

# The Myths and Reality of Deindustrialization in Sweden: the Role of Productivity

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## ABSTRACT

This article analyzes three possible hypotheses behind deindustrialization in Sweden. The main conclusion is that deindustrialization is both a myth and a reality. There has been a decrease in manufacturing employment in both relative and absolute terms in the post-war period, and the share of nominal GDP has gone in the same direction. However, the high productivity growth in manufacturing has led to an increase in its share of real GDP since the beginning of the 1990's. Using input-output analysis, it is shown that the loss of employed who work with satisfying final demand for manufactured goods is less pronounced than what is shown by official statistics. The explanation for this is a deeper interaction with the rest of the economy, particularly in relation to knowledge-intensive service industries.

## RÉSUMÉ

Cet article présente l'analyse de trois hypothèses possibles pour expliquer la désindustrialisation en Suède. Sa principale conclusion est que la désindustrialisation est à la fois mythe et réalité. Pendant l'après-guerre, l'emploi a chuté de façon relative et absolue dans le secteur de la fabrication, et sa part du PIB nominal a suivi cette tendance. Néanmoins, depuis le début des années 1990, la croissance rapide de la productivité du secteur de la fabrication a entraîné une hausse de sa part du PIB réel. L'analyse des intrants et extrants permet de montrer que la chute du nombre de personnes qui travaillent pour répondre à la demande finale de produits manufacturés est moins marquée que la chute de l'emploi dans le secteur de la fabrication, selon sa stricte définition. Ce changement serait causé par une intégration accrue de la fabrication au reste de l'économie compte tenu des secteurs de service à forte intensité de savoir, apportent davantage d'intrants à la fabrication.

IN THE LAST THIRTY YEARS, the share of manufacturing in total world GDP has decreased. Simultaneously, there has been a fall in manufacturing employment in the Western world. This

structural change is defined as deindustrialization and started in the United States at the beginning of the 1960s.<sup>2</sup> Since then, almost all rich countries experienced this trend, although at different

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2 See, for example, Rowthorn and Ramaswamy (1997), Rowthorn and Coutts (2004), Nickell *et al.* (2008) and Pilat *et al.* (2006).

speeds and to different degrees.<sup>3</sup>

Sweden has been part of this. Despite deindustrialization being a well-known phenomenon, an understanding about its causes is still relatively limited. From a Swedish perspective, this article aims at critically analyzing three of the hypotheses usually emphasized as possible explanations for the deindustrialization.<sup>4</sup> These are: (1) demand for manufactured goods decreases as countries become richer; (2) faster productivity growth in manufacturing compared to the service sector; (3) manufacturing has been focusing on its core activities and has deepened its interaction with other sectors in the economy.

The article is structured as follows. The next section presents an overview of the process of

deindustrialization in Sweden. The next three sections analyze the three hypotheses. The article concludes with a summarizing discussion.

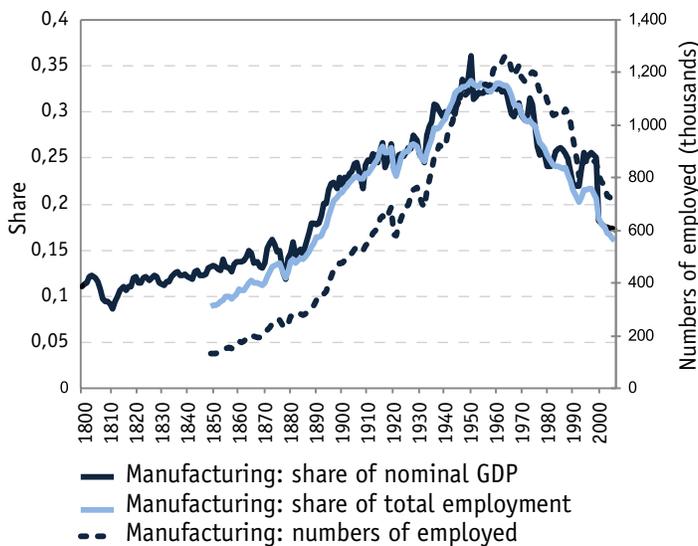
## Swedish Deindustrialization

Three indicators are usually used to identify and analyze deindustrialization: (1) the number of employed in manufacturing, (2) the share of manufacturing employment in relation to total employment and (3) the share of manufacturing in nominal GDP.<sup>5</sup>

On the basis of these indicators, the Swedish industrialization and deindustrialization process is summarized in Chart 1. Industrialization became increasingly intensive in the latter part of the 19th century and continued over the World Wars until the 1950s, but then reached a plateau. After that, the phase of deindustrialization started. Both the sector's share of nominal GDP and relative employment reached their highest levels already in 1951, even if the level in the latter case was almost as high ten years later. In absolute terms, manufacturing employment reached its highest level in 1965 (1,263 thousand). After that there has been a gradual decrease and in 2007 it amounted to 722 thousand.<sup>6</sup> This means that the number of employed has returned to the same level as in the latter part of the 1920s and the first years of the 1930s. The downturn is even more pronounced in relative terms – one has to go back to the years around the previous turn of the century in order to find an equally low level of relative manufacturing employment.

Despite this considerable structural change, Palma (2004) argues that the development in Sweden – at least between 1960 and 1998 – fol-

**Chart 1**  
**Manufacturing in Sweden, 1800-2007**



Sources: Edvinsson (2005), Statistics Sweden and own calculations.

3 It is mainly employment in textiles and metal production manufacturing that has decreased in G7 countries since the 1970s.

4 See, for example, Schettkat and Yocarini (2003). A fourth hypothesis is the increase in trade with low-cost countries. Rowthorn and Coutts (2004) estimate that about 5 million manufacturing jobs were lost in the Western world between 1992 and 2002 due to this trade.

5 See, for example, Rowthorn and Coutts (2004), Nickell *et al.* (2008) and Palma (2004).

6 Note that the series until 2000 are from Edvinsson (2005) and those after that from the national accounts of Statistics Sweden. For all three variables, the levels are higher in Edvinsson's statistics. Thus, the downturn since the beginning of the new millennium is somewhat overestimated.

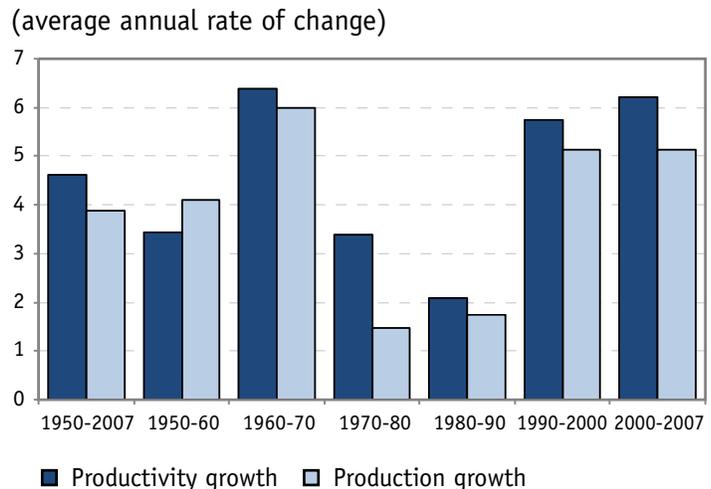
lows an average pattern of deindustrialization that many other developed countries also have experienced.<sup>7</sup>

Swedish deindustrialization is characterized by periods with favorable output and labour productivity growth, but also the opposite. This is summarized in Chart 2. Average yearly output growth in manufacturing amounted to 3.9 per cent between 1950 and 2007. With an average labour productivity growth of 4.6 per cent, this means that the average decrease in hours worked was 0.7 per cent per year. The first two decades are characterized by rapid output growth at the same time as this demand was mainly met by an improved productivity, but also by a slight increase in employment.<sup>8</sup> The second – notorious – phase is characterized by weak demand and low productivity growth. In terms of employment and production, the 1970s is the worst decade since the 1950s and the 1980s the corresponding decade when it comes to productivity growth.

The third, more favorable phase of deindustrialization began with the crisis years at the beginning of the 1990s and lasted until the financial crisis in 2008. With an average yearly productivity growth of about 6 per cent per year since 1990, this means that output would have had to grow at an even faster pace for employment to increase.<sup>9</sup> This has not been the case, and employment has continued to decrease.

Deindustrialization in Sweden is a fact – there has been a decrease in the manufacturing sector’s share of nominal GDP and also in its rela-

**Chart 2**  
**Manufacturing in Sweden: Output and Labour Productivity Growth, 1950-2007**  
(average annual rate of change)



Sources: BLS and own calculations.

tive and absolute employment. The question is: what can explain these developments?

### Changes in the Composition of Demand

Engel’s law was established to describe how the relative consumption of food decreased when the Western world was industrialized. In the same way, the sociologist Daniel Bell (1976) has established the theory of postindustrial society. This theory predicts a decrease in household demand for manufactured goods in favor of a larger share of services when GDP per person grows.<sup>10</sup> The theory of a growing service society thus takes its starting point in the hierarchy of needs that the human nature is assumed to have. When our basic material needs have been satis-

7 Palma (2004) also shows that the inverted U-relation is not constant over time; countries that have been industrialized at a later stage than the Western world have reached their inflection point at an increasingly lower level of GDP per person.

8 More hours worked is of course translated into higher employment when the current staff cannot work additional hours.

9 For the 1990-2007 period, no other country in the Western world experienced such strong output and labour productivity growth in manufacturing as did Sweden.

10 Expressed differently: the income elasticity for services is larger than one. Summers (1985) is an ambitious attempt at establishing the connection between demand for services and the level of development at the global level. Depending on what price deflators are used, he obtains different results.

**Table 1****Indicators of the Composition of Demand in the Swedish Economy**

## Panel A. Output growth, 1980-2007 (average annual rate of change)

	1980-2007	1980-90	1990-2000
Total economy	2.4	2.2	2.1
Private sector	3.1	2.5	3.1
Manufacturing	4.2	1.9	5.4
Service sector	3.0	2.8	2.9

## Panel B. Household consumption, 1980-2007 (period average)

Share of nominal consumption	1980-2007	1980-90	1990-2000
Goods	0.54	0.61	0.50
Services	0.46	0.39	0.50
Durable goods	0.09	0.10	0.08
Share of real consumption	1980-2007	1980-90	1990-2000
Goods	0.50	0.52	0.48
Services	0.50	0.48	0.52
Durable goods	0.09	0.07	0.07

## Panel C. Nominal demand for manufactured goods, shares, 1995-2005 (average share)

	1995-2005
Domestic economy: household demand	0.15
Domestic economy: final demand	0.33
Domestic economy: total demand	0.32
Total economy: household demand	0.22
Total economy: final demand	0.38
Total economy: total demand	0.38

Source: Statistics Sweden and author's calculations.

fied, an increasing share of our consumption is directed towards services which are assumed to increase our quality of life in a broader sense. As a consequence, there will be a decrease in manufacturing employment – in absolute and relative terms – and in the sector's share of nominal GDP.

Has there been a decrease in demand for manufactured goods in favor of more services during the process of Swedish deindustrialization?

The question can be answered from several indicators. The most important of them are presented in Table 1. From this table, it appears, from Panel A, that the output growth of manufactured goods has been higher than for services since 1980 and that this is explained by a favorable

relative – and absolute – growth since the beginning of the 1990s. It thus follows that there is no indication that the structure of demand is becoming more service oriented. In the last 15 years, with an intensified globalization and even higher competitive pressure in the manufacturing sector, the trends in output have in this sense gone in the opposite direction. The question is, however, to what extent this strong output growth is due to an increasing need in the surrounding world for imports of manufactured goods produced in Sweden.

As appears from Panel B, there has been a decrease in the share of goods in nominal, domestic consumption since 1980, even if the trend has largely remained unchanged since

1990. In the same way, there has been an increase in the relative consumption of services. However, the picture is not unambiguous. When it comes to nominal consumption of durable goods, the share has been constant since 1980.

In real, inflation-adjusted terms, the share of consumption of goods of total consumption has largely remained unchanged since 1980, and for durable goods the increase is considerable since the mid 1990s. The explanation for this is that the falling relative prices for goods mean that households can consume as much goods as before, but at the same time still have money left to increase their consumption of more (and relatively more expensive) services.<sup>11</sup> Since the 1980s, there has not been any decrease in the quantity of manufactured goods for which there is a demand by Swedish households, but the shift in relative prices has resulted in a decrease in the share of goods in nominal terms, in particular after the 1980s.<sup>12</sup>

An additional indicator of the consumption structure is obtained by studying the input-output-tables of Statistics Sweden. When imports and exports are excluded, the first line in Panel C shows that there has been an decrease in nominal household demand for manufactured goods between 1995 and 2005 – from 15 to 12 per cent. A similar pattern emerges from the other domestic indicators: the share of manufactured goods in final and total demand (intermediate and final demand).

However, the last three lines show that the pattern is somewhat different if trade with the

outside world is included. Household demand for manufactured goods has remained unchanged in nominal terms if it is taken into account that imports of manufactured goods that target household demand are larger than the corresponding demand for services. The same also applies for final and total demand: the share of manufactured goods in final and total demand has remained unchanged since 1995 if trade with the surrounding world is included. Considering that there has been a fall in relative prices for manufactured goods between 1995 and 2005, this means that there has probably been an increase rather than a decrease in their share of total household real aggregate demand and of final and total demand since the mid 1990s.

Altogether, Table 1 indicates that the deindustrialization – at least since 1980 – cannot be explained by a weaker demand for manufactured goods; in some (but not all) respects, there has been a decrease in nominal demand, but there are no indications of this having been the case in real terms. Swedish deindustrialization must have another explanation.<sup>13</sup>

## **Productivity Growth Differences between Manufacturing and Services**

Baumol and Bowen (1966) established what later came to be called Baumol's cost disease within artistic activities.<sup>14</sup> One of Baumol's basic assumptions is that in real terms, the demand for services is independent of the level

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11 Since 1990, there has been a decrease in the prices for household consumption of durable goods. Between 1990 and 2007, prices fell by about 3 per cent per year. This considerable change in relative prices probably explains why household demand for durable goods has grown about three times as quickly as household consumption of services since the beginning of the 1990s.

12 Jansson (2008) has a similar line of reasoning.

13 The indicators of the total economy in Panel C in Table 1 shows that these shares are considerably larger than the corresponding ones in Chart 1. Depending on whether the output or the user side of the economy is studied, there are different conclusions about the importance of the manufacturing sector; in 2005, 38 per cent of total demand was spent on imports of manufactured goods, while the employment share only amounted to 17 per cent.

14 In the following year, Baumol (1967) generalized the argument, which was further developed in Baumol *et al.* (1985), Baumol and Wolff (1989), and Baumol (2001).

of income and, as a consequence, the share of services in real GDP is constant over time. But the assumption of a higher productivity growth in manufacturing than in services means – along with an approximately similar increase in wages in all parts of the economy – that there is a decrease over time in manufacturing’s share of nominal GDP and of total employment. The falling nominal share of GDP is explained by productivity driven changes in relative prices. In order to keep an even pace with output growth within manufacturing, there must be a gradual increase in employment in the service sector.<sup>15</sup> These developments are not explained by a change in the patterns of demand, however; rather, it is the result of changes in supply conditions. Deindustrialization can thus occur despite relative demand for manufactured goods remaining unchanged.

Let us study Baumol’s explanations for a shrinking manufacturing sector. From Chart 3, it is clear that the productivity level – in contrast

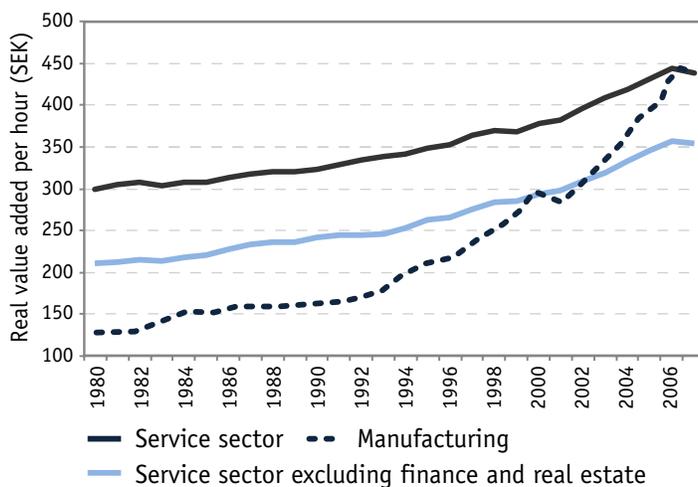
to Baumol’s theory – on average is not lower in the service sector than in manufacturing. What is shown in the chart is rather that Swedish post-war history is about manufacturing – thanks to a higher average productivity growth – having caught up with the service sector. By the financial crisis in 2008, this period of catching up had been completed.

As Chart 3 shows, the finance- and real estate sectors explain a significant part of the high productivity level in the service sector. However, even without these industries manufacturing did not catch up with the service sector until around the turn of the millennium. In particular, the real estate business, with a productivity level of 1,100 Swedish Krona (SEK) per hour in 2007, substantially contributes to the average in the service sector. But the same argument can be used for certain parts of manufacturing. In the same year, the chemical products industry showed a productivity level of slightly more than SEK 4,100 per hour and electronics and telecom a level of slightly more than SEK 3,000 per hour. It is an incorrect statement that the productivity level in the service sector on average is lower than in manufacturing.<sup>16</sup>

Since 1980, Baumol is, from this perspective, both right and wrong: the productivity level is not higher in manufacturing but productivity growth has been considerably higher in this period, in particular since the 1990s. The question is how this has affected the development of the nominal and real share of manufacturing GDP.

Baumol’s hypothesis is that the difference in productivity growth between manufacturing and the service sector results in a decrease in the relative prices of manufactured goods. According to Chart 4, this is indeed what has happened since 1980. When the differences in productiv-

**Chart 3**  
**Labour Productivity Levels in Sweden, 1980-2007**



Sources: Statistics Sweden and author’s calculations.

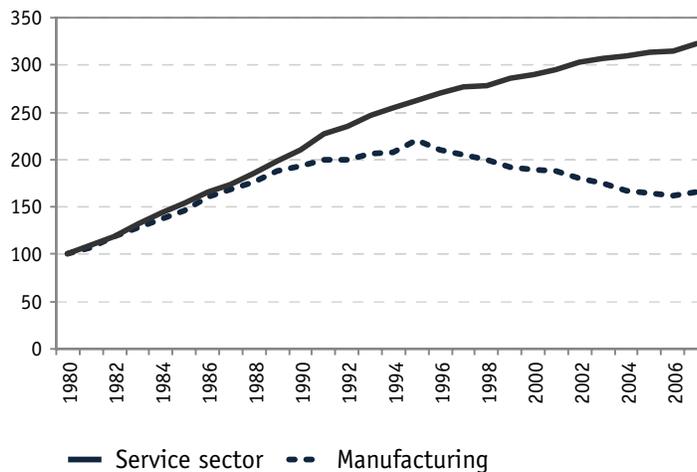
15 Asymptotically, this means that productivity growth in the economy is in the end entirely determined by the service sector since this is where everyone will be employed.

16 See ITPS (2008) for an analysis of the characteristics of different types of service industries, where some have qualities that are more similar to those of manufacturing.

ity growth between manufacturing and the service sector were smaller, their prices increased at approximately the same rate. But as – absolute and relative – productivity growth took off in manufacturing after 1990, there has not only been an increased divergence in relative prices, but also average prices within manufacturing have fallen in absolute terms. This is partly explained by an increased share of telecom products in total manufacturing production, but also in other parts of the sector has the price increase come to a halt since the mid-1990s.

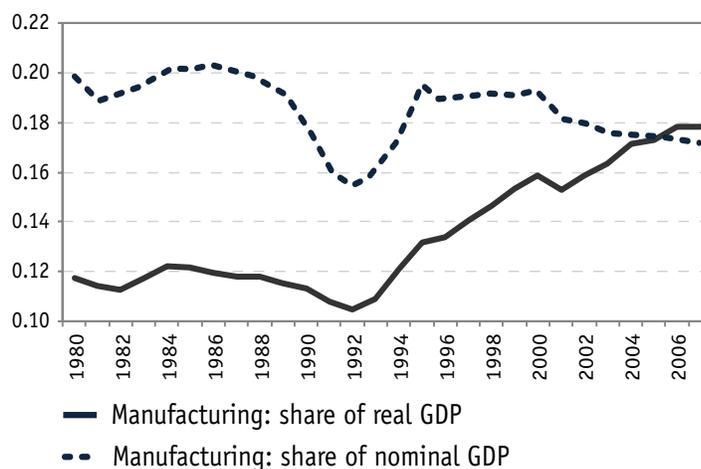
The mirror image of the changed price trend in manufacturing – most likely not only an effect of an impressive productivity growth but also of an intensified globalization and increased imports of intermediate goods – is that there has been an increase in its share of real GDP in the same period. At the same time as there has been a slight decrease in its nominal share since 1980 (even if not to any remarkable extent), the weakly falling trend until the beginning of the 1990s has, in accordance with Chart 5, turned into a period where there has been a significant increase in the share of manufacturing in real GDP since the mid-1990s.<sup>17</sup> This means that in terms of physical quantity of output produced, in the last 15 years manufacturing increased its share of the total economy real output by almost 70 per cent and since 1980 by slightly more than 50 per cent. At the same time, there has been a decrease in manufacturing employment by more than 30 per cent and there has been a fall in the sector’s share of nominal GDP. In this latter perspective, deindustrialization is entirely about changes in relative prices driven by differences in productivity growth between manufacturing and the service sector. In terms of units produced, the period

**Chart 4**  
Value Added Price Developments, Manufacturing and the Service Sector, 1980-2007  
Index (1980 = 100)



Sources: Statistics Sweden and author’s calculations.

**Chart 5**  
Nominal and Real GDP Shares in Swedish Manufacturing, 1980-2007



Sources: Statistics Sweden and author’s calculations.

17 However, real shares should be handled with caution. This is certainly the case with chain-aggregated data. One reason for this is that the non-additivity, which follows from the chain method and its yearly updated price weights, means that the real aggregate of sector X and Y is not the arithmetic sum of the real series for X and Y. This implies that real shares will not necessarily sum to unity when different sectors are related to total GDP. Hence, the real share in Chart 5 should not be seen as a “true” share. See Whelan (2002) for a more thorough discussion.

since 1980 has instead been characterized by a clear reindustrialization.

The growing divergence in productivity growth rates between manufacturing and services – which in the last 15 years has increased from an average of 1.5 to almost to four percentage points a year – also means that, at a given level of relative demand, deindustrialization has been intensified in terms of employment. But output growth in manufacturing has in fact since 1990 been about twice as high per year as in the service sector. This is the reason why the share of manufacturing employment in total employment has not fallen more than what has actually been the case.

In absolute terms, the rapid productivity growth in manufacturing during the entire post-war era means that there has been a decrease in employment. With an average yearly labour productivity growth of 6 per cent in the last 15 years, this means that there must have been a much higher output growth for manufactured goods in the 1990s and 2000s than in the 1970s and the 1980s for not causing a fall in manufacturing employment. Given no effect on demand, a productivity growth in the last 15 years on par with the development in the 1980s, would have led to an increase in manufacturing employment by 2.5-3 per cent per year.<sup>18</sup>

Altogether, this means that labour productivity growth in manufacturing is an important explanation behind the reduced employment in this sector – in both relative and absolute terms – despite the fact that demand having grown considerably faster than GDP in the last 25 years. This is also the explanation for deindustrialization in terms of nominal GDP since 1980 and the reindustrialization in real terms during the same period.

## **Greater Interaction between Manufacturing and the Rest of the Economy**

Another supply-oriented explanation for the deindustrialization is that firms increasingly buy the intermediate goods that were previously produced in-house. Due to technological development and globalization, firms have greater possibilities – both at the national and the global level – to increase their degree of specialization and separate parts of the production process.<sup>19</sup> Not the least for many manufacturing firms does this apply for services in general and business services in particular. Another aspect that points in the same direction is that many manufacturing firms today include an increasing number of services in their work at developing, producing, and marketing their products. This includes everything from R&D, IT-services, publicity and financial services to logistics, legal advice, and training/education. A manufactured good is to a smaller degree a "product" and increasingly a carrier of "services" that create extra value added.

Deindustrialization in this sense is thus about statistical reallocations of businesses and the fact that more services are required to deliver a manufactured good, rather than about a smaller number of employees in manufacturing.<sup>20</sup> A broader definition of the sector would include those intermediate goods that are required in order to meet final demand for manufactured goods and what was formerly included in manufacturing in the national accounts.

Input-output-analysis (IO) is an often used method for analyzing the interaction between manufacturing and the rest of the economy and its development over time. The starting point is to study the flow of intermediate goods between

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18 Basic arithmetic indicates that the decrease in manufacturing employment in the 1970s and 1980s would have been much more significant if productivity growth in this period had reached the levels of the 1990s and 2000s (for a given demand).

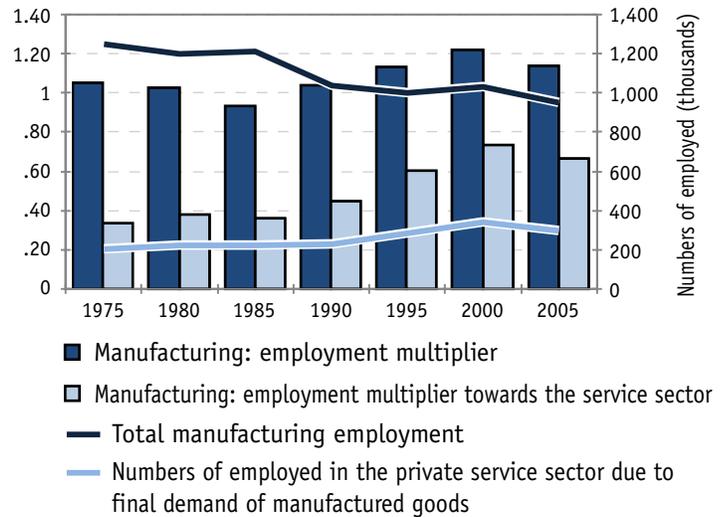
19 The interaction between industries can be expressed in several ways. See for example Wöflfl (2006) for a theoretical survey.

sectors and from this calculate how much production/employment increases in the whole economy, including at all levels of subcontractors, when there is an increase in final demand in individual sectors.<sup>21</sup> One can calculate the total number of persons involved in the production of manufactured goods, independent of where in the economy they are employed.

Chart 6 shows that there has been an increase in the number of employed in the private service sector who work to meet final demand for manufactured goods from around 200 thousand in 1975 to almost 300 thousand in 2005 – an increase of almost 50 per cent.<sup>22</sup> It also appears that the contribution of manufacturing to employment in the service sector was at its highest during the boom year of 2000. Five years later, the number had been reduced by more than 40 000 individuals.

The employment multiplier of manufacturing shows how much additional employment is on average generated by each manufacturing employee. This indicator fell between 1975 and 1985. Then, it took off, and finally fell somewhat between 2000 and 2005. Each manufacturing worker generated an average of 1.14 jobs in the private sector (including manufacturing) in 2005. Through the combination of a decrease in manufacturing employment and a rise in the indirectly employed in the private service sector, there has

**Chart 6**  
**Manufacturing and its Interaction with the Service Sector in Sweden, 1975-2005**



Sources: Statistics Sweden and author's calculations.

been a large increase in the employment multiplier for the service sector since 1985. In 1975, each manufacturing employee generated an average of 0.34 indirectly employed in the service sector. By 2005, the number of employed had doubled to 0.67.

Manufacturing employment has decreased by more than 450 thousand in the official statistics since 1975. But a greater interaction between manufacturing and non-manufacturing industries in general and the service sector in particu-

20 In the official statistics, firms and workplaces are classified according to their main business. This means that a firm belongs to manufacturing if its main task is to produce manufactured goods. The effect of this is that small changes in the business might mean that firms are reclassified and, thus, the employees will also belong to a new sector. Statistics Sweden (2010) shows that reclassifications are relatively common, but that the net flow between manufacturing and the service sector cannot explain the fall in manufacturing employment in the period 1990-2007. The National Board of Trade (2010) shows, according to the same line of reasoning, that the manufacturing share of employment and GDP has not fallen as quickly between 1997 and 2006 if company group data is taken as the starting point. The explanation for this is that those firms that belong to the service sector are then included in the group of manufacturing companies.

21 See, for example, Dietzenbacher and Lahr (2004) and ten Raa (2005) for an introduction of the input-output method and Wölfl (2006) and Pilat *et al.* (2006) for recent international applications. Hagman and Lind (2008) and Lind (2009, 2010) have in later years used the method in a Swedish context.

22 Note that these calculations are based on statistics for the private sector. To extend the comparison back to 1975 one must use the private sector. In the remainder of this section, the focus will be on the entire economy and the period 1995-2005. This means that the analysis from Chart 6 should not be confused with the rest of the analysis in the section, even if the differences in practice are almost negligible.

lar has meant that in terms of final demand the fall in employment has been limited to about 300 thousand– from 1,250 thousand to 950 thousand.<sup>23</sup> Hence, this greater inter-industry interaction can explain a significant part of the Swedish deindustrialization, but since the mid 1970s there has been a decrease in the total number of employed who, directly or indirectly, work with production of manufactured goods.

What does the period 1995 and onwards look like? The number of employed in the Swedish economy who either directly or indirectly work with production of manufactured goods can be calculated by adding up three categories of employed. First, we have those who are directly employed in manufacturing through final demand for manufactured goods. Second, we have those who at all subcontracting levels are

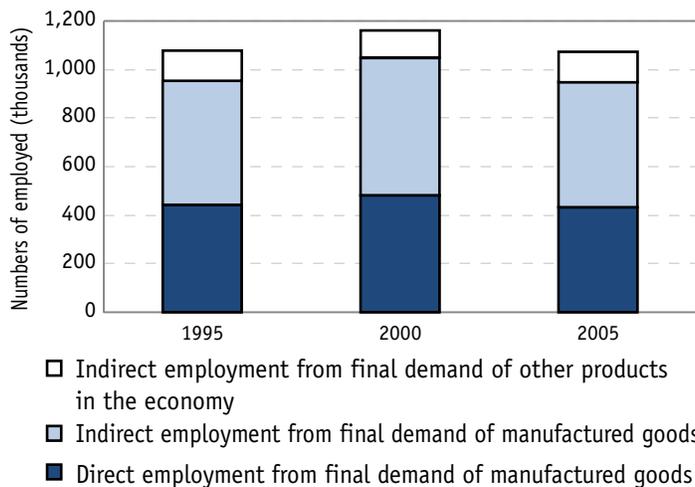
indirectly employed by final demand for manufactured goods (also in their own sector). Finally, we have those who are indirectly employed in manufacturing due to final demand for other products in the economy.<sup>24</sup>

If these three categories are added up, Chart 7 shows that manufacturing employment has largely remained unchanged between 1995 and 2005 – the decrease only amounts to 9,200 people. This is equivalent to a fall of 0.9 per cent,<sup>25</sup> compared with a 10 per cent decrease in the official statistics during the same period.

How is this total manufacturing employment distributed between the manufacturing industries? As appears from Chart 8, machinery was the industry that employed the largest number of people in 2005 – 156 thousand, 77 thousand of which were directly employed in the own industry through meeting final demand, 73 thousand were indirectly employed as a result of final demand, and 6 thousand were employed due to final demand of products in other industries.<sup>26</sup> Two other manufacturing industries of great importance for total manufacturing employment are motor vehicles (143 thousand) and food products and beverages (132 thousand). At the other end of the spectrum, there are four industries that employ less than 6 thousand people each.

A great deal of the research on deindustrialization is focused on the interaction between manufacturing and the knowledge intensive service sector and how this has developed over time.<sup>27</sup> Obviously, defining knowledge intensive services can be problematic, but on the basis of the definition of the EU Commission,

**Chart 7**  
**Total Manufacturing Employment in Sweden, 1995, 2000 and 2005**



Sources: Statistics Sweden and author's calculations.

23 Note that this total number of manufacturing employees does not include those persons in the manufacturing sector who work at meeting final demand of other industries (Chart 7).

24 For example, final demand for agricultural goods and IT-services means that these sectors must buy intermediate goods from manufacturing in order to satisfy the demand that they meet.

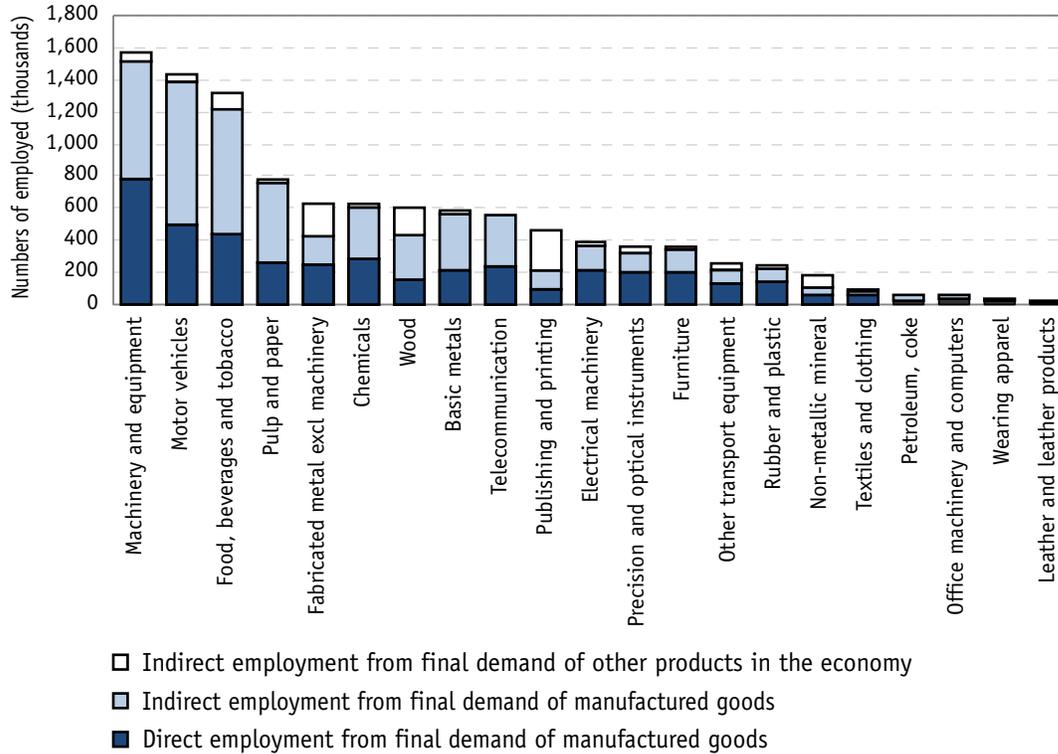
25 With this method, a total of 1,068,380 persons were in 2005 employed either directly or indirectly in the production of manufactured goods. These constituted slightly more than 24 per cent of the total number of employed in the economy – a decrease by two percentage points since 1995.

26 The highest employment multipliers are found in pulp, paper and paper products (1.9), wood and products of wood and cork (1.8), motor vehicles (1.8) and food products and beverages (1.8).

27 See, for example, EU-commission (2004), Kox and Rubalcaba (2007) and OECD (2007).

**Chart 8**

**Total Manufacturing Employment Distributed between Manufacturing Industries in Sweden, 2005**



Sources: Statistics Sweden.

it is clear from Chart 9 that there has been an increase in the number of employed in these industries who work at meeting final demand for manufactured goods since the mid 1990s – from 130 thousand to 177 thousand.<sup>28</sup> This corresponds to an increase by more than 35 per cent. An important explanation for this is that the number of employed who work indirectly with manufacturing production in business service industries has increased from

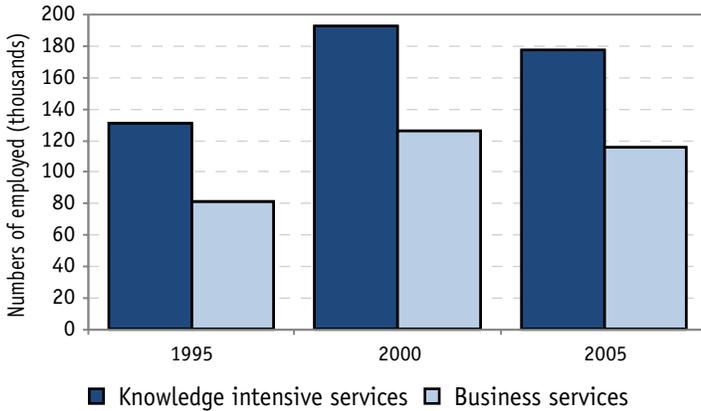
slightly more than 80 thousand to more than 115 thousand during the same period.

Chart 7 made it clear that due to final demand for manufactured goods, the total number of indirectly employed increased by more than 10 thousand between 1995 and 2005. This means that the share of business services in indirect manufacturing employment has increased from 16 to 22 per cent; a non-negligible increase in a ten-year period.<sup>29</sup> For knowledge-intensive ser-

28 The knowledge-intensive service industries are defined in terms of SNA as water transport services (61), air transport services (62), post and telecommunication services (64), financial intermediation services and insurance funding services (65-67), real estate services, renting services and other business services (70-74), education services (80), health and social work services (85) and recreational, cultural and sporting services (92). The business service industries are defined as computer and related services (72), R&D (73) and other business services (74). See, for example, OECD (2007) for a discussion of business services, what they contain and how they are to be identified. See Baker (2007) and Camacho and Rodriguez (2007) for examples of how IO-analysis can be applied to the knowledge intensive service industries.

29 About 80 per cent of indirect manufacturing employment in the business service industries can be referred to other business services, 15 per cent to computer services and 5 per cent to R&D.

**Chart 9**  
**Employment in Knowledge-Intensive Services**  
**and in Business Services Due to Final Demand**  
**for Manufactured Goods in Sweden, 1995, 2000, and 2005**

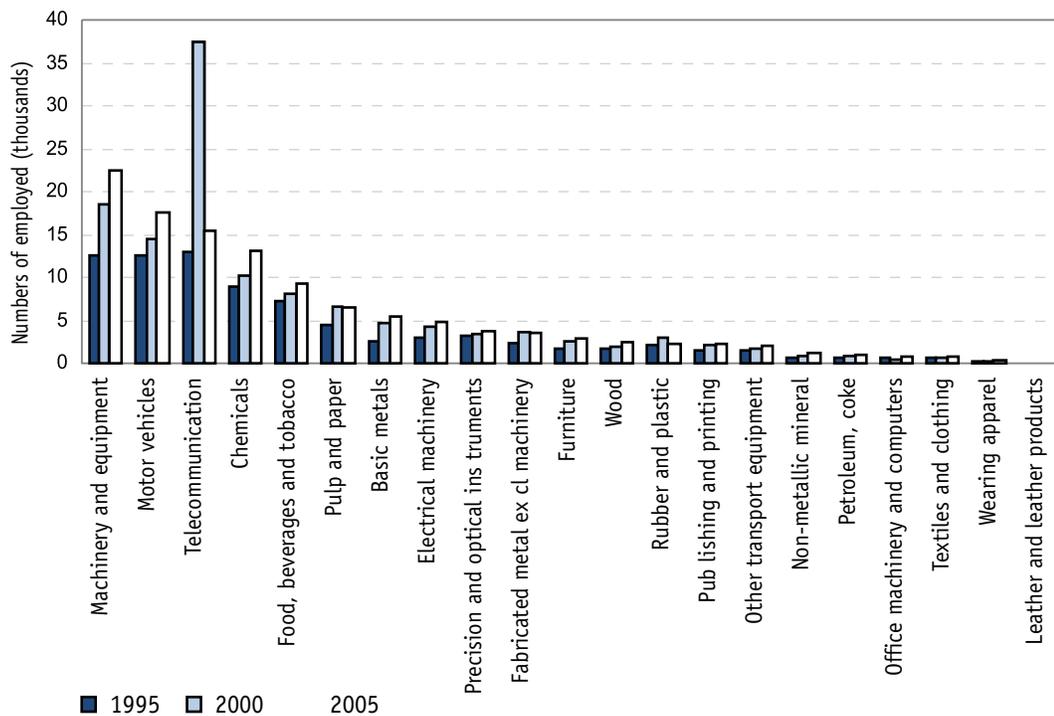


Sources: Statistics Sweden and author's calculations.

vice industries, their share increased from 25 to 34 per cent.

How many persons are indirectly employed in business services due to final demand of manufactured goods and how has this developed over time? Out of the 21 industries, the number of indirectly employed has, according to Chart 10, increased in 19 industries between 1995 and 2005; in the two industries where there has been a decrease, this amounts to less than a total of 100 employees. The increase in demand for intermediate goods from business services is thus widely established in the entire manufacturing sector. In the vehicle industry, indirect employment increased by almost 10 thousand employees, which corresponds to an increase of almost 80 per cent. Other industries that employ

**Chart 10**  
**Employment in Business Services in Sweden Due to Final Demand for Manufactured**  
**Goods, 1995, 2000, and 2005**



Sources: Statistics Sweden and own calculations.

a large number of people in business services are machinery, telecom products and chemistry.<sup>30</sup>

In summary, this section has shown that there has been a decrease in the number of employed who either directly or indirectly works with manufacturing production between 1975 and 2005, but the decrease has been considerably smaller than what is shown in the official statistics. The explanation for this is the greater interaction between manufacturing and the rest of the economy, in particular in relation to the service sector. But another picture has been emerging since the mid-1990s. Total manufacturing employment has largely remained unchanged between 1995 and 2005, mainly due to an increase in the indirect employment in the knowledge-intensive service sector in general and in business services in particular. In this sense, deindustrialization is conspicuous by its absence.

## Conclusion

Is Sweden being deindustrialized? There has been a decrease in manufacturing employment in both relative and absolute terms in the post-war period and there has been a gradual decrease in its share of nominal GDP in the same period. But at the same time, manufacturing output has grown faster than GDP and there has been no decrease in domestic demand for manufactured goods over time.

However, the high productivity growth in manufacturing – which means that the productivity level today is on par with the service sector – has led to a fall in the relative prices of manufactured goods over time. This has not only resulted in a fall in relative employment, but also to an increase in the share of real GDP since the beginning of the 1990s. In terms of number of units produced, we have been in a period of rein-

dustrialization; the falling share of nominal GDP is entirely explained by the change in relative prices, not by a decrease in the demand for manufactured goods. The price effect has been stronger than the income effect.

Despite this, there has been a decrease in the number of employed who work with satisfying final demand for manufactured goods since 1975, even if the loss is less pronounced than what is shown by official statistics. The explanation for this is the increased indirect manufacturing employment caused by a greater interaction with the rest of the economy; each manufacturing employee generates more indirect employment than before. This intensified interaction is particularly pronounced in relation to the service sector in general and its knowledge-intensive part in particular.

This aspect has been of particular importance since the crisis years at the beginning of the 1990s. The number of employed who were in some way involved in the production of manufactured goods only decreased by 9 thousand between 1995 and 2005, and the share of total employment only fell from 26 to 24 per cent. In the same period, output growth was twice as rapid in manufacturing as in the service sector, productivity growth was on average about 7 per cent per year and the share of real GDP increased by 70 per cent. In fact, more than half of the productivity growth in the private sector can be explained by the rapid improvement in manufacturing in this period. The jobless growth experienced in Sweden after the turn of the millennium was caused by a large global demand for manufactured goods which was met by increasing the output per hour, not by increasing the numbers of employed. Thus, this is the reason for the extended lag between GDP growth and a reduced unemployment, at the

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30 Note also that there is a considerable variation between industries in how large a share of indirect employment is due to business services. In the industry for telecom products, the share is as high as 50 per cent and in chemistry, it is more than 40 per cent. For wood and products of wood and cork and food products and beverages, the corresponding share amounts to about 10 per cent.

same time as it explains the falling wage share within manufacturing.

The period since the 1990s has been the most manufacturing intensive since the 1960s. Considering that the number of employed who were in any way involved in the production of manufactured goods and that the share of nominal GDP did fall, some label this development as deindustrialization. But in terms of output, productivity and the share of real GDP, others would claim that this is rather a case of reindustrialization.

Notwithstanding which interpretation seems most reasonable, the picture is considerably more complicated than what is too often being expressed in the public debate. Deindustrialization is both a myth and a reality. A more service oriented Swedish economy is a fact and a competitive manufacturing sector is an important component of that.

In many ways this discussion is relevant for other countries in the developed world. It is becoming more unlikely that plants within the same company in different Western countries will systematically differ in their productivity levels. Of course, an important part of the Swedish story is the telecom sector and its impressive technological achievements, but the competitive pressure that follows from the intensified globalization is a truly world-wide force. We have also seen the knowledge-intensive service sector grow rapidly in many countries. It is a general trend that the indirect employment created by manufacturing production has increased over the last decades. An increasing number of people employed in manufacturing also work on service related tasks.

In light of the enormous effects of the financial crisis on output, it is crucial to create the best possible conditions for manufacturing to return to full capacity utilization. A growth policy based on the needs of manufacturing contributes to the growing number of knowledge-

intensive service firms that many experts consider to be the future employment engine, and creates the necessary condition for improved living standards in the Western world.

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