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Input-Output Analysis of Deindustrialization and Outsourcing

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Input-Output Analysis of Deindustrialization and Outsourcing*

Stracová Erika⁺⁾ , Kališ Richard, ⁺⁾

Abstract

The paper deals with the topic of deindustrialization as a process of a decreasing relative importance of manufacturing. While the decrease of manufacturing in major developed and developed economies is undeniable, the developing and newly industrialized economies are starting to experience this phenomenon as well. The results of the paper show that the so-called premature deindustrialization is mainly caused by outsourcing. Furthermore, the data suggest the existence of an upper limit of outsourcing for major developed economies. In these economies, the decrease of manufacturing is more likely caused by other relevant factors. Last but not least, a few transition economies face to a slightly decreasing value of outsourcing on a much lower level. This could be explained by a fragmentation of the entire value chain across the European Union. The empirical results are based on the Input-Output methodology, the observation period of fifteen years from 2000 to 2014 and a sample of 43 countries.

Keywords: input-output analysis, deindustrialization, outsourcing

JEL codes: C67, L60

1 Introduction

In general, manufacturing has a major effect on employment and it is considered to be one of the key sectors for job creation. Moreover, its importance is further increased by its ability to attract R&D investments. These facts are also emphasized in a study dealing with the manufacturing industry in Slovakia and its importance for the Slovak economy issued at the Department of Economic Policy, Faculty of National Economy, University of Economics in Bratislava. While less than one quarter of the whole working population is directly employed in manufacturing, more than one third of jobs is generated by the final demand for manufacturing products in Slovakia. Even though the R&D expenditures are still rather low in Slovakia, on average, 62 % of all private investments in 2011 – 2013 was used by manufacturing (Luptáčik et al., 2016).

This also draws the attention of the European Commission, which is reflected in frequent Commission communications in this field. A strong industrial base and resilience of the industry to economic crises is highlighted in the most recent communication called For a European Industrial Renaissance (European Commission, 2014).

Nowadays, a decreasing share of industry on the overall value added and employment in national economy can be observed, which leads to a discussion about deindustrialization. By definition, it involves a decrease in the size and relative importance of manufacturing (Bernard et al., 2016). This

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is not only a phenomenon of the developed economies but this trend is observable in the developing countries as well.

According to Mucha-Leszko (2016), some of the drivers intensifying the deindustrialization processes are commercialization of services for households, increasing importance of educational services and growing service outsourcing by manufacturing companies. First, the commercialization of services for households is represented by more intense linkages between traditional manufacturing products and new modern services (e. g. the tracking of some products after they are sold by a producer to a customer). Second, the importance of a highly-skilled and qualified labor force for manufacturing is constantly increasing. Most importantly, a major growth of services outsourced by manufacturing companies has been observed. In this context, outsourcing is represented by the share of total employment and value added generated by the final demand for manufacturing products in market services. This process is characterised by redrawing boundaries between existing industries (Jacobides and Winter, 2005). According to Rodrik (2015), the shift of some manufacturing activities towards services has caused a decrease of the manufacturing sector. Paradoxically, this has been happening in developing countries at an even faster pace. This implies that these economies are running out of industrialization opportunities sooner than today's developed countries. This could lead to a change in the process of creating modern states and democratic policies, as was historically documented in the case of Western Europe and North America. Thus, the problem of premature deindustrialization, as mentioned by Dasgupta and Singh (2006), is identified in many countries of the developing world.

2 Data and Methodology

In order to identify the extent of outsourcing as a driver of deindustrialization, the input-output analysis is used. This is a useful tool for capturing not only the direct but also the indirect linkages among industries.

The analysis is based on data from the World Input-Output Database. The version released in 2016 covers the period from 2000 – 2014 for 43 countries. In comparison with the version released in 2013, the new dataset from 2016 features data up to 2014 in a more detailed structure but socio-economic indicators linked to the data have not been published yet. So far, the new release can be used for the analysis of value added effects. Because of the similar development of the value added and employment in the case of deindustrialization, one can consider a change in value added as a proxy for a changing trend in employment.

The model calculations are based on the Leontief inverse matrix expressed as follows:

$$(\mathbf{I} - \mathbf{A})^{-1} = \mathbf{L} \quad (1)$$

Matrix $\mathbf{L}$ represents the complex linkages among industries, which connect the final demand with the whole production. Each element of matrix $\mathbf{L}$ (l_{ij}) represents the volume of commodity i which has to be produced in order to supply one unit of commodity j into the final use.

In order to identify the net effect of outsourcing, the concept of a subsystem is used (cf. Montresor – Vittucci, 2008). For production, one can calculate matrix $\mathbf{B}$, where $\hat{\mathbf{q}}$ is the diagonalized vector of gross production and $\hat{\mathbf{y}}$ is the diagonalized vector of final demand. Each element of $\mathbf{B}$ (b_{ij}) represents the share of production in sector i satisfying the final demand of sector j and also each row of $\mathbf{B}$ adds up to one.

$$\mathbf{B} = \hat{\mathbf{q}}^{-1} \mathbf{L} \hat{\mathbf{y}} \quad (2)$$

To investigate the effects of outsourcing, matrix $\mathbf{B}$ is multiplied by the diagonalized vector of value added $\hat{\mathbf{v}}$, which is defined as:

$$\mathbf{U} = \hat{\mathbf{v}} \mathbf{B} \quad (3)$$

Each element of $\mathbf{U}$ (u_{ij}) shows value added in sector i generated both directly and indirectly by the final demand for the products of sector j . Matrix $\mathbf{C}$ is also of relevance, and it can be obtained by dividing each of the cells in $\mathbf{U}$ by the total of the corresponding column. Denoting a row unit vector with $\mathbf{i}'$, $\mathbf{C}$ can be defined as:

$$\mathbf{C} = \mathbf{U}(\mathbf{i}\mathbf{U})^{-1} \quad (4)$$

The generic element of $\mathbf{C}$, c_{ij} , represents the share of value added generated in sector i by the final demand for commodities of the sector j , which in case of outsourcing can be interpreted as the share of value added generated by the final demand for manufacturing products in market services.

For better interpretation, matrix $\mathbf{C}$ is first aggregated from the original 56 sectors into 7 main sectors and then the sample of 43 countries is aggregated into 3 regions (major developed – G7, developed and developing). The classification of regions is based on the criteria of the UN methodology.

3 Empirical analysis

In the case of deindustrialization, a decreasing share of direct value added in manufacturing can generally be observed. For the chosen regions and the observation period 2000 – 2014, the results are as follows (Table 1):

Table 1: The share of direct value added in manufacturing on the whole value added (in %)

	Major developed – G7	Developed	Developing
2000	18.1%	18.6%	23.3%
2001	17.3%	18.5%	22.4%
2002	16.8%	18.2%	22.3%
2003	16.4%	17.9%	22.3%
2004	16.2%	17.8%	22.6%
2005	16.0%	17.4%	22.5%
2006	15.8%	17.2%	22.7%
2007	15.7%	17.0%	22.4%
2008	15.3%	16.4%	22.1%
2009	14.1%	15.4%	21.0%
2010	14.7%	15.9%	21.4%
2011	14.6%	16.2%	21.4%
2012	14.5%	15.8%	21.2%
2013	14.5%	15.6%	20.8%
2014	14.6%	15.6%	20.8%

Source: Authors' calculations based on NIOT from WIOD.org.

As can be seen in Table 1, the most significant decrease in the share of value added generated by manufacturing can be observed in G7. Throughout the years, it declined to 80 % of the value of 2000 with the average rate of decline of 1.54 %. However, the process of deindustrialization in the major developed countries is not a new phenomenon. The developing countries have been experiencing a decrease in the relative importance of manufacturing as well. In 2014, the share of value added in manufacturing decreased to 90 % of the value of 2000. In this case, the average rate of decline was of 0.81 %¹.

As mentioned in introduction, outsourcing was one of the drivers of deindustrialization. Two questions arise: (i) whether the process of outsourcing is present in the developing countries to the same extent as in the developed countries and (ii) what was the change in time.

Table 2: The share of value added generated by the final demand for manufacturing products in market services (in %)

	Major developed – G7	Developed	Developing
2000	20.7%	15.5%	12.1%
2001	21.6%	15.5%	13.1%
2002	21.7%	15.6%	13.0%
2003	21.7%	15.6%	13.4%
2004	21.5%	15.7%	13.1%
2005	21.8%	16.1%	13.2%
2006	22.0%	16.2%	13.1%
2007	22.4%	16.4%	13.1%
2008	22.6%	16.5%	13.0%
2009	21.9%	17.0%	13.6%
2010	21.2%	16.7%	13.0%
2011	21.1%	16.6%	12.7%
2012	21.2%	16.5%	13.0%
2013	21.2%	16.6%	13.2%
2014	21.4%	16.6%	13.8%

Source: Authors' calculations based on NIOT from WIOD.org.

Table 2 shows that throughout the whole observation period, the magnitude of outsourcing has been much larger in developed countries and G7 can be seen as the frontier. However, the convergence in the shares of value added generated by the final demand for manufacturing products in market services can be seen in the different average rate of change among regions. While the average rate of change in the major developed regions has equaled to 0.24 %, the number has been almost four times higher (0.94 %) in developing countries. This can be considered as one of the factors of premature deindustrialization. In the case of deindustrialization, the process is generally more visible in the major developed countries but, paradoxically, the outsourcing as a driver of deindustrialization

¹ For a detailed view of the shares of direct value added in manufacturing on the whole value added for all countries and all years in the sample, see Appendix C.

is significantly larger in developing economies. After all, the original share of outsourcing is higher in more developed countries, which is also underlined by a positive correlation coefficient².

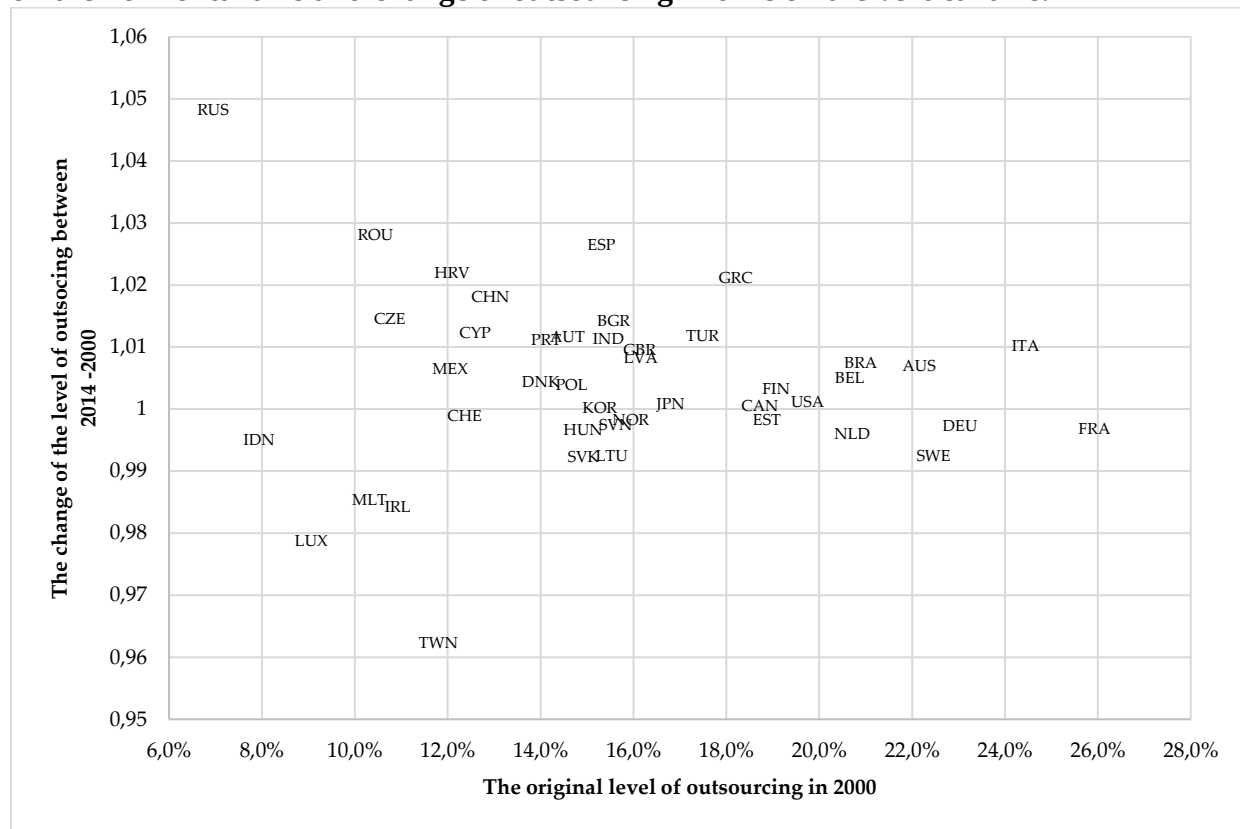
Figure 1 shows countries organized based on two criteria: share of value added generated by the final demand for manufacturing products in market services in 2000 (the original level of outsourcing), and the average rate of change of outsourcing between 2014 and 2000. Figure 1 can be horizontally divided into two parts by the average rate of change equal to one. The countries lying under the naturally set boundary are those where the level of outsourcing decreased during the observation period and vice versa. As mentioned above, the effects of outsourcing on value added are represented by the horizontal axis. The average value accounts for 16 %.

As can be seen, the countries with a lower original level of outsourcing were expected to converge to the level of the most developed countries in a higher pace, which is represented by the main diagonal. The countries considered to be a frontier in manufacturing, i.e. the major developed ones, are located mostly in the bottom right-hand corner. This means that outsourcing in manufacturing is higher in these countries but it experienced no change or even a decrease in the observation period 2000 – 2014. A good example of that are France and Germany, both of which are a part of the major developed world and trend setters in industrial policies. In Germany, 23 % of the whole value added generated by the final demand for manufacturing products is generated in the market service sectors in 2000. The share is even higher in France, 26 % in particular. However, there has been a decreasing trend in outsourcing in both countries, 0.25 % and 0.3 % respectively on average. The converging trend in outsourcing is visible in the upper left-hand corner. The countries located in this quadrant belong to those with a lower original level of outsourcing but with a higher average rate of change. The best example of that is the Russian Federation where the share of value added generated by the final demand for manufacturing products in market services accounted for less than 7 % in 2000. In 2014, this share almost doubled with the average rate of change of 4.85 %. During the last 15 years, another well-known industrialized country, China, experienced the same development.

Looking at the bottom left-hand corner, there are two groups of countries, which can be interpreted separately. The first one consists of Slovakia, Hungary, Slovenia and Lithuania where the rate of change in time is similar to developed countries but the magnitude of outsourcing is much lower. However, using this methodology, only domestic flows are captured. This implies that in these economies, the shift of value added from manufacturing to services is also present, but more likely across the country's boundaries. A good example is the Slovak automotive industry where many high value added service activities have stayed in the countries of origin (e.g. design, marketing and R&D or financial activities). The second group of countries including Indonesia, Taiwan, Luxembourg, Malta and Ireland is quite different from the rest of the economies in this quadrant. First, in Luxembourg, the manufacturing accounts for less than 10 % of the whole value added. This implies that the manufacturing sector in Luxembourg does not play a major role in the country's economy. In Malta, there has been a significant decrease of the relative importance of manufacturing during the last 15 years. However, this process has not been caused by domestic outsourcing, since its level decreased quite significantly as well. The development of manufacturing in the rest of the countries in this group, i.e. Indonesia, Taiwan and Ireland, is not clear and a deeper research would be needed.

² For a detailed view of the shares of value added generated by the final demand of manufacturing products in market services for all countries and all years in the sample, see Appendix D.

Figure 1: The sample organized based on two criteria: the original level of outsourcing on the horizontal axis and change of outsourcing in time on the vertical axis.



Source: Authors' calculations based on NIOT from WIOD.org.

4 Conclusions

By definition, deindustrialization is a decreasing share of industry on the overall value added and employment in national economy. This phenomenon is present more significantly in the major developed countries when compared to developing economies. However, the fact that deindustrialization is an issue also for developing countries creates the hypothesis of premature deindustrialization. When outsourcing is considered to be one of the drivers of deindustrialization, then, based on the findings of the paper, it plays a major role mostly in developing countries.

This conclusion is well documented on the example of China where one third of the whole value added is generated directly by manufacturing. However, even such a newly industrialized country faces a decrease in the relative importance of manufacturing. The change in the share of value added generated by the final demand for manufacturing products in market services has increased notably during the last 15 years. Such a conclusion suggests that the emerging industry is connecting with market services in a much faster pace. Moreover, such a connection can be directly transferred to the economy as the whole package.

The higher level of outsourcing in the major developed economies represents the upper limit. This frontier is confirmed by the average rate of change in time, which is constant or even slightly decreasing. This implies that the most intense deindustrialization in the most developed countries is

not very well described by the trend of outsourcing. Therefore, various other factors like offshoring or a rapid growth of productivity in manufacturing apply to these economies.

Furthermore, in countries like Slovakia, Hungary, Lithuania or Slovenia, the level of outsourcing is expected to be of a higher value. However, for a given level of outsourcing, its change in time is negative. Services are probably outsourced here as well, but more likely among different countries. For instance, the new major investment in Slovakia – Jaguar Land Rover – will probably not transfer all of their high value added services into the country. More likely, they will remain in the country of origin or they will be fragmented across several European Union countries.

At this stage of research, such considerations are speculative, so they raise questions for further research. Using the World Input-Output Tables capturing also the flows among countries, it is possible to go beyond the transfer of value added from manufacturing to market services within a national economy.

After all, deindustrialization and its driver force, i.e. outsourcing, influence the employment in countries significantly. However, different development in the relative importance of industry between developed and developing countries may have serious consequences for their industrial policies.

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APPENDIX

Appendix A – The aggregation of countries into three regions

Major developed countries – G7
CAN, DEU, FRA, GBR, ITA, JPN, USA
Developed countries
AUS, AUT, BEL, BGR, BRA, CHE, CYP, CZE, DNK, ESP, EST, FIN, GRC, HRV, HUN, IRL, KOR, LTU, LUX, LVA, MLT, NLD, NOR, POL, PRT, ROU, SVK, SVN, SWE
Developing countries
CHN, IDN, IND, MEX, RUS, TUR, TWN

Appendix B – The aggregated sectors of manufacturing and market services

Manufacturing:
Manufacture of food products, beverages and tobacco products
Manufacture of textiles, wearing apparel and leather products
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
Manufacture of paper and paper products
Printing and reproduction of recorded media
Manufacture of coke and refined petroleum products
Manufacture of chemicals and chemical products
Manufacture of basic pharmaceutical products and pharmaceutical preparations
Manufacture of rubber and plastic products
Manufacture of other non-metallic mineral products
Manufacture of basic metals
Manufacture of fabricated metal products, except machinery and equipment
Manufacture of computer, electronic and optical products
Manufacture of electrical equipment
Manufacture of machinery and equipment n.e.c.
Manufacture of motor vehicles, trailers and semi-trailers
Manufacture of other transport equipment
Manufacture of furniture; other manufacturing
Repair and installation of machinery and equipment
Market services:
Land transport and transport via pipelines

Water transport
Air transport
Warehousing and support activities for transportation
Postal and courier activities
Accommodation and food service activities
Publishing activities
Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities
Telecommunications
Computer programming, consultancy and related activities; information service activities
Financial service activities, except insurance and pension funding
Insurance, reinsurance and pension funding, except compulsory social security
Activities auxiliary to financial services and insurance activities
Real estate activities
Legal and accounting activities; activities of head offices; management consultancy activities
Architectural and engineering activities; technical testing and analysis
Scientific research and development
Advertising and market research
Other professional, scientific and technical activities; veterinary activities
Administrative and support service activities

Appendix C - The share of direct value added in manufacturing on the whole value added (in %) by countries and years

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AUS	12.2%	11.7%	12.0%	12.1%	11.4%	10.9%	10.2%	10.1%	9.1%	8.7%	8.0%	7.6%	7.1%	6.9%	6.8%
AUT	20.5%	20.7%	20.0%	19.6%	19.6%	19.7%	20.1%	20.5%	19.6%	18.5%	18.7%	18.8%	18.9%	18.5%	18.4%
BEL	19.6%	19.0%	18.7%	17.9%	17.9%	17.6%	17.0%	16.9%	15.9%	14.3%	14.7%	14.3%	14.1%	14.0%	13.8%
BGR	13.8%	14.7%	15.0%	15.7%	14.7%	15.8%	15.8%	16.3%	14.5%	14.7%	13.4%	15.9%	15.9%	14.7%	15.2%
BRA	15.7%	14.9%	14.9%	16.6%	18.0%	15.7%	14.2%	14.8%	14.2%	15.2%	15.0%	13.9%	12.6%	12.3%	11.7%
CAN	16.5%	15.4%	15.0%	14.2%	14.0%	13.1%	12.4%	11.9%	11.9%	11.9%	11.7%	11.1%	11.1%	11.1%	11.1%
CHE	18.5%	19.2%	19.6%	19.4%	19.5%	19.6%	20.0%	20.1%	20.4%	19.1%	19.2%	19.5%	19.0%	18.9%	18.6%
CHN	32.2%	31.5%	31.0%	32.2%	32.4%	32.5%	32.9%	32.9%	32.7%	32.3%	32.5%	32.2%	31.8%	30.7%	29.6%
CYP	8.9%	8.5%	8.6%	8.2%	8.1%	7.6%	6.9%	6.5%	6.2%	6.0%	5.7%	5.4%	5.1%	4.9%	5.0%
CZE	25.9%	26.2%	24.6%	24.0%	25.4%	25.5%	25.9%	26.0%	24.5%	22.9%	23.4%	24.5%	24.8%	24.9%	26.6%
DEU	23.0%	22.7%	22.1%	22.2%	22.4%	22.4%	23.1%	23.4%	22.5%	19.9%	22.2%	22.9%	22.8%	22.6%	22.6%
DNK	16.4%	16.3%	16.2%	15.4%	14.9%	14.4%	14.5%	14.4%	13.8%	13.0%	12.6%	12.8%	13.3%	13.5%	13.5%
ESP	17.8%	17.4%	16.9%	16.5%	16.1%	15.7%	15.5%	15.0%	14.5%	13.2%	13.3%	13.5%	13.1%	13.1%	13.2%
EST	17.3%	17.9%	17.7%	17.7%	16.9%	16.6%	16.4%	15.9%	15.4%	14.1%	15.7%	16.6%	15.9%	15.6%	15.9%
FIN	27.6%	26.9%	26.1%	25.2%	24.6%	24.3%	25.1%	25.3%	23.7%	19.1%	19.5%	18.9%	16.9%	16.9%	16.7%
FRA	15.7%	15.2%	14.7%	14.2%	13.8%	13.3%	12.8%	12.7%	12.1%	11.5%	11.3%	11.4%	11.3%	11.3%	11.2%
GBR	15.7%	14.5%	13.7%	12.8%	12.1%	11.8%	11.3%	10.7%	10.7%	10.1%	10.3%	10.3%	10.3%	10.8%	10.6%
GRC	10.6%	11.2%	11.0%	10.2%	9.7%	9.6%	9.5%	9.6%	9.6%	8.5%	8.2%	8.9%	9.1%	9.6%	9.4%
HRV	17.8%	17.7%	17.3%	16.6%	16.3%	15.6%	15.2%	15.2%	15.1%	14.4%	14.2%	14.4%	14.5%	14.1%	14.5%
HUN	22.4%	22.2%	21.4%	21.6%	22.0%	22.0%	22.7%	22.3%	21.4%	20.3%	21.7%	22.1%	22.4%	22.6%	23.5%
IDN	26.9%	27.9%	27.8%	27.0%	26.9%	26.3%	26.2%	25.4%	26.1%	24.4%	22.6%	22.2%	21.9%	21.6%	21.5%

IND	14.9%	14.3%	14.5%	14.6%	14.9%	15.1%	15.7%	15.6%	15.1%	14.8%	14.5%	14.4%	14.6%	14.1%	14.0%
IRL	26.0%	28.4%	30.2%	26.3%	24.0%	22.4%	21.1%	20.3%	19.6%	22.7%	22.2%	23.8%	21.5%	20.4%	19.7%
ITA	19.5%	19.0%	18.6%	17.8%	17.6%	17.2%	17.4%	17.7%	17.1%	15.2%	15.8%	15.8%	15.4%	15.3%	15.4%
JPN	21.3%	20.1%	19.8%	20.2%	20.5%	20.8%	20.7%	20.7%	20.1%	17.7%	19.1%	18.5%	18.5%	18.5%	18.9%
KOR	29.0%	27.6%	27.2%	26.7%	28.5%	28.3%	27.8%	28.2%	28.6%	28.7%	30.7%	31.4%	31.0%	31.0%	30.3%
LTU	18.9%	19.4%	18.3%	18.6%	20.1%	20.2%	19.5%	17.7%	17.5%	16.7%	18.8%	20.4%	20.7%	19.4%	19.3%
LUX	10.8%	10.2%	9.8%	10.0%	9.7%	8.9%	8.0%	9.1%	8.0%	5.3%	5.9%	5.7%	5.6%	5.1%	4.8%
LVA	15.4%	15.3%	15.1%	13.9%	13.8%	13.0%	12.1%	11.4%	10.8%	10.9%	13.4%	13.1%	13.0%	12.6%	12.2%
MEX	20.9%	19.9%	19.1%	18.3%	18.4%	17.4%	18.2%	17.5%	17.1%	16.8%	17.4%	17.2%	18.0%	17.7%	17.8%
MLT	20.9%	17.3%	17.0%	17.1%	14.8%	14.3%	13.7%	13.9%	15.1%	12.7%	13.1%	12.8%	12.1%	10.4%	9.6%
NLD	15.3%	14.9%	14.2%	13.8%	14.0%	14.1%	13.6%	13.7%	12.9%	11.7%	11.8%	12.1%	11.8%	11.8%	12.1%
NOR	10.0%	10.1%	10.1%	10.0%	9.6%	9.1%	9.3%	9.3%	8.6%	8.2%	8.1%	7.6%	7.4%	7.4%	7.8%
POL	18.0%	16.6%	16.2%	17.7%	19.1%	18.4%	19.0%	18.8%	18.6%	18.3%	17.5%	18.1%	18.0%	18.8%	19.6%
PRT	17.2%	16.7%	16.2%	15.4%	14.9%	14.5%	14.3%	14.1%	13.7%	12.6%	13.2%	12.9%	13.0%	13.1%	13.3%
ROU	22.1%	24.3%	24.1%	22.8%	23.4%	23.8%	23.6%	22.1%	21.5%	21.6%	23.9%	24.5%	22.6%	23.0%	21.7%
RUS	20.8%	18.5%	17.6%	16.3%	17.4%	18.3%	17.9%	17.6%	17.4%	15.0%	15.2%	16.3%	15.6%	14.9%	14.3%
SVK	23.9%	24.8%	22.4%	23.0%	23.5%	23.6%	23.5%	23.3%	22.3%	17.7%	20.8%	21.1%	20.9%	20.3%	20.9%
SVN	24.9%	25.0%	24.8%	24.8%	24.5%	23.6%	23.4%	23.3%	21.9%	19.6%	20.2%	21.0%	21.6%	22.5%	23.1%
SWE	23.0%	21.9%	21.3%	20.8%	20.7%	20.5%	20.6%	20.5%	19.1%	17.3%	18.6%	18.3%	17.2%	16.8%	16.4%
TUR	21.2%	20.1%	19.5%	19.8%	19.5%	19.4%	19.3%	18.6%	17.8%	16.6%	17.4%	18.2%	17.4%	17.3%	17.8%
TWN	26.4%	24.8%	26.8%	28.1%	28.8%	28.6%	28.5%	29.2%	28.2%	27.4%	29.9%	29.5%	29.2%	29.6%	30.7%
USA	15.2%	14.0%	13.5%	13.4%	13.3%	13.1%	13.1%	12.9%	12.5%	12.1%	12.3%	12.4%	12.4%	12.3%	12.2%

Source: Authors' calculations based on NIOT from WIOD.org.

Appendix D - The share of value added generated by the final demand for manufacturing products in market services (in %) by countries and years

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AUS	22.1%	21.8%	22.5%	22.7%	22.5%	21.7%	22.7%	22.6%	22.3%	23.6%	22.9%	23.4%	23.6%	23.7%	24.5%
AUT	14.6%	14.7%	15.7%	15.7%	16.0%	16.2%	16.3%	16.6%	17.6%	16.8%	16.9%	17.0%	16.7%	17.1%	17.2%
BEL	20.7%	20.8%	19.9%	19.9%	20.1%	20.0%	21.3%	21.2%	21.5%	21.6%	21.2%	23.1%	22.4%	22.5%	22.2%
BGR	15.6%	16.1%	16.8%	16.2%	17.2%	17.0%	17.1%	19.1%	18.0%	18.6%	20.9%	19.5%	19.1%	19.3%	19.0%
BRA	20.9%	21.8%	21.6%	20.8%	19.2%	21.8%	22.6%	22.2%	21.9%	20.8%	21.1%	20.9%	21.9%	22.3%	23.2%
CAN	18.7%	19.9%	19.8%	19.5%	19.3%	19.5%	19.7%	20.0%	20.4%	19.0%	18.4%	18.4%	18.4%	18.5%	18.9%
CHE	12.4%	11.3%	11.6%	11.7%	11.7%	11.3%	11.0%	11.2%	11.1%	12.0%	11.9%	11.8%	11.9%	12.0%	12.2%
CHN	12.9%	13.3%	13.5%	13.2%	13.3%	14.0%	14.3%	14.7%	14.2%	15.1%	14.6%	14.3%	15.0%	15.8%	16.7%
CYP	12.6%	13.3%	12.8%	12.1%	11.0%	11.5%	13.1%	12.7%	13.0%	14.1%	13.0%	13.9%	13.4%	14.1%	15.0%
CZE	10.8%	11.2%	12.7%	13.9%	13.8%	13.8%	13.7%	14.3%	14.6%	14.6%	14.5%	14.1%	13.6%	13.9%	13.2%
DEU	23.0%	23.4%	23.8%	23.8%	23.6%	24.0%	23.9%	24.4%	24.8%	24.0%	22.4%	22.3%	22.0%	22.3%	22.2%
DNK	14.0%	14.7%	14.7%	14.9%	15.1%	16.0%	14.9%	15.0%	16.1%	17.9%	16.1%	15.8%	14.8%	14.8%	14.9%
ESP	15.3%	16.1%	16.5%	16.8%	17.2%	17.5%	18.0%	18.8%	19.2%	20.5%	21.2%	21.5%	22.0%	21.8%	22.1%
EST	18.9%	18.7%	18.5%	17.7%	18.0%	17.5%	17.2%	16.6%	17.5%	18.6%	18.6%	18.5%	18.0%	18.5%	18.5%

FIN	19.1%	18.9%	18.8%	18.5%	18.7%	19.0%	18.6%	18.2%	18.7%	20.1%	18.7%	19.5%	20.9%	19.7%	20.0%
FRA	25.9%	26.5%	26.4%	26.4%	26.9%	27.6%	28.8%	29.0%	29.6%	26.1%	25.6%	25.3%	24.8%	24.7%	24.8%
GBR	16.1%	16.7%	17.4%	17.6%	17.9%	17.6%	18.0%	18.6%	18.1%	18.8%	18.3%	18.4%	18.4%	18.1%	18.5%
GRC	18.2%	17.9%	18.6%	18.1%	19.2%	22.2%	23.1%	22.2%	21.8%	24.5%	26.1%	24.8%	25.7%	24.6%	24.6%
HRV	12.1%	11.8%	11.2%	11.9%	12.6%	13.6%	14.6%	15.3%	15.2%	16.0%	16.3%	16.9%	16.7%	16.6%	16.4%
HUN	14.9%	15.1%	16.4%	16.6%	16.9%	18.1%	17.7%	17.9%	18.7%	17.6%	16.7%	16.1%	15.4%	14.7%	14.3%
IDN	7.9%	8.7%	9.5%	11.0%	10.4%	10.3%	9.7%	8.2%	7.4%	7.2%	6.8%	6.5%	6.7%	7.0%	7.4%
IND	15.5%	16.5%	17.0%	18.2%	18.4%	17.8%	16.9%	16.2%	16.5%	17.7%	16.6%	17.1%	16.8%	17.2%	18.1%
IRL	10.9%	9.3%	8.1%	8.9%	9.8%	12.4%	12.4%	13.3%	13.3%	12.7%	11.6%	8.2%	7.6%	8.9%	8.8%
ITA	24.4%	25.0%	25.5%	26.4%	26.5%	27.0%	27.0%	27.4%	28.1%	27.9%	27.1%	27.2%	28.1%	28.3%	28.2%
JPN	16.8%	18.1%	17.8%	17.4%	17.0%	16.6%	17.2%	17.7%	18.4%	19.1%	17.8%	18.0%	17.5%	17.1%	17.0%
KOR	15.3%	16.2%	17.2%	17.9%	17.4%	17.6%	16.8%	16.3%	16.6%	16.7%	15.9%	15.9%	15.6%	15.3%	15.4%
LTU	15.5%	14.5%	14.1%	13.4%	12.9%	13.2%	13.5%	14.4%	15.2%	16.4%	15.6%	14.9%	13.7%	14.4%	14.0%
LUX	9.1%	9.3%	9.8%	8.3%	8.8%	8.6%	8.7%	6.9%	7.4%	10.8%	9.7%	9.6%	7.2%	6.7%	6.7%
LVA	16.2%	16.0%	16.7%	19.0%	17.8%	18.3%	17.5%	16.9%	17.4%	16.8%	16.2%	17.5%	18.0%	18.3%	18.2%
MEX	12.1%	12.2%	12.9%	13.6%	12.9%	13.6%	12.9%	13.2%	13.1%	14.2%	13.4%	12.7%	12.6%	13.3%	13.2%
MLT	10.3%	11.3%	9.9%	9.3%	10.6%	9.6%	8.5%	8.3%	6.0%	6.6%	6.5%	6.2%	6.8%	7.5%	8.4%
NLD	20.7%	20.2%	18.9%	19.2%	20.5%	20.8%	20.9%	21.7%	21.5%	20.9%	20.7%	20.8%	21.3%	20.3%	19.6%
NOR	15.9%	16.4%	16.4%	16.2%	16.3%	16.3%	16.1%	17.3%	17.0%	17.4%	16.0%	15.6%	15.3%	15.8%	15.6%
POL	14.7%	15.7%	16.0%	16.1%	15.2%	15.8%	15.6%	15.9%	15.9%	15.0%	15.4%	15.5%	15.9%	15.2%	15.5%
PRT	14.1%	14.2%	14.2%	15.0%	15.3%	15.7%	16.2%	17.0%	17.7%	17.0%	17.1%	17.7%	17.8%	17.0%	16.5%
ROU	10.4%	9.0%	9.5%	9.1%	9.2%	9.6%	9.9%	11.0%	10.2%	11.5%	12.1%	12.2%	13.8%	16.0%	15.4%
RUS	7.0%	8.6%	9.1%	10.6%	10.2%	10.0%	10.1%	11.2%	10.7%	12.0%	12.3%	11.2%	11.5%	12.2%	13.5%
SVK	14.9%	14.3%	16.0%	16.0%	14.2%	13.5%	12.6%	13.8%	13.9%	16.4%	15.8%	13.7%	14.2%	14.3%	13.4%
SVN	15.6%	15.4%	15.5%	15.6%	15.7%	15.6%	16.2%	16.0%	16.0%	16.4%	17.2%	16.8%	15.8%	15.3%	15.1%
SWE	22.5%	23.0%	22.6%	22.2%	22.2%	22.9%	22.7%	22.7%	23.5%	21.8%	19.0%	19.9%	20.4%	20.4%	20.3%
TUR	17.5%	20.2%	18.1%	16.9%	16.6%	16.2%	17.0%	17.6%	18.9%	20.3%	19.1%	18.8%	20.3%	20.0%	20.7%
TWN	11.8%	12.2%	10.9%	10.5%	10.2%	10.3%	10.7%	10.2%	10.1%	8.6%	8.0%	7.9%	8.0%	7.3%	6.9%
USA	19.8%	21.4%	21.5%	20.4%	19.4%	20.2%	19.4%	19.3%	18.8%	18.5%	18.6%	18.4%	19.4%	19.4%	20.1%

Source: Authors' calculations based on NIOT from WIOD.org.