensive and growing as a share of total value added, especially at higher levels of income per capita.

A location in the north-west quadrant indicates that, for that country and time period, manufacturing grew as a share of total value added but became less labour-intensive. Where the point falls to the right of the y=x line, the positive share effect outweighs the negative labour-intensity effect, and conversely to the left of the line. Both the sector share and labour-intensity effects are negative in the south-west quadrant, and unless their sum were outweighed by a positive aggregate labour-productivity effect there would have been a fall in the share of manufacturing in total employment for that country and time period. For a point located in the south-east quadrant, manufacturing became more labour-intensive but shrank as a share of total value added. In this quadrant, for a point to the right of the diagonal y=x line the positive labour-intensity effect outweighed the negative sector share effect, and vice versa.

The overwhelming majority of points are located either in the south-west quadrant, where manufacturing became less labour-intensive while shrinking as a share of total value added, or in the north-west quadrant to the left of the y=x line, where manufacturing became less labour-intensive but grew as a share of total value added. Although the latter category comprises primarily developing countries, an interesting exception is that of Sweden, in which manufacturing grew as a share of total value added, in particular between 1995 and 2005.

The results also show up an interesting contrast between Asian and Latin American middle-income countries. With the exception of Taiwan in the first period, all the Asian newly industrialized countries (NICs) in both periods are in the north-west quadrant, with manufacturing becoming less labour-intensive (i.e. more productive) and growing as a share of value added. In middle-income Latin American countries such as Venezuela, Chile, Colombia in the second period, and Brazil, by contrast, both the labour-intensity and sector share effects were negative in both periods. Despite the fact that manufacturing was generally

4 Note that the aggregate labour-productivity effect is positive in all cases except for the following: Mexico in the first period, Venezuela in both periods, and Spain (marginally) in the second period.

a lower share of total value added in these countries than in the Asian NICs at the beginning of the period of analysis, manufacturing shrank as a share of total value added in the Latin American countries while growing further in the Asian NICs. It is also striking that the Asian NICs are located far out from the origin, indicating the size of both the sector share and labour-intensity components, in contrast to the Latin American countries, Venezuela and Brazil in particular. These differences are surely not unrelated to the divergent growth performances of these two groups of middle-income countries during these periods of time.

Reflecting on the results from the decompositions, both of changes in the level and share of manufacturing employment, a fall in manufacturing employment (whether level or share) associated primarily with changes in the labour-intensity of production, is very different from a fall in manufacturing employment associated primarily with a declining level/share of manufacturing output. These two types of falling manufacturing employment are quite different phenomena, likely to have different causes, different implications for growth, and to require different policy interventions (should they be deemed undesirable). Given that labour-intensity refers here to the labour-intensity of value added, which is simply the inverse of labour-productivity, a decline in labour-intensity amounts to an increase in labour-productivity.

If a decrease in manufacturing employment share is primarily accounted for by falling labour-intensity of manufacturing, this calls into question the extent to which 'deindustrialization' is an appropriate characterization. This is especially relevant in cases where the manufacturing sector is growing in real terms as well as increasing its share of GDP. There could be various underlying economic causes behind falling labour-intensity in manufacturing, which might relate to the subsectoral composition of manufacturing and/ or to processes within subsectors (including as a defensive response to cheap manufacturing imports from lower-wage countries). In an 'optimistic' scenario, falling labour-intensity could essentially amount to exogenous increases in labour-productivity, driven by factors such as improved skills or technology. Or, falling labour-intensity could be caused by labour-displacing capital intensification. The actual causes of falling labour-intensity would vary across countries and time periods, and are not the focus of this study. The point is that a fall in the share of manufacturing employment that is mostly accounted for by falling labour-intensity of manufacturing (i.e. increasing labour-productivity of manufacturing) would not necessarily have a negative impact on growth. The impact on growth would be contingent on various conjunctural factors, including the causes of the fall in labour-intensity.

This is very different from the case where the fall in the share of manufacturing employment is associated primarily with a decline of the manufacturing sector as a share of GDP (and especially in cases such as the latter two, where manufacturing shrank in real terms as well). In such a scenario, an economy would be particularly at risk of losing out on the growth-pulling effects of manufacturing. This could be associated with a diminution of long-term growth prospects (although of course this would be contingent on the country's stage of development, on the nature of the manufacturing sectors in decline, of the sectors whose share of GDP is growing and so on). This strongly suggests the need to go deeper into the black box of falling share of manufacturing employment—as this paper has attempted to do—before the effects on growth can be assumed.

One insight that emerges from this analysis is the significant heterogeneity of experiences that would be characterized as 'deindustrialization' when considered exclusively in terms of the share of manufacturing in total employment (as with the conventional denotation of

deindustrialization). We would argue that a case in which the sector growth effect, sector share effect, and aggregate labour-productivity effects are all positive and the decline in manufacturing employment level and/or share is accounted for entirely by a negative labour-intensity effect should not be characterized as deindustrialization in any real sense. If labour-productivity rises more rapidly in manufacturing than in the rest of the economy—as might be expected if manufacturing does indeed have the Kaldorian properties attributed to it—and if manufacturing does not increase its share of GDP commensurately, then the share of manufacturing in total employment would of course fall.

Yet, it does not seem meaningful to characterize such a process as deindustrialization, particularly when associating deindustrialization with negative implications for growth. Rather than defining deindustrialization in terms of the single dimension of falling share of manufacturing in total employment, as in the current literature, we propose that deindustrialization should be regarded as occurring when there is a sustained decline in both the share of manufacturing in total employment and the share of manufacturing in GDP.

4 From deindustrialization to reindustrialization?

In considering pathways to industrialization in the twenty-first century, the reality that there has been, and continues to be, deindustrialization in many countries needs to be taken into account. This implies that the challenge of industrialization may thus also entail 'reindustrialization'.

We have suggested that deindustrialization should appropriately be defined as a sustained decline in both the share of manufacturing in total employment and the share of manufacturing in GDP. Reindustrialization might be thought of as a sustained increase in both the share of manufacturing in total employment and the share of manufacturing in GDP. Naturally, this is not simply a case of 'inverse deindustrialization' as there would be different dynamics at work. It is likely that there is an asymmetry in that reindustrialization is less likely to 'just happen' than is the case with a similar magnitude of deindustrialization.

We briefly review recent international experiences in which countries have experienced an increase in their share of manufacturing in GDP, and thereafter where manufacturing has increased as a share of total employment.

There are 52 countries in which manufacturing has increased as a share of GDP since 2000.[5] These are listed in Table 2, excluding the 15 countries in which the increase was less than one percentage point. Almost all of these are low- or middle-income countries. In 18 of these 52 countries, the increase in the share of manufacturing in GDP followed increases in the share of manufacturing in GDP in the preceding decade (1990–2000), while for the other 34 countries the recent increase followed a fall in the preceding decade. This latter group might be cases of reindustrialization, at least on the value added side, but they could also be cases of manufacturing simply partially bouncing back from a previous decline without a structural reversal. In fact, there only appear to be about seven countries in which manufacturing declined as a share of GDP in the 1990s but increased by a greater magnitude since 2000.

5 All value added data here sourced from UN National Accounts database (http://unstats.un.org/unsd/snaama/Introduction.asp)

These are almost all low-income countries: Pakistan, Myanmar, Equatorial Guinea, Sudan, Mali, Liberia, and Burkina Faso.

The apparent paucity of cases in which manufacturing increases as a share of GDP, outweighing previous declines, is to some extent a result of the somewhat arbitrary points in time chosen here. Manufacturing would have grown in other countries over periods spanning these points. Nevertheless, this does underline how difficult it is for manufacturing to recover (as a share of GDP) after an earlier decline.

Next, we briefly review some recent international experiences of employment creation in manufacturing. The focus is on employment creation in the decade up to the latest consistently available data (which does not extend beyond 2003). A decade is used for consistency (unless there is a specific reason to use a different period) and in order to look at sustainable manufacturing employment creation rather than short spurts of employment growth. All data is derived from the ILO's Key Indicators of the Labour Market.[6] The figures cited should be treated as indicative. Further, it should be noted that most low- and lower-middle-income countries are excluded from the data, although it is in these categories of countries that most manufacturing growth (particularly in terms of the share of total employment) would be expected.

Unusually for a developed country, Canada has seen increases in both the level and share of manufacturing employment from the early to the late 1990s (the latest available data is for 1998), although the share is not as high as it had been in the 1980s. In Ireland the level of manufacturing employment has grown steadily at a rate of 2.2 per cent per annum between 1993 and 2003 (there is a break in the series in 1998 and the effects of this are unclear), although it has declined as a share of total employment. In Italy the share of total employment in manufacturing has remained roughly steady since the mid-1980s, and although the level of manufacturing employment had earlier declined it has since been increasing from the mid 1990s onwards (data up to 2003).

There have been steady increases in the level of manufacturing employment but falls in the share of total employment in the decade up to 2003; in Ecuador (data up to 2002), Honduras (2.3 per cent manufacturing employment growth per annum from 1995–2002), and El Salvador (3.8 per cent growth per annum from 1992–2001). In Guatemala (up to 2002), both the level and share of manufacturing employment have been increasing. The Bahamas has experienced an almost continuous growth of manufacturing employment over the period for which data is available (2.8 per cent per annum for 1991–99), although it has remained low and stable as a percentage of total employment.

Brazil, surprisingly given the poor performance of its manufacturing sector, shows increases in both the level and share of manufacturing employment in the decade up to 2002 (although the share is not as high as it was in the 1980s), with an annual increase of 2.2 per cent in the period 1992–2002. There is however a break in the series in 2002 which may have artificially inflated this increase; if the year 2002 is excluded, the annual increase from 1992–2001 is 1.2 per cent per annum In Trinidad and Tobago the level of manufacturing employment has been increasing at a rate of 2.8 per cent per annum in the decade up to 2002, while the share has

6 See: http://www.ilo.org/empelm/what/lang--en/WCMS_114240

been fluctuating around a fairly constant level. In Nicaragua both the level and share of employment have been increasing (at a rate of 9.4 per cent per annum from 1993–2003, but excluding the years 2002 and 2003 where there are breaks in the series, just 2.8 per cent per annum). One consideration to be borne in mind regarding the figures from Latin America and the Caribbean is that some or all of the manufacturing jobs created (notably in countries such as Nicaragua, Mexico, Guatemala, and Honduras) is due to 'maquila' production, which has less of the positive effects associated with manufacturing than would be the case in most non-maquila manufacturing.

In Egypt, data is only available up to 1995, but up to that point the level of manufacturing employment is increasing, but the share is fluctuating around a fairly constant level. The level of manufacturing employment in Mauritius has been increasing (2 per cent per annum in the five years up to 1999, the latest available date), but roughly steady as a share. Data for Hungary is available only up to 1998, but the couple of preceding years saw small increases in both the level and share.

Indonesia has seen significant and steady increases in both the share and level (4.4 per cent per annum from 1992–2002). The level of manufacturing employment in Malaysia has been on a general upward trend (2.4 per cent annual increases from 1992 to 2002) although declining a bit as a share since the mid-1990s. In Myanmar, data is available only up to 1998, but until that point both the level and share of manufacturing employment have been increasing (the former at 2 per cent per annum). In Pakistan the level of manufacturing employment has been increasing at 4 per cent per annum (1992–2002); the share had earlier fallen, but has since increased back to the high shares of the 1980s.

In the Philippines the level of manufacturing employment has been increasing (by 2.1 per cent per annum during 1991–2001) while the share has been fluctuating around a fairly constant level for some time. In Sri Lanka the level of manufacturing employment has been increasing though in a volatile fashion (data up to 1998) but the share falling. In Thailand both the level and share of manufacturing employment have been rising, with the number of manufacturing jobs increasing at 2.5 per cent per annum from 1993–2003. There is, however, a break in the series in 2002; if measured only up to 2001 the annual increases are 2.3 per cent. Both the level and share of manufacturing employment have also been increasing in Turkey: the level by 3.3 per cent per annum from 1990 to 2000 (the latest available), and the share from 14.2 per cent to 16.9 per cent.

There are thus a number of countries, especially in Asia, that have been experiencing increases in manufacturing employment—particularly in the level, less commonly in the share—in recent years. The annual rates of increase cited are (generally) for the most recent decade for which data is available, and faster rates of increase are of course evident for shorter periods, as well as in earlier periods. Of course, there are bound to be many more countries whose employment in services has grown than for manufacturing. As would be expected, these are particularly but not exclusively upper-middle- and higher income countries.

5 Conclusions

The empirical analysis of changes in the level and share of manufacturing employment internationally over the period 1985–2005 brought out the heterogeneity of what could

conventionally be characterized as deindustrialization. This heterogeneity relates in particular to the dynamics of manufacturing productivity. In some cases, decline in manufacturing employment is accounted for in the main by decreasing labour-intensity in manufacturing, which is equivalent to increasing labour-productivity. This is so particularly in fast-growing economies. Increasing labour-productivity in manufacturing was an important dynamic in the growth experiences of the East Asian NICs. This is a very different situation from where the manufacturing sector as a whole is in decline with contracting output.

A stylized fact that emerges is that it is highly unusual for manufacturing to grow (in terms of real value added) while simultaneously becoming more labour-intensive. This holds true especially at higher levels of income per capita. This observation again underlines the importance of increasing labour-productivity in manufacturing for manufacturing growth. It also poses a challenge for the role of manufacturing in labour absorption, especially in countries facing a problem of high rates of unemployment.

Reindustrialization after deindustrialization is likely to prove even more challenging than the earlier industrialization. Re-raising the share of manufacturing in a country's total employment (or GDP) in the twenty-first century would take greater 'effort' than was the case in the initial increase.

Developing countries that have deindustrialized may, in some ways, face the most acute challenges. Deindustrialization in developing countries can be considered 'premature' in the sense that of commencing at lower levels of income per capita than was generally the case for deindustrialization in advanced economies. Furthermore, deindustrialization in developing countries could be associated with policy shifts—in particular trade and financial liberalization—rather than just with the 'maturation' of their economic structure; see Palma (2005; 2008) for more on this. Premature deindustrialization is likely to have particularly severe negative effects on long-term growth, as less of the benefits of industrialization would already have been captured. Competition from China and other low-cost manufacturers in Asia tends to affect developing countries especially hard, as they are more likely to be competing in the manufacture of similar types of goods. Developing countries can be in a situation of being unable to compete with China on cost grounds, yet lacking the technology, skills, and market access to compete higher up the value chain with developed countries.

Reindustrialization may be particularly necessary as well as viable in countries where 'premature' deindustrialized has been triggered or exacerbated by policy-related factors such as trade or financial liberalization. Policy interventions might be able to reverse some of such premature deindustrialization. However, it needs to be recognized that it is generally difficult to build up lost production capacity, because of micro-level factors such as loss in market share, fixed capital, networks both in input sourcing and output markets, skills, tacit knowledge, and the other institutional qualities that are built up over time. Moreover, where the international market structure has changed since deindustrialization—for instance, due to the increasing dominance of low-cost producers in labour-intensive activities—this can make re-entry much more difficult than it would have been to enter previously or even to maintain a market position while continuing production.

These challenges, along with the stylized facts of the changes in sectoral composition internationally, do not detract from the importance of developing the manufacturing sector and of the desirability of (re)industrialization, especially in middle- and lower-income countries. They do, however, underline how difficult this can be. The types of policies

relevant to meeting these challenges are beyond the scope of this paper. What we can say is that, if countries want to pursue (re)industrialization in the twenty-first century, it cannot be 'business as usual'. Decisive and effective industrial policies are required, along with a macroeconomic environment that does not contribute to the further emasculation of industry.

Appendix: Technical details of decomposition

This sets out the derivation of the three components in the decomposition of the share of manufacturing in total employment presented in Section 3; all terms are as defined there.

$$\sigma_{ijt} \equiv \frac{L_{ijt}}{L_{jt}} \equiv \phi_{ijt}\delta_{ijt}\theta_{jt}$$

hence $\Delta\sigma_{ij} = \phi_{ijt}\delta_{ijt}\theta_{jt} - \phi_{ijt-h}\delta_{ijt-h}\theta_{jt-h}$

$$= \underbrace{(\phi_{ijt} - \phi_{ijt-h})\left(\frac{\delta_{ijt\ h}\theta_{jt\ h} + \delta_{ijt}\theta_{jt}}{2}\right)}_{\text{labour-intensity effect}_1} + \underbrace{(\delta_{ijt} - \delta_{ijt\ h})\left(\frac{\theta_{jt-h} + \theta_{jt}}{2}\right)\left(\frac{\phi_{ijt-h} + \phi_{ijt}}{2}\right)}_{\text{sector share effect}_1} +$$

$$\underbrace{(\theta_{jt} - \theta_{jt-h})\left(\frac{\delta_{ijt-h} + \delta_{ijt}}{2}\right)\left(\frac{\phi_{ijt-h} + \phi_{ijt}}{2}\right)}_{\text{aggregate labour-productivity effect}_1}$$

$$= \underbrace{(\phi_{ijt} - \phi_{ijt-h})\left(\frac{\delta_{ijt-h} + \delta_{ijt}}{2}\right)\left(\frac{\theta_{jt-h} + \theta_{jt}}{2}\right)}_{\text{labour-intensity effect}_2} + \underbrace{(\delta_{ijt} - \delta_{ijt\ h})\left(\frac{\theta_{jt-h}\phi_{ijt-h} + \theta_{jt}\phi_{ijt}}{2}\right)}_{\text{sector share effect}_2} +$$

$$\underbrace{(\theta_{jt} - \theta_{jt\ h})\left(\frac{\delta_{ijt-h} + \delta_{ijt}}{2}\right)\left(\frac{\phi_{ijt-h} + \phi_{ijt}}{2}\right)}_{\text{aggregate labour-productivity effect}_2}$$

$$= \underbrace{(\phi_{ijt} - \phi_{ijt\ h})\left(\frac{\delta_{ijt-h} + \delta_{ijt}}{2}\right)\left(\frac{\theta_{jt-h} + \theta_{jt}}{2}\right)}_{\text{labour-intensity effect}_3} + \underbrace{(\delta_{ijt} - \delta_{ijt-h})\left(\frac{\theta_{jt-h} + \theta_{jt}}{2}\right)\left(\frac{\phi_{ijt-h} + \phi_{ijt}}{2}\right)}_{\text{sector share effect}_3} +$$

$$\underbrace{(\theta_{jt} - \theta_{jt\ h})\left(\frac{\delta_{ijt-h}\phi_{ijt\ h} + \delta_{ijt}\phi_{ijt}}{2}\right)}_{\text{aggregate labour-productivity effect}_3}$$

Taking the means of each of the three terms from the three alternative formulations,

the labour-intensity effect = $\frac{1}{6}(\phi_{ijt} - \phi_{ijt-h})\left\{\left(\delta_{ijt-h}\theta_{jt-h} + \delta_{ijt}\theta_{jt}\right) + (\theta_{jt-h} + \theta_{jt})(\delta_{ijt-h} + \delta_{ijt})\right\}$

the sector share effect = $\frac{1}{6}(\delta_{ijt} - \delta_{ijt-h})\left\{\left(\phi_{ijt-h}\theta_{jt-h} + \phi_{ijt}\theta_{jt}\right) + (\theta_{jt-h} + \theta_{jt})(\phi_{ijt-h} + \phi_{ijt})\right\}$

and the aggregate labour-productivity effect = $\frac{1}{6}(\theta_{ijt} - \theta_{ijt-h})\{(\phi_{ijt-h}\delta_{jt-h} + \phi_{ijt}\delta_{jt}) + (\delta_{jt-h} + \delta_{jt})(\phi_{ijt-h} + \phi_{ijt})\}$.

These three components sum exactly to the change in the share of employment in sector in the total employment of country *j* over the period *h*.

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Table 1: Summary of trends in manufacturing performance among sample countries, 1985–2005

	%Δ level manuf. VA	%Δ level manuf. employment	Δ share manuf. VA	Δ share manuf. employment	%Δ manuf. productivity
Argentina	44	-22	-3	-7	84
Bolivia	105	204	1	6	-32
Brazil	38	23	-2	-2	13
Chile	156	43	-3	-2	79
Colombia	77	73	-1	-0	2
Costa Rica	176	92	1	-2	44
Hong Kong	-4	-75	-7	-29	287
Indonesia	317	106	10	3	102
India	264	73	2	2	111
Japan	42	-21	-1	-6	79
Korea	416	21	14	-5	327
Mexico	77	40	1	-2	27
Malaysia	526	166	12	8	136
Peru	64	21	-0	-2	35
Philippines	103	58	-1	-0	28
Singapore	355	55	5	-4	194
Thailand	432	165	16	7	101
Taiwan	175	9	-5	-6	152
Venezuela	26	-0	-4	-7	26
South Africa	43	0	-2	-2	42
Denmark	-3	-26	-6	-6	32
Spain	65	31	-3	-4	26
France	44	-25	-1	-7	91
Italy	22	-10	-3	-5	35
Netherlands	54	-10	-2	-6	71
Sweden	116	-26	7	-5	191
UK	22	-37	-6	-10	94
USA	80	-19	0	-7	123

Note: %Δ refers to net changes in percentage points over the whole period 1985–2005.

Source: derived from Groningen Growth and Development Centre data and Quantec South African Standardised Industry Database (http://www.ggdc.net/databases/10_sector.htm and http://www.quantec.co.za/data/easydata-rsa-standardised-industry)

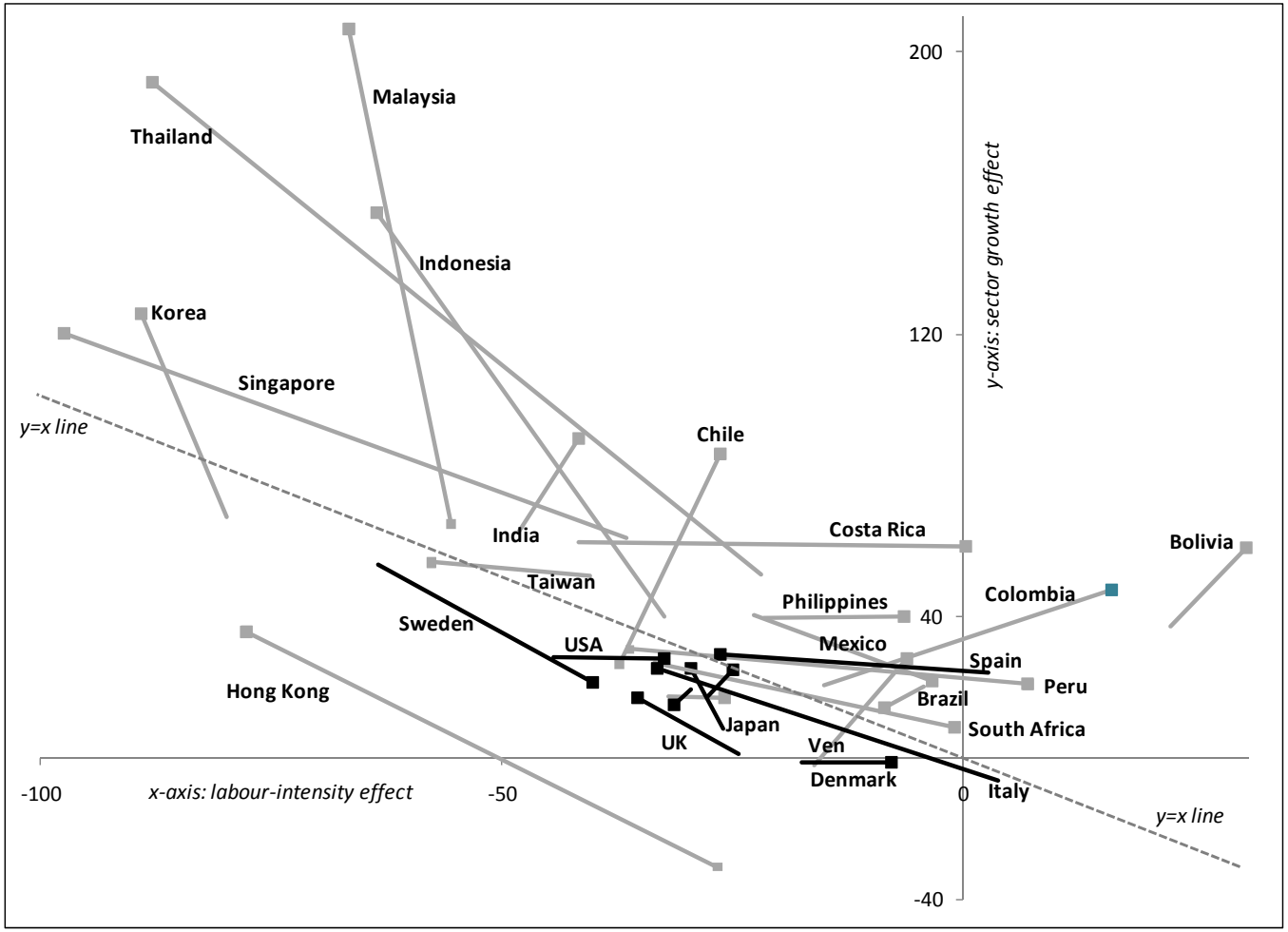
Table 2: Countries in which manufacturing increased as % GDP 2000–07

Country	Change in manufacturing as % GDP	
	2000–7	1990–2000
Uruguay	6.5	-8.7
Uzbekistan	5.6	-8.4
Argentina	5.4	-9.0
Equatorial Guinea	4.9	-1.4
Oman	4.6	2.4
Mozambique	3.7	0.8
Pakistan	3.7	-1.2
Myanmar	3.6	-0.6
Lao	3.6	7.0
Suriname	3.2	4.6
Bangladesh	2.7	2.8
Belize	2.7	-4.4
Sudan	2.6	-1.9
Mali	2.5	-1.0
Madagascar	2.3	-4.3
Qatar	2.3	-7.3
Congo	2.2	-4.8
Viet Nam	2.2	6.3
Jordan	2.1	-2.3
Zimbabwe	1.9	-10.6
Lesotho	1.9	4.1
Liberia	1.9	-1.7
Turkey	1.9	-2.8
Cambodia	1.8	8.1
Yemen	1.7	-2.6
Burkina Faso	1.6	-1.2
Swaziland	1.6	0.8
Nicaragua	1.5	-2.1
Lithuania	1.4	2.0
Ukraine	1.3	-15.5
North Korea	1.3	-14.1
Greece	1.2	-4.5
Thailand	1.2	8.7
Saint Lucia	1.1	-3.1
Albania	1.0	4.8
Syria	1.0	-4.0
Angola	1.0	-2.1

Note: Sample limited to countries in which the 2000–07 increase exceeds one percentage point.

Source: Data sourced from UN National Accounts (http://unstats.un.org/unsd/snaama/Introduction.asp)

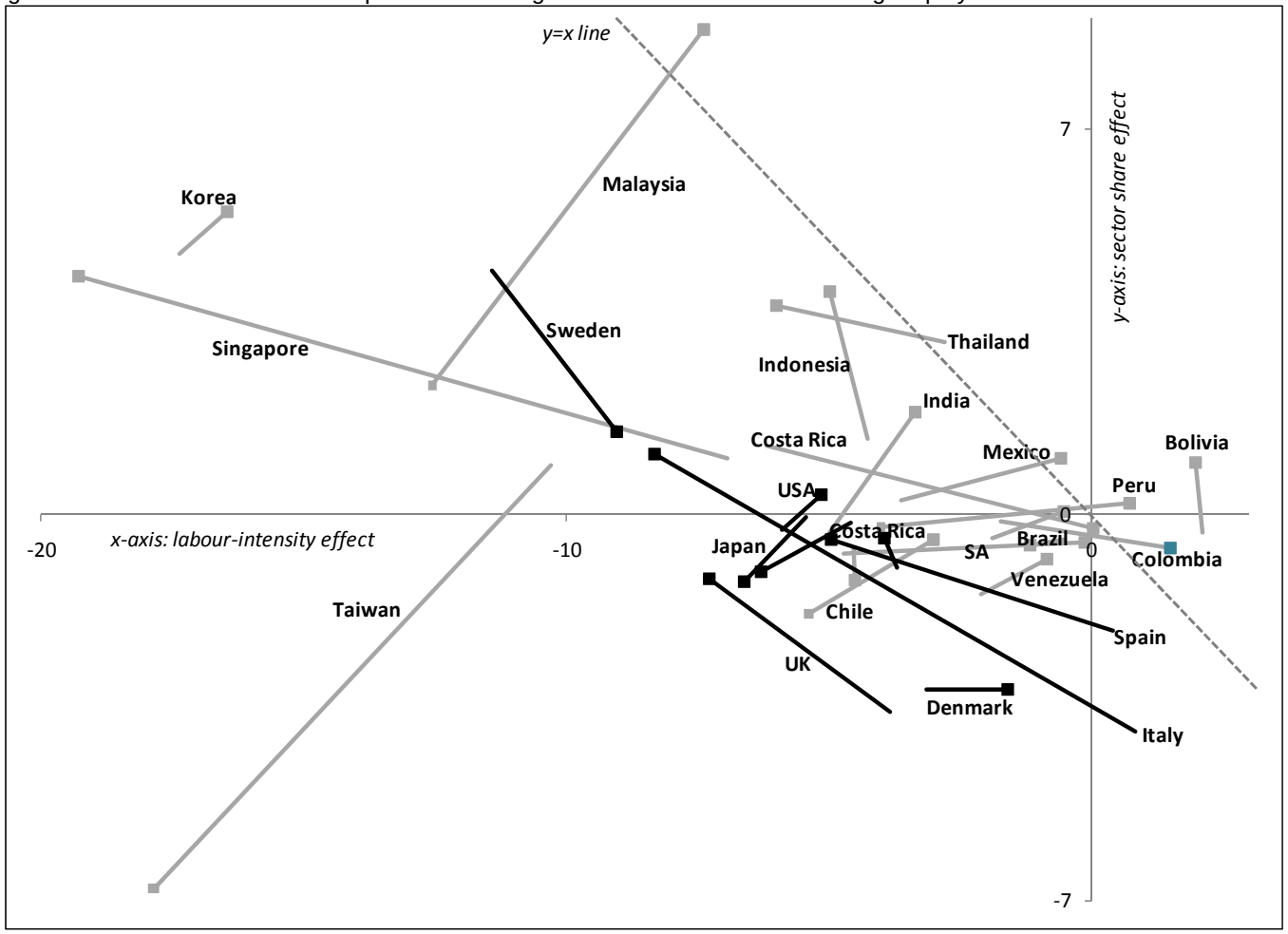
Figure 1: Decomposition of change in the level of manufacturing employment: 1985–95 and 1995–2005



Notes: Square marker refers to 1985–95; end of line refers to 1995–2005. Venezuela, Argentina, France, and the Netherlands are included in the chart, but are not labelled for reasons of space; these are the short lines located nearby the UK and Japan.

Source: author's illustration.

Figure 2: Partial results from decomposition of changes in the share of manufacturing employment: 1985–95 and 1995–2005



Notes: Only the labour-intensity and sector share effects are shown here, not the aggregate labour-productivity effect. Square marker refers to 1985–95; end of line refers to 1995–2005. Italy and the Philippines are included in the chart but are not labelled for reasons of space.

Source: author's illustrations.