PSL Quarterly Review

vol. 78 n. 312 (March 2025)

Special issue on premature deindustrialization and climate change: global North and South perspectives

Patterns of industrialisation and deindustrialisation in Europe

JESUS FERREIRO, CARMEN GOMEZ*

Abstract:
The aim of the article is to analyse the performance of the manufacturing sector in Europe in order to check whether there is a relationship between the level of development and the share of the industrial sector, and whether the manufacturing sector plays a key role in the economic growth and catching-up processes in European countries. The results of the study show that the evolution of the manufacturing sector is very different between countries, not only between countries at different levels of development but also between similar countries. The results also show the key role played by the Global Financial Crisis in explaining the fall in manufacturing output and employment and the deindustrialisation processes detected in certain countries.

Ferreiro: University of the Basque Country (UPV/EHU, Spain), email: jesus.ferreiro@ehu.es
Gomez: University of the Basque Country (UPV/EHU, Spain), email: carmen.gomez@ehu.eus

How to cite this article:
Ferreiro J., Gomez C. (2025), "Patterns of industrialisation and deindustrialisation in Europe", *PSL Quarterly Review*, 78 (312), pp. 67-94.

DOI: https://doi.org/10.13133/2037-3643/18919

JEL codes:
L16, L60, O14

Keywords:
manufacturing, industrialisation, deindustralisation, Europe

Journal homepage:
https://rosa.uniroma1.it/rosa04/psl_quarterly_review

Within the dominant theory on development processes, especially in the heterodox approaches, it is argued that there is a relationship between the weight of the manufacturing sector and the development processes of the countries. These approaches suggest that an economy begins its development process thanks to an increase in the size of its manufacturing sector, which accelerates the pace of economic growth and advances in the process of economic (and social) development. However, once a certain level of income is reached, close to that of the most advanced or developed economies, the weight of manufacturing begins to decline, generating a process of deindustrialisation that is inherent to the development process itself.

According to this approach, the existence of a process of deindustrialisation would be a phenomenon that would generally or naturally affect the advanced economies, those whose income levels place them in the status of high-income countries. Conversely, the less advanced economies, those with lower income levels, which place them in the group of emerging or

* This work was supported by the University of the Basque Country UPV/EHU (Research Group IPESRED GIU21/058) and by the National Council for Scientific and Technological Development (CNPq) of the Ministry of Science and Technology of Brazil (MCT) (Research Project 404978/2023-1). We want to thank the useful comments and suggestions made by Professor Jose Luis Oreiro and two anonymous referees.

developing economies or middle- or upper-middle-income countries, should see an increase in the weight of the manufacturing sector. However, this view is challenged by recent studies that raise the possibility of an early or premature deindustrialisation process affecting emerging or developing economies before they can be considered as advanced (high-income) economies.

In contrast to most existing articles, which pay special attention to emerging and developing economies, our article analyses the behaviour of the manufacturing sector in several European countries over the last decades. According to the hypothesis presented above, a 'natural' process of deindustrialisation should take place in the European economies, especially in the more developed ones (with higher per capita income); however, the less advanced European economies should maintain or even increase the weight of the manufacturing sector, which would allow them to advance in their catching-up process with the more advanced and higher-income European countries. The existence of a process of early or premature deindustrialisation in some European economies would act as a brake on this catching-up process.

The aim of this article is precisely to test these hypotheses. In other words, to see whether, in Europe, deindustrialisation processes are taking place in the most advanced economies as a natural consequence of the process of economic development itself, and whether the weight of the manufacturing sector is being maintained or increased in the less advanced economies, i.e., those where the level of per capita income is well below that of the richest European economies. The article also analyses whether it is possible to speak of a premature deindustrialisation process in some European economies.

In this sense, the article suggests the need to analyse the behaviour of the manufacturing sector by analysing the evolution of employment and gross value added (GVA) in the sector. It emphasises the need to study the behaviour of these variables not only in relative terms, i.e., as a percentage of total employment or total GVA, but also in absolute terms, since the long-term economic impact of deindustrialisation processes would be negative in the case of absolute deindustrialisation (a fall in the value of employment and manufacturing output) and less so in the case of relative deindustrialisation (a fall in the relative weight of employment and manufacturing output).

To this end, the following section provides a brief review of the literature analysing the relationship between industrialisation processes and economic development, as well as the causes behind both natural and premature deindustrialisation processes. The next two sections analyse the behaviour of the manufacturing sector in Europe. In particular, the third section analyses the performance of manufacturing employment, while the fourth section analyses the performance of GVA in the manufacturing sector. The last section presents the conclusions drawn from the analyses developed throughout the article.

1. Industrialisation and economic development

The literature, mainly heterodox, on the determinants of development processes is unanimous in attributing a central role to the manufacturing sector in the processes of social and political transformation in developing and emerging economies (Kaldor, 1966 and 1967; Szirmai, 2012; Szirmai and Verspagen, 2015; Rocha, 2018; Lautier, 2024). Thus, economic development would be directly linked to a process of structural change in economies, in which the primary sector (agricultural and extractive) would progressively lose weight in the economy as a whole (both in terms of the value of its activity and employment) in favour of the manufacturing sector. In other words, the processes of economic development would be directly linked to the processes of industrialisation.

This process, or relationship, however, would not be linear. Higher productivity growth in the manufacturing sector and lower growth in the prices of these goods, coupled with an increase in

the prices of services and a shift in agents' demand towards the consumption of services as per capita income rises, make the relationship between the weight of the manufacturing sector (usually measured by the share of manufacturing in total value added) and the level of development (usually measured by real income per capita) nonlinear, having a hump shape or an inverted-U shape (Özçelik and Ozmen, 2023).

This relationship assumes that, above a certain level of income, the (relative) weight of manufacturing starts to decline, being a natural process (explained, as mentioned above, by technological and productive factors and by changes in the consumption pattern of agents as their income increases). The conclusion is obvious: below this turning point, i.e., below a certain level of real income per capita, the weight of manufacturing is in a process of growth, although, as a country approaches this threshold, the growth of the weight of manufacturing slows down. Conversely, in countries with higher per capita incomes, the weight of manufacturing gradually declines.

This process implies that, in poorer countries, the weight of manufacturing is smaller but would accelerate as the country progresses along its development path. In lower-middle-income countries (close to but below the threshold that categorizes a country as high-income), the weight of manufactures would continue to increase, but more slowly. In the upper-middle-income countries (close to but at the turning point), the share of manufactures would be high, as in the lower-middle-income countries, but this share would enter a phase of decline. Finally, in the richer, high-income countries, manufactures would progressively lose their relative weight.

Using the usual nomenclature of advanced-developed, developing, emerging and underdeveloped countries, the aforementioned theoretical framework would assume that the weight of manufacturing would decline in advanced-developed economies and, therefore, the more developed economies would have a lower weight of manufacturing. In the case of developing and emerging economies, the process of industrialisation (a greater weight of manufacturing) would continue until they reach a level of development that places them among the advanced economies, at which point the weight of their manufacturing sector would decline.

In this sense, the process of deindustrialisation is understood as a reduction in the weight of manufacturing production and employment in total production and employment in the economy (Villanueva and Jiang, 2018; de Sousa and Oreiro, 2024a, 2024b), and would therefore be a phenomenon or process characteristic of more advanced or developed economies.

Notwithstanding the above, in recent years there has been an abundance of studies suggesting the possibility of an early or premature deindustrialisation (Rodrik, 2016; Lautier, 2024; de Sousa and Oreiro, 2024a). According to these studies, some emerging or developing economies are currently starting to deindustrialise at a much lower level of real per capita income than that registered when the current advanced economies started to deindustrialise in the past (Rodrik, 2016; Özçelik and Ozmen, 2023). In other words, the level of per capita income at which these developing and emerging economies start to deindustrialise is much lower than the one that affected the advanced economies. In fact, what is relevant here is that these economies deindustrialise without having reached a level of development that would place them among advanced or developing economies.

This process of early or premature deindustrialisation poses problems for the economies concerned, as the loss of weight of their manufacturing sector would have a negative effect on their long-term potential growth, preventing them from moving towards a more advanced level of development (Trofimov, 2023). This process of early deindustrialisation would affect economies with an intermediate level of development to a greater extent, placing them in a middle-income trap, slowing down their development process and, therefore, their convergence with more advanced economies (Oreiro et al., 2020a; de Sousa and Oreiro, 2024a, 2024b).

Most studies on premature deindustrialisation focus on developing and emerging economies (Lautier, 2024). Much less research has been done on the performance of the manufacturing sector in more advanced or developed economies. This is not surprising, given that the loss of weight of the manufacturing sector in advanced economies in the long run is assumed to be a natural process (Villanueva and Jiang, 2018), inherent to their state of development, and that the weight of manufacturing should be lower in advanced economies with higher levels of income per capita. This difference between the expected behaviour of the weight of the manufacturing sector in developed and in developing economies leads Rowthorn and Wells (1987) to distinguish between a positive deindustrialisation process, typical of advanced economies, in which the decline in the weight of manufacturing does not affect either total employment or real income growth, and a negative deindustrialisation process, typical of developing or emerging economies, in which the decline in the weight of manufacturing negatively affects total employment and causes real income stagnation.

The above analysis implicitly assumes that all advanced economies follow a natural pattern of deindustrialisation. However, as we will see in later sections, it is possible that this phenomenon is not general and that, in some advanced economies, the weight of manufacturing does not fall but remains constant or even increases. If this is the case, it would imply that deindustrialisation processes in advanced economies may not occur in the presence of certain institutional or productive environments or in the presence of effective public policies, such as industrial policies, aimed at promoting the development of the manufacturing sector.

In the case of developing and emerging economies, recent empirical evidence shows that this is a phenomenon that affects certain countries and regions, mainly Latin America and Africa, with the exception of emerging economies in East Asia (Özçelik and Ozmen, 2023; de Sousa and Oreiro, 2024b; Isabella, 2024; Lautier, 2024). As in the case of developed economies, there is no generally accepted explanation for why some economies are deindustrialising and others are not, although the Brazilian school of New Developmentalism, for example, puts the emphasis not on global factors, such as trade protectionism, the processes of productive globalisation and the development of global value chains, or the emergence of new international competitors (e.g., China), but on national elements related to domestic macroeconomic and supply-side policies, such as the absence of an effective industrial policy, the lack of an adequate national innovation system, the existence of high real interest rates, or the persistent overvaluation of the exchange rate (Oreiro and Araujo, 2013; Oreiro et al., 2015; Landesmann and Stöllinger, 2019; Gabriel et al., 2020; Oreiro et al., 2020b; Dávila-Fernández and Oreiro, 2023; de Sousa and Oreiro, 2024b).

In any case, if the hypothesis that the manufacturing sector is the main driver of economic growth and productivity (and competitiveness) in the long run is correct, the advanced economies in which the deindustrialisation process takes place should experience a process of deterioration in their level of development, bringing their level of development (income per capita) closer to that of the emerging or developing middle- or upper-middle-income economies, or even losing their status as advanced high-income economies. In the case of developing countries, the process of premature deindustrialisation would slow down their real catching-up process with advanced economies and could even widen their gap with high-income economies (Gabriel et al., 2020). Conversely, in developing economies where the weight of manufacturing is maintained or increased, the catching-up process with advanced economies would be maintained (ibid.).

On the other hand, a limitation of the usual studies of deindustrialisation processes is that they focus on studying the evolution over time of the relative weight of manufacturing, both in terms of output and of employment, in such a way that deindustrialisation is identified as the declining relative importance of manufacturing. In our view, the limitation of this approach is that it does not take into account that the lower relative weight of manufacturing may be due not so much to a decline in the value of manufacturing output and employment as to an increase in the output

and employment of other sectors. In other words, deindustrialisation would occur even if the real value of manufacturing output and the number of people employed in manufacturing increased. In this sense, the growth of manufacturing would continue to act as an engine of growth for the other sectors and, by extension, for the economy as a whole, although its relative weight would decline.

The situation would be different if the process of deindustrialisation were explained by a decline in the absolute size of manufacturing, i.e., in the real value of manufacturing output and the number of people employed in manufacturing. In this sense, the impact of a declining weight of manufacturing on the growth and development path would be different if we were in the presence of an "absolute" deindustrialisation, where the lower weight of manufacturing is explained by a decline in the real value of manufacturing production, or in the presence of "relative" deindustrialisation, where the real value of manufacturing production increases but at a slower rate than the production of the other sectors, leading to a lower share of manufacturing in the economy as a whole.

Using the terminology of Rowthorn and Wells (1987), we would identify a process of absolute deindustrialisation with a negative deindustrialisation, which would have a negative impact on long-term economic growth. Absolute deindustrialisation would be detrimental to both developed and developing economies. For the latter, it would be associated with a process of early or premature deindustrialisation, which would have a negative impact on the long-term development path of the economy, preventing it from advancing in its development status, for example, from an upper-middle-income economy to a high-income economy, or even reversing the development process. In the case of advanced economies, in addition to slowing down their long-term potential growth, the main effect would be to open a gap with the richer developed economies.

Although this is not the aim of this article, given the space constraints, we would like to mention some of the channels or pathways through which absolute deindustrialisation would negatively affect the long-term economic growth of the economies concerned. One of these elements would be related to the fact that the manufacturing sector is more intensive in physical capital and knowledge (research, development, and innovation, or R&D&I) activities than the services sector. Thus, the decline in manufacturing output could reduce investment in fixed (nonresidential) capital and R&D&I activities, thereby affecting long-term growth potential. On the other hand, to the extent that productivity is higher in manufacturing than in other sectors, the decline in manufacturing would imply lower productivity growth in the economy as a whole.

Other channels would relate to the impact on income distribution and aggregate demand. Average wages in manufacturing tend to be higher than in services, so absolute deindustrialisation would lead to a decline in average wages in the economy as a whole, which could have a negative impact on household consumption and, by extension, on aggregate demand. Given that the manufacturing sector is more open to domestic and international competition than the services sector, and that profit margins, and hence the share of profits (capital income), are higher in the services sector than in manufacturing, the result of absolute deindustrialisation would be a more favourable distribution of income towards capital income.

Finally, we must not forget that a fall in manufacturing output, if not accompanied by a corresponding fall in domestic demand for manufactured goods, will lead to an increase in imports of goods and/or a fall in exports of goods, with the consequent negative effect on the balance of goods and payments, net external demand, and, hence, aggregate demand.

In advanced economies, the relative deindustrialisation could be identified with natural deindustrialisation resulting from the higher growth of the services sector due to the development process itself, so that it would not have a negative impact on the long-term growth of these

economies. In the case of developing and emerging economies, however, it could have a negative impact, slowing down or even reversing the process of convergence with developed economies.

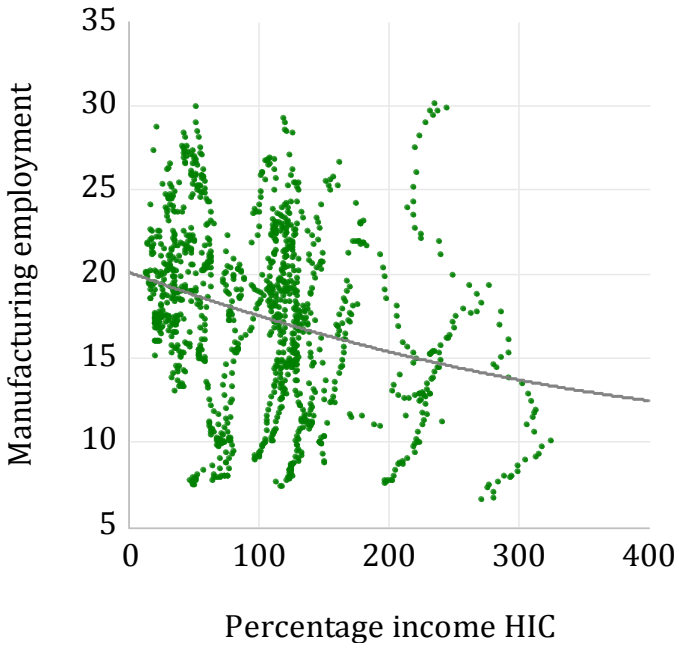
2. Employment trends in the manufacturing sector in Europe

As mentioned above, our paper analyses the dynamics of manufacturing in Europe. To do so, we analyse the evolution of employment and real value added in the manufacturing sector in a heterogeneous group of countries. In this section, our focus is on the evolution of manufacturing employment.

To analyse the behaviour of manufacturing employment in Europe, we have used employment data provided by the AMECO database.[1] Specifically, we have analysed data available from 1960 to 2022 for 30 European countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, Switzerland, and United Kingdom.

As pointed out in the previous section, the natural deindustrialisation hypothesis states that, in developed, high-income economies, the weight of the manufacturing sector would follow a decreasing trend, so that, the higher the stage of development of an economy, the lower the weight (in employment and output) of the manufacturing sector.

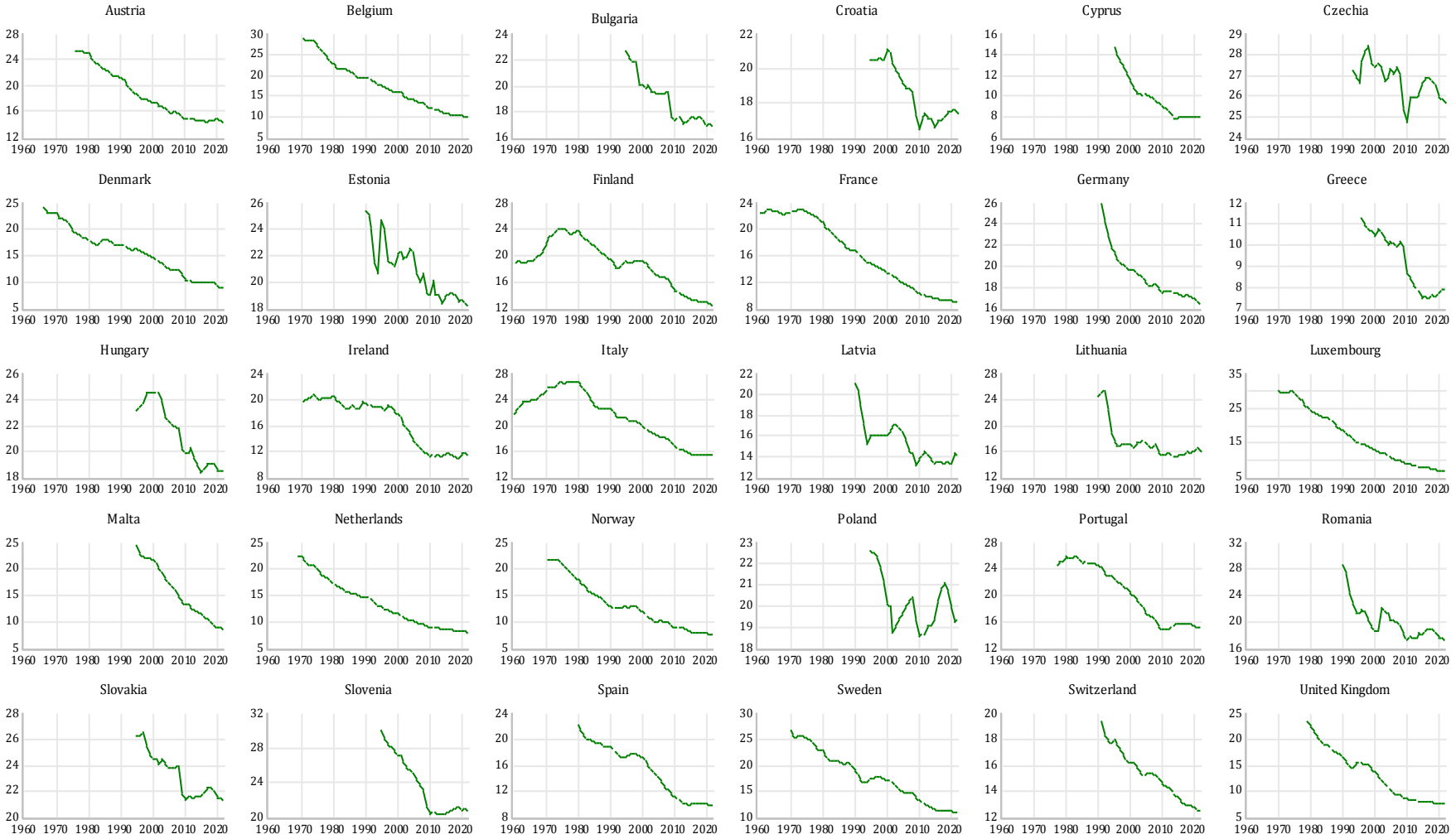
Figure 1 – *Manufacturing employment as a percentage of total employment and GDP per capita (as a percentage of GDP per capita of high-income countries), 1960-2022*



Source: Our calculations.

[1] AMECO is the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs: see online.

Figure 2 – *Employment in the manufacturing sector (percentage of total employment)*

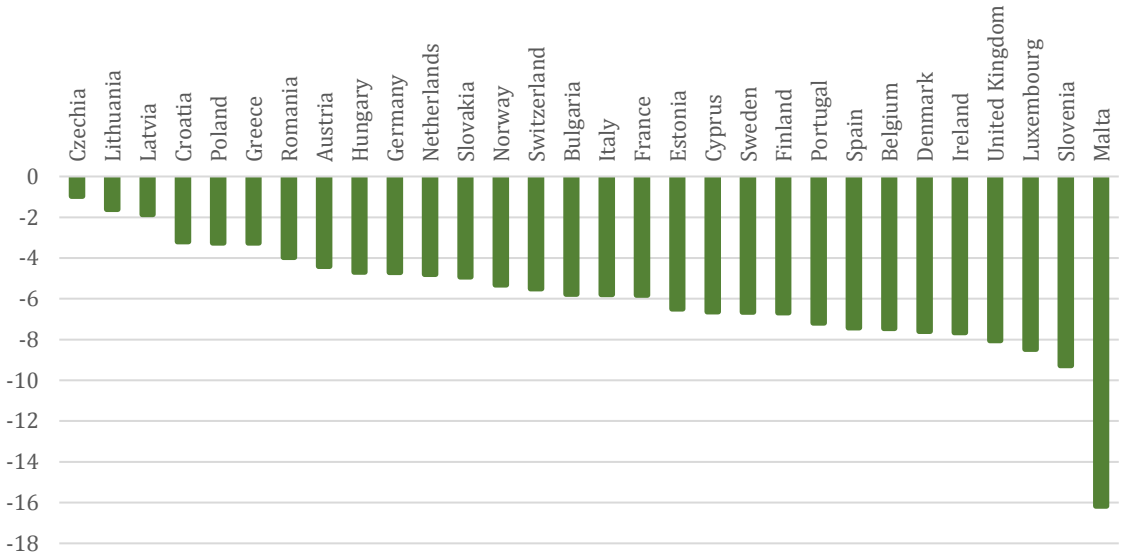


Source: Our calculations, based on the AMECO database.

Figure 1 shows the relationship between the weight of manufacturing employment and the level of development of the countries analysed. Given that practically all the European countries analysed are high-income or at least upper-middle-income economies, we have identified the level of development of these countries with the percentage of real gross domestic product (GDP) of each country in each year with respect to the GDP per capita of the countries classified by the World Bank as high-income countries (HICs), as shown in the World Development Indicators. One would expect that, in the higher-income European countries (those above the HIC average, i.e., countries with a percentage of HIC income above 100), the weight of manufacturing employment would be significantly lower than in the lower-income countries (those below the HIC average). Although this is apparently the case, as shown by the polynomial regression line included in the graph, there are nevertheless many cases in which a very high GDP per capita, above the HIC average, is associated with a high weight of manufacturing employment, indicating that the loss of weight of manufacturing employment associated with a high level of economic development is not a universal phenomenon.

Figure 2 shows the evolution of the weight of the manufacturing sector in total employment in the 30 countries studied. Although the time series differ, it is clear that in all European countries the share of manufacturing employment is lower in the year 2022 than in the first year for which data are available.

Figure 3 – *Change in the manufacturing employment as a share of total employment between 1995 and 2022*



Source: Our calculations, based on the AMECO database.

The fact that the employment data for the different countries cover different periods make it impossible to correctly assess the loss of weight of manufacturing in the different countries, although it is clear that, where data are available further back, the share of manufacturing

employment in total employment begins to fall from the 1980s onwards. Figure 3 shows the evolution of this share between 1995 (the first year for which data are available for all countries) and 2022. The data show that there are considerable differences in the decline in the share of manufacturing employment: while in the Czech Republic the weight of manufacturing fell by only 1 percentage point (p.p.), from 26.6% to 25.6% of total employment, in Malta it fell by 16.2 p.p., from 24.6% to 8.4% of total employment).

These data show a significant decline in the relative importance of manufacturing in Europe. In 1995, manufacturing employment accounted for more than 25% of total employment in 3 countries, between 20% and 25% in 10 countries, and between 10% and 20% in 17 countries. However, in 2022, manufacturing employment accounted for more than 25% of total employment in only 1 country, between 20% and 25% in 2 countries, between 10% and 20% in 17 countries, and below 10% of total employment in 10 countries. It is important to note that, in the former Eastern European countries, the share of manufacturing employment in 2022 ranged from 14.2% in Latvia to 25.6% in the Czech Republic, indicating that the loss of importance of the manufacturing sector was much more pronounced in Western European countries.

The above data reflect the decline in the importance of the manufacturing sector in European economies. However, it is difficult to conclude from these data that all or some of these economies are undergoing a process of deindustrialisation, or at least premature deindustrialisation, since, as mentioned in the previous section, there would exist, at least in the advanced economies, as would be the case of European economies, a natural process or trend, based on higher productivity growth in the manufacturing sector; this points to a loss of relative importance of manufacturing employment, to the detriment of an increasing growing weight of employment in the services sector.

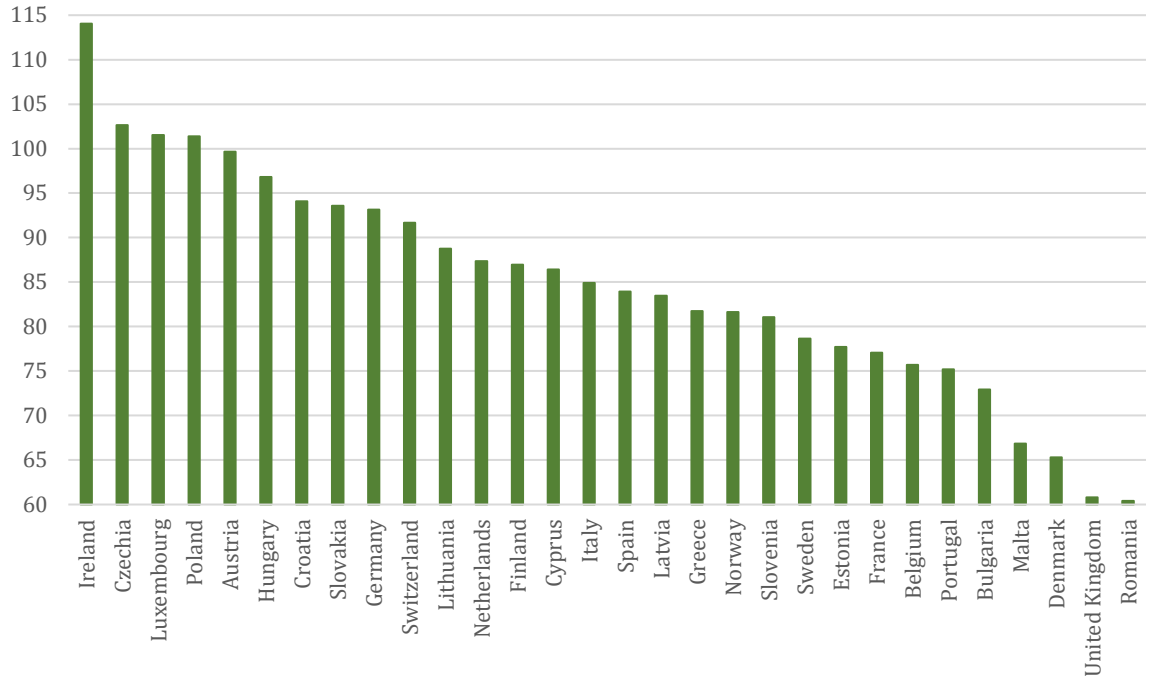
Therefore, for a correct assessment of the existence of a deindustrialisation process, we consider it necessary to analyse not only the evolution of the relative weight of manufacturing employment but also the evolution of the number of workers in this sector. In this sense, figure 3 shows the size of manufacturing employment in 2022 as a percentage of the manufacturing employment in 1995.

The data show that manufacturing employment has increased since 1995 in four countries (Ireland, Czech Republic, Luxembourg, and Poland) and has remained stable in Austria. In the other countries it has fallen significantly, reaching the extreme cases of the United Kingdom and Romania, where manufacturing employment has fallen by almost 40% over the last two decades. The data in figure 4 show that the process of decline in manufacturing employment is a common phenomenon in Europe, affecting 25 of the 30 countries analysed. It should also be noted that this process affects very different economies, both large and small economies, Western countries and former Eastern European countries, high- and middle-income countries, etc. This means that, while some countries are experiencing a natural deindustrialisation process, as they are at an advanced stage of development, other economies are affected by a process of early or premature deindustrialisation, because the process affects countries with income levels far removed from the European average and from the most prosperous countries in Europe.

In any case, it is noteworthy that not all of the most advanced European economies are experiencing a decline in manufacturing employment and, similarly, not all of the less advanced economies are experiencing a process of (de)industrialisation, suggesting the existence of national factors affecting the performance of the manufacturing sector in each country.

The above conclusions are based on the study of manufacturing employment over a period of almost 20 years. However, it should be noted that, as can be seen in figure 2, a large number of countries, 17 countries, have seen an increase in the number of workers in the manufacturing sector over the last decade; although this is significant, it has not allowed them to recover the level of employment recorded barely three decades ago.

Figure 4 – *Manufacturing employment in 2022 (1995=100)*

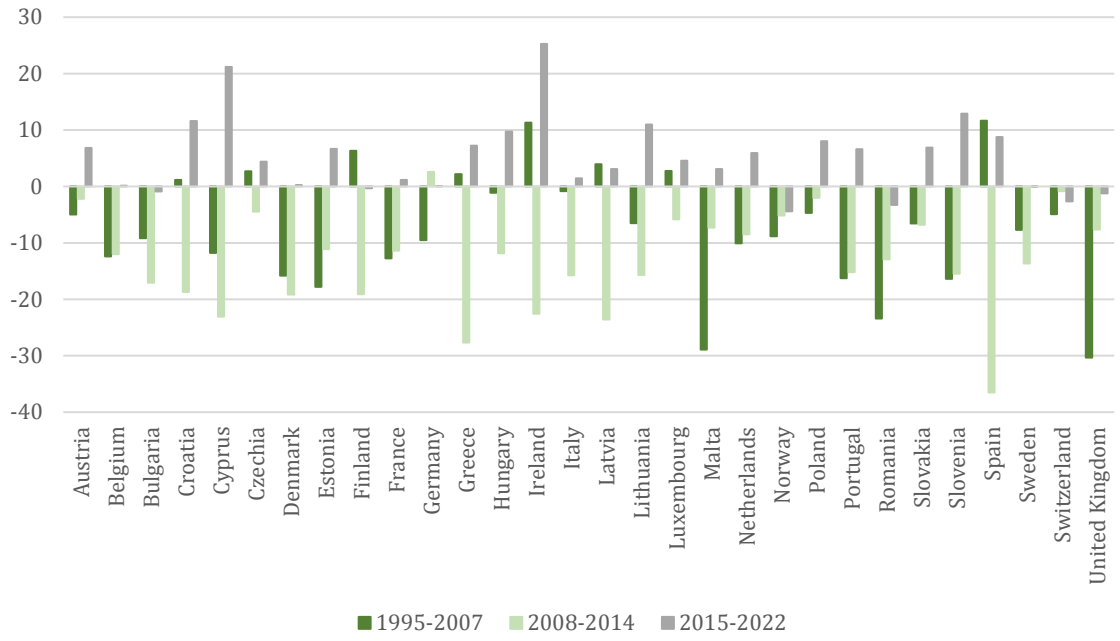


Source: Our calculations, based on the AMECO database.

In this respect, figure 5 shows the change in the number of manufacturing workers over three periods: 1995-2007 (before the Global Financial Crisis), 2008-2014 (during the Global Financial Crisis and the Great Recession), and 2015-2022 (after the Great Recession). The relevance of this figure is that it shows the enormous impact of the Global Financial Crisis and the subsequent Great Recession on the manufacturing sector. Thus, in the period 2008-2014, manufacturing employment increased in only one country, Germany. Compared to Germany, Spain lost one-third of the manufacturing workers existing in 2007. On the other hand, it shows that, in the period 2015-2022, manufacturing employment increased in 23 countries and fell only in Bulgaria, Finland, Norway, Romania, Sweden, Switzerland, and the United Kingdom. In fact, employment decreased in all three periods in only six countries: Bulgaria, Norway, Romania, Sweden, Switzerland, and the United Kingdom.

These data show, as mentioned above, that the financial crisis hit the manufacturing industry more than it did other sectors, as the fall in the number of workers in manufacturing was accompanied by a fall in manufacturing employment as a proportion of total employment. On the other hand, it gives rise to the hypothesis that the process of deindustrialisation (especially that of premature deindustrialisation, but also that of natural deindustrialisation), measured by changes in manufacturing employment, may be due to a one-off phenomenon, such as the financial crisis, although in this case we would have to wait a few more years to see if the recovery in manufacturing employment is sustained over time. In fact, in the period 1995-2007, manufacturing employment increased in eight countries (Czech Republic, Finland, Greece, Ireland, Latvia, Luxembourg, and Spain).

Figure 5 – *Percentage point change in manufacturing employment (1995=100)*



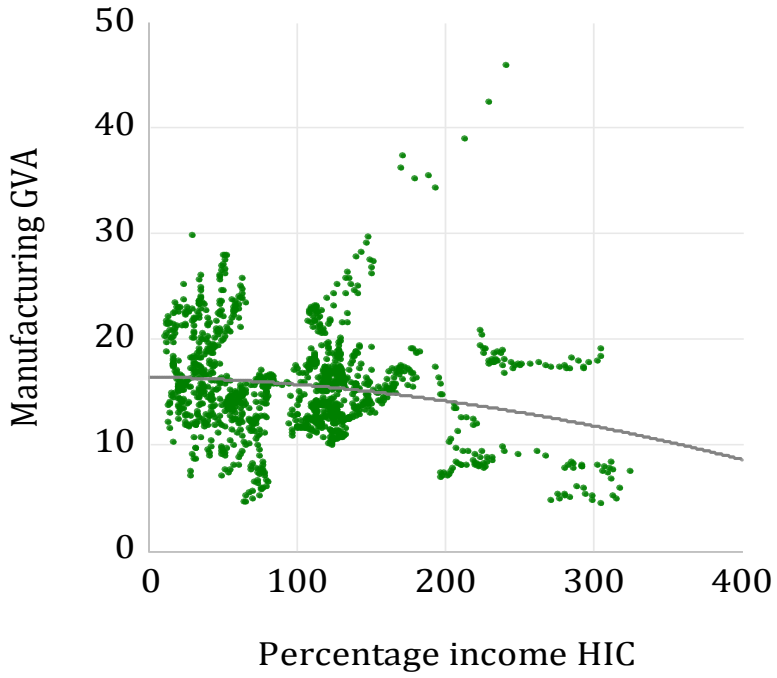
Source: Our calculations, based on the AMECO database.

3. Evolution of manufacturing gross value added in Europe

Although the employment data reflect both an absolute and a relative decline in manufacturing employment, this decline does not necessarily have a negative impact on the value of manufacturing production, in either absolute or relative terms, as long as it is accompanied by a compensating increase in the productivity of the sector, favoured by a more intensive use of capital, human capital, and knowledge-technology. Therefore, in order to assess the existence, extent, and possible consequences of a process of deindustrialisation, we must pay particular attention to the behaviour of the real value of manufacturing production.

As in the case of employment, we first analyse the relationship between the relative weight of manufacturing gross value added (GVA) and the level of development of countries. As shown in figure 6, there is no clear relationship between the level of development and the weight of manufacturing output. As the polynomial regression line shows, the decline in the weight of manufacturing would seem to be associated with countries with the highest level of development, i.e., those whose GDP per capita is more than double that calculated for high-income countries; but, even in these countries, for countries with similar levels of development, there are significant differences in the weight of manufacturing production, so we cannot speak of a generalised process of decline in the weight of manufacturing production associated with a higher level of development. This result therefore calls into question the existence of a generalised process of natural deindustrialisation in advanced or high-income economies.

Figure 6 – *Manufacturing GVA as a percentage of total GVA and GDP per capita (as a percentage of GDP per capita of high-income countries), 1960-2022*



Source: Our calculations.

In this section, we analyse the behaviour of the GVA of the manufacturing sector in Europe. As with employment, we initially examine the behaviour of the relative weight of the manufacturing sector, measured as the share of the manufacturing sector in the GVA of the total economy. Once we have identified the countries where the relative weight of the manufacturing sector is declining, we analyse whether this decline is accompanied by a maintenance or even an increase in industrial GVA, which would mean that the loss of weight of the manufacturing sector is explained by the higher growth of economic activity in the other sectors (a process of relative and "natural" deindustrialisation), or whether, on the contrary, the smaller relative size of manufacturing GVA is explained by a fall in absolute manufacturing GVA, i.e., by a process of absolute deindustrialisation. As in the case of employment, the data are from the AMECO database and the countries are the same as in the case of employment, plus Serbia (31 in total).

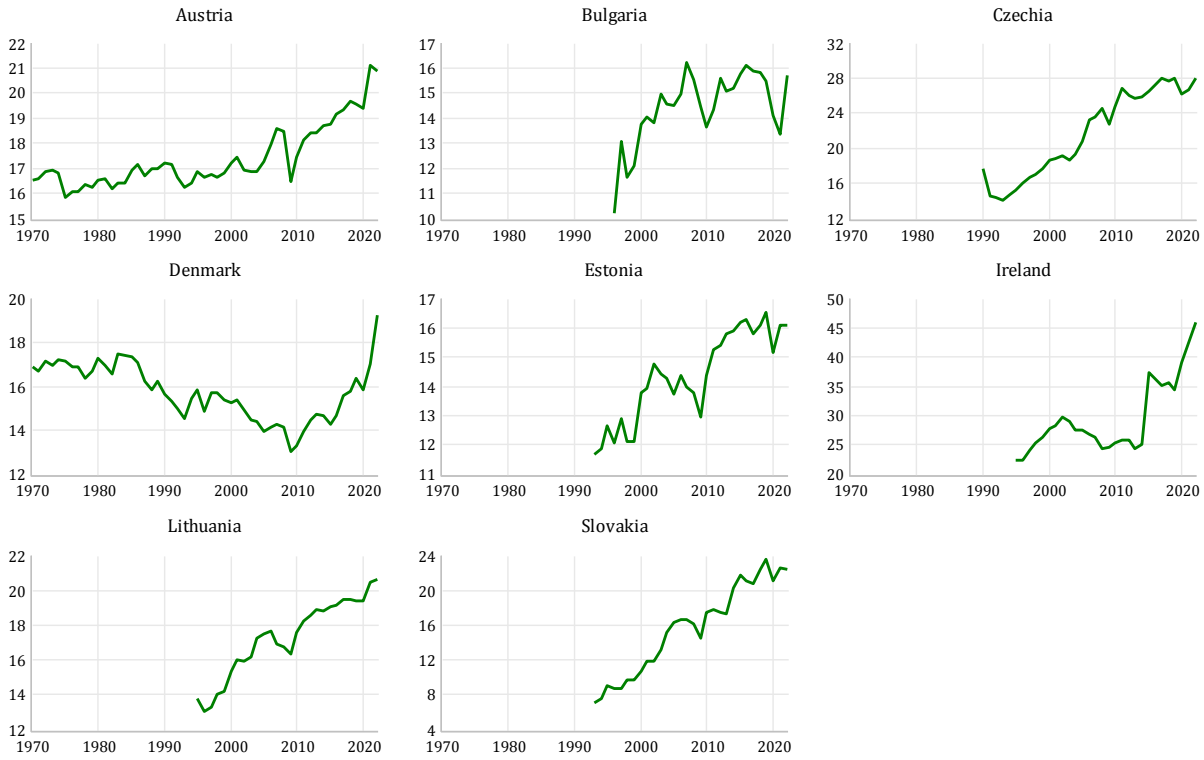
It is important to note, that, as we will see below, while in the analysis of manufacturing employment its behaviour was very homogeneous in all the countries (with a generalised decline in the share of manufacturing employment in all the countries and a fall in the number of workers in 26 of the 30 countries analysed), in the case of manufacturing GVA its evolution is quite diverse. This has led to the identification of six groups of countries.

The first group consists of eight countries in which there has been an increase in the relative share of manufacturing GVA of total GVA: Austria, Bulgaria, Czech Republic, Denmark, Estonia, Ireland, Lithuania, and Slovakia (figure 7).

The data on the growth of the share of the manufacturing sector in these countries range from 3.7 p.p. of total GVA for Denmark between 1966 and 2022 to 23.6 p.p. for Ireland in the period

1995-2022. Again, it is important to note the heterogeneity of this group of countries. Thus, we are including countries with a high level of development, such as Austria, Denmark, and Ireland, where, a priori, we would expect a decrease in the share of the manufacturing sector in total production.

Figure 7 – *Countries with an increase in the weight of manufacturing GVA (% total GVA)*



Source: Our calculations, based on the AMECO database.

Table 1 shows the real GDP per capita, measured in dollars, of this group of countries, showing for each of them the figure for both the year 2022 and the first year for which the weight of manufacturing GVA was available. It also shows the percentage of the real GDP per capita with respect to the average real GDP per capita of the HICs in those years, a percentage that can be used as an indicator of the level of development of the countries; that percentages enables us to assess or measure the distance of each country with respect to the most advanced HICs and, therefore, the evolution of this gap over time, assessing whether this country is converging or diverging with respect to the group of the richest countries. The data for the year 2022 show that Austria, Denmark, and Ireland have a GDP per capita that exceeds the threshold established by the World Bank to classify a country as 'high income', which is 40,395 USD. The rest of the countries would fall into the 'upper middle income' category, where the World Bank's threshold is 9,418 USD. With the exception of Bulgaria, whose per capita income level barely exceeds this threshold, those of the other countries are twice as high.

According to the U-inverted model, Austria, Denmark, and Ireland should be in a phase of deindustrialisation, which is not the case according to the available data. In the case of Czechia, Estonia, Lithuania, and Slovakia, one would expect that, given their level of development, the weight of their manufacturing sector should be in a phase of decline, or, at least, that it should have reached its peak and started to decline, which does not seem to be the case according to the most recent data. In any case, the experience of these countries suggests that the process of deindustrialisation in advanced economies is not a natural process. Rather, it may not occur in the context of a certain economic and public policy that is favourable to industrial manufacturing activity.

Finally, the data in table 1 show that all countries have maintained or increased the percentage of their income above the income threshold of the set of HICs, except Denmark, although its per capita income is still well above the threshold. This implies that the formerly upper-middle-income countries have intensified their convergence with the more advanced economies. Indeed, Ireland has entered the category of HICs, thus corroborating the hypothesis that the manufacturing sector acts as an engine of long-term growth and development.

Table 1 – *Real GDP per capita (constant 2015 USD)*

Country	Year	Real GDP per capita	% Real GDP per capita in HIC
Austria	1960	11,960	116.3
	2022	49,698	121.4
Bulgaria	1996	4,257	15.9
	2022	9,551	23.3
Czechia	1990	11,627	47.0
	2022	20,237	49.4
Denmark	1966	22,952	174.5
	2022	60,346	147.4
Estonia	1993	6,675	26.7
	2022	21,141	52.3
Ireland	1993	24,537	98.0
	2022	97,317	240.9
Lithuania	1995	4,936	18.9
	2022	18,535	45.9
Slovakia	1993	6,756	27.0
	2022	18,898	46.8

Source: World Bank, *World Development Indicators* (accessed 24/09/2024).
HIC: high-income countries.

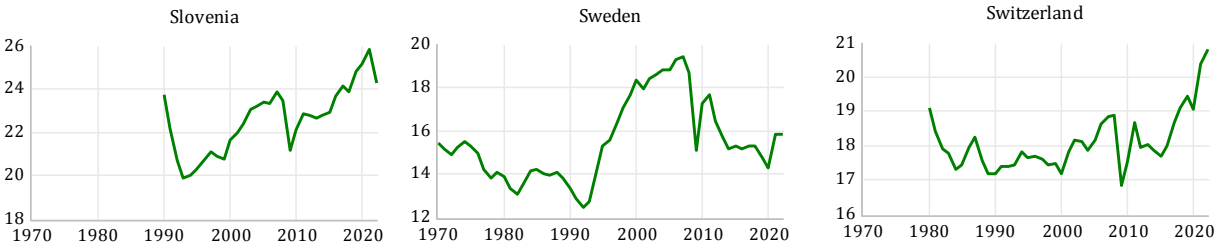
The second group comprises three countries: Slovenia, Sweden, and Switzerland, where a small increase in the share of manufacturing GVA has been recorded (see figure 8). Thus, the share of manufacturing GVA has risen in Slovenia by 0.6 p.p. since 1990, in Sweden by 0.4 p.p. since 1970, and in Switzerland by 1.7 p.p. since 1980.

Although in all three countries the share of manufacturing GVA in 2022 is higher than at the beginning of the period for which data are available, a similar pattern of evolution can be observed in the three countries. Thus, manufacturing output declined until the early 1990s, followed by an increase – in some cases a significant increase – until the outbreak of the financial crisis in 2008. The financial crisis had a profound negative impact on the manufacturing sector in these countries, like in the first group of countries; however, since 2010, manufacturing underwent a period of expansion, especially in Slovenia and Switzerland, where the highest figure for the share of the manufacturing sector in their economies is recorded in 2021-2022. The Swedish case is slightly different; from 2012 onwards, the weight of manufacturing fell, although it has recovered since 2021.

The experience of these countries is consistent with the case study of manufacturing employment, indicating that the financial crisis had a significant impact on the manufacturing sector. Indeed, given the trends observed in these countries, it could be argued that, in the absence of the Global Financial Crisis, the weight of manufacturing in 2022 would have been even higher than actually recorded.

In any case, once again, it is worth noting that this group of countries includes two of the most developed European economies, Sweden and Switzerland, which refutes the idea that the loss of weight of the manufacturing sector is a natural or inevitable phenomenon for the economies in the most developed stages (see table 2).

Figure 8 – *Countries with a small increase in the share of manufacturing production (% of total GVA)*



Source: Our calculations, based on the AMECO database.

Table 2 – *Real GDP per capita (constant 2015 USD)*

Country	Year	Real GDP per capita	% Real GDP per capita in HIC
Slovenia	1990	13,613	55.1
	2022	25,643	63.5
Sweden	1970	24,388	161.1
	2022	55,521	137.4
Switzerland	1980	59,771	305.4
	2022	89,943	222.7

Source: World Bank, *World Development Indicators* (accessed 24/09/2024).

As in the first group, two of the three economies have a per capita income that categorises them as HICs, so we would have expected a decline in the share of manufacturing production. In the case of Slovenia, its income level would place it in the upper-middle-income group, where we would expect a slowdown in the growth of the weight of manufactures, rather than the continuous increase in the share of manufactures shown in figure 8.

In contrast to the previous group, the lower growth of the manufacturing sector is associated, in the case of the high-income economies (Sweden and Switzerland), with a relative decline in their level of income in relation to the high-income economies as a whole, and, in the case of Slovenia, with a much slower process of convergence in its level of development with the high-income economies than that registered in the countries where the weight of manufacturing increases to a greater extent.

Overall, we see that in 11 European countries there has been a process of increase in the weight of the manufacturing sector, which makes it possible to rule out the existence of a generalised process of decline in the weight of the manufacturing sector. Five countries are classified as HICs (Austria, Denmark, Ireland, Sweden, and Switzerland) and the other six fall into the category of upper-middle-income country according to the World Bank's classification.[2] In 1995 only five countries (Austria, Denmark, Ireland, Sweden, and Switzerland) were classified as high-income countries; two countries (Czech Republic and Slovenia) were in the upper-middle-income group, and another four countries (Bulgaria, Estonia, Lithuania, and Slovakia) were in the lower-middle-income group.

The observation that the share of the manufacturing sector in total GVA has not decreased but has increased in a number of highly developed countries means that the hypothesis that the process of deindustrialisation in the most advanced economies is a natural and generalised process in all advanced economies should be taken with reservations, since certain advanced economies, due to some elements (such as their productive structure, institutional framework, public policies, etc.), have been able to maintain or even increase the relative weight of the manufacturing sector. In this sense, and taking into account the results of the previous analysis of the manufacturing employment, the only "natural" process that would affect European economies would be the decline of the share of manufacturing employment with respect to total employment. On the other hand, it is evident that the increase in the share of the manufacturing sector has allowed the rest of the economies to advance in their catching-up process towards the more advanced economies, giving support to the hypothesis that manufacturing plays a key role in development processes.

The next group comprises nine countries in which there is a continuous and sustained decline in the share of the manufacturing sector in total GVA (figure 9): Belgium, Croatia, France, Luxembourg, Malta, Norway, Serbia, Spain, and United Kingdom.

A comparison between the year 2022 with the first year for which data are available for these countries shows that the share of manufacturing GVA fell in Belgium by 1.4 points of GVA since 1970, in Croatia by 3.6 points since 1995, in France by 1.4 points since 1960, in Luxembourg by 4.6 points since 1985, in Malta by 7 points since 2000, in Norway by 12.3 points since 1970, in Serbia by 2.2 points since 1995, in Spain by 5 points since 1980, and in the United Kingdom by 5.4 points since 1960.

Table 3 shows the level of real per capita income of these countries in the year 2022 and in the year from which the weight of manufacturing GVA begins to decline. According to World Bank data, in the year from which the relative share of manufacturing GVA declines, five countries (Belgium, France, Luxembourg, Norway, and United Kingdom) were in the group of high-income countries; three countries (Croatia, Malta, and Spain) were in the group of upper-middle-income

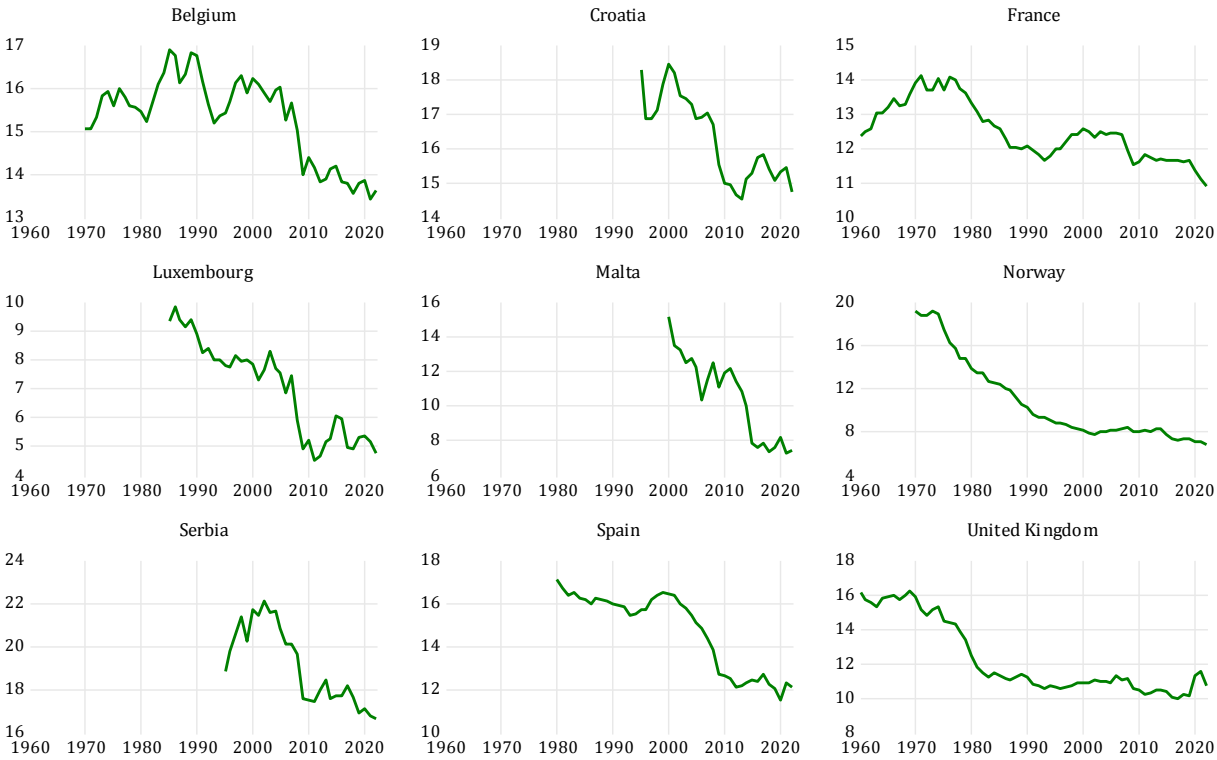
[2] See online.

countries, and Serbia had barely reached upper-middle-income status (although in 2022 it is in the group of low-middle-income countries).

It is remarkable that, as table 3 shows, the process of deindustrialisation in three of the HICs (Belgium, France, and the United Kingdom) is accompanied by a decline in their per capita income relative to the HICs, and, indeed, in France in 2022 the real income per capita is below the average income per capita of HICs. In the remaining economies, the loss of share of manufacturing GVA is not associated with a process of divergence from the more advanced economies. This is not the case, however, in Spain, where the lower share of manufacturing not only slows down its catching-up process but also widens the gap with the most advanced economies.

These data reflect the relative share of manufacturing GVA. However, for a more accurate assessment of the existence of a deindustrialisation process, as we did in the case of employment, it is useful to study the behaviour of the size in absolute terms of manufacturing GVA. As in the previous section, in order to have homogeneous data we measure the size of real manufacturing GVA in each country in terms of index numbers by making manufacturing GVA in 1995 equal to 100 (1996 in Bulgaria and 2000 in Malta).

Figure 9 – *Countries with a sustained decline in the share of manufacturing GVA (% total GVA)*



Source: Our calculations, based on the AMECO database.

Table 3 – *Real GDP per capita (constant 2015 USD)*

Country	Year	Real GDP per capita	% Real GDP per capita in HIC
Belgium	1985	25,569	119.4
	2022	44,198	109.4
Croatia	2000	8,877	29.5
	2022	16,712	41.4
France	1971	18,378	118.0
	2022	38,816	96.1
Luxembourg	1986	52,497	239.0
	2022	109,715	271.6
Malta	2000	17,190	57.2
	2022	30,761	76.0
Norway	1973	30,441	177.5
	2022	79,435	196.6
Serbia	2002	3,640	11.8
	2022	7,494	18.6
Spain	1980	14,727	75.2
	2022	27,703	68.6
United Kingdom	1969	18,851	127.0
	2022	47,343	117.2

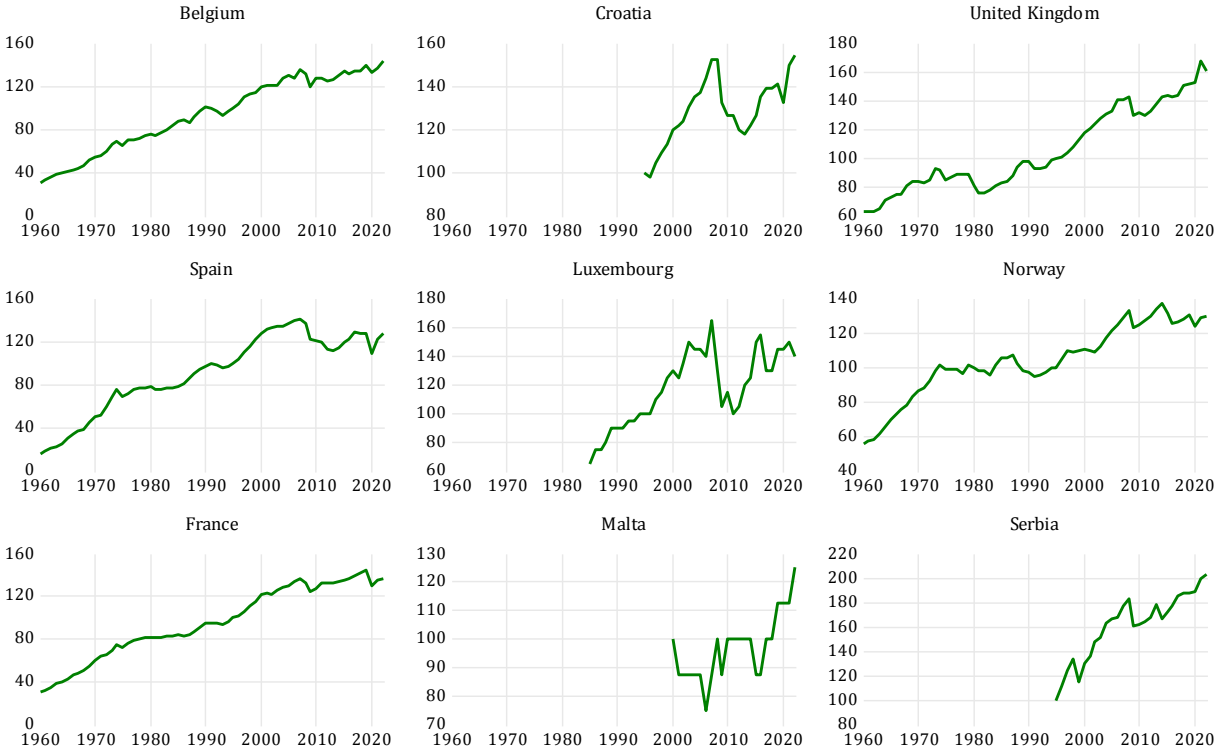
Source: World Bank, *World Development Indicators* (accessed 24/09/2024).

Figure 10 shows that, in a group of four countries, manufacturing GVA reaches a maximum value in a given year, after which it declines: in Luxembourg, real manufacturing GVA declines from 165 in 2007 to 140 in 2022; in Norway, from 137 in 2014 to 129 in 2022; in Spain, from 141 in 2007 to 128 in 2022; and in France, from 144 in 2019 to 136 in 2022.

Again, the negative impact of the financial crisis on manufacturing activity is evident, as all countries show a significant decline in the real GVA of the sector. Although, in almost all countries, manufacturing output recovers at the beginning or the middle of the last decade, in these four countries manufacturing output in 2022 is lower than it was before the Global Financial Crisis; thus, in these countries, we would be talking of the existence of an absolute deindustrialisation process.

It is important to note that in France and Spain this process of deindustrialisation has a negative impact on their relative level of development. The cases of Luxembourg and Norway are different because of the importance of the financial sector in Luxembourg and the importance of the development of the gas and oil sector in Norway. Thus, as can be seen in table 3, France's GDP per capita falls below the average of the HICs, while Spain's gap with these countries widens, indicating in both cases a negative impact of their relative and absolute deindustrialisation process on their long-term growth path.

Figure 10 – *Real manufacturing GVA in Belgium, Croatia, France, Luxembourg, Malta, Norway, Serbia, Spain, and United Kingdom (1995=100)*

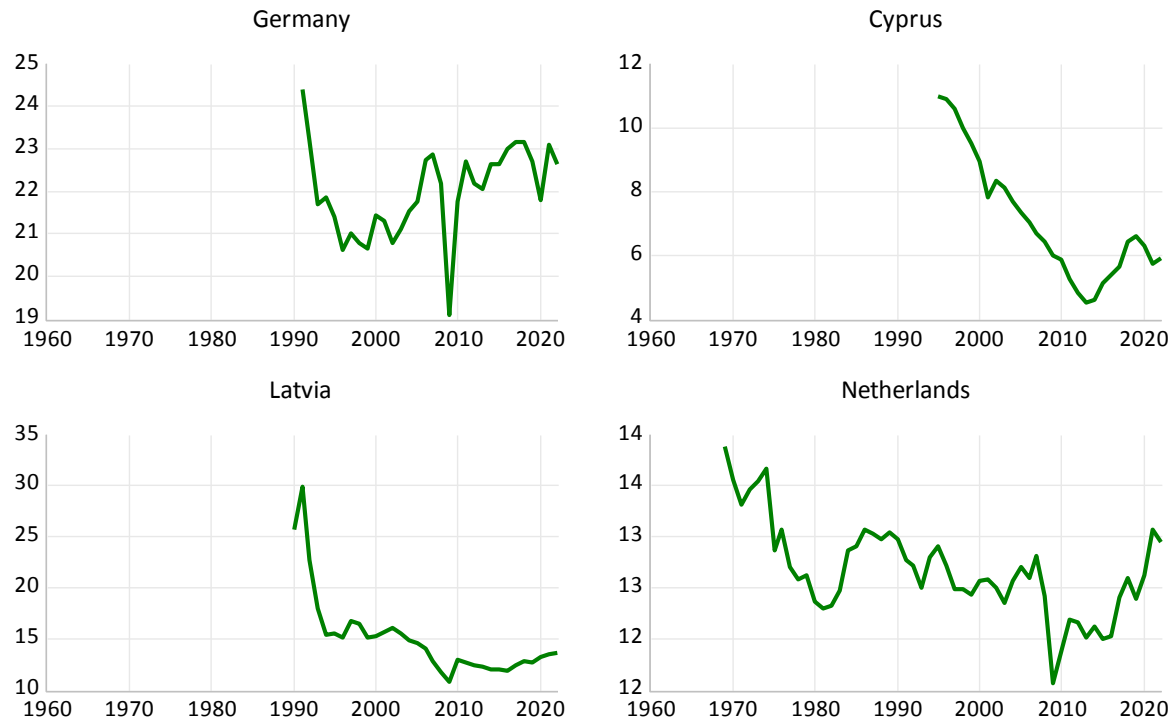


Source: Our calculations, based on the AMECO database.

The next group comprises four countries (Cyprus, Germany, Latvia, and the Netherlands) in which the share of manufacturing in total GVA is lower in 2022 than at the beginning of the period for which data are available (figure 11). However, these countries have the particularity that there is a turning point at which the share of the manufacturing sector begins to increase. In Cyprus, the manufacturing sector reaches its lowest level in 2013, after which the share of the sector increases by 1.4 p.p. of total GVA. In Germany, the Netherlands, and Latvia, the turning point is 2009, after which the weight of manufacturing rises by 2.8 points of total GVA in Latvia, 3.5 points in Germany, and 1.4 points in the Netherlands.

In this group of countries, with the exception of Latvia, which is the country with the lowest level of development, the decline in the manufacturing sector is accompanied in Germany and the Netherlands by a fall in their level of per capita income relative to that of HICs, and a maintenance in the case of Cyprus. However, the increase in the relative share of manufacturing in the last years of the period allows them, with the exception of the Netherlands, to reduce the gap with HICs and, in Germany, to halt the decline in their level of relative real per capita income. Therefore, these countries would have been affected by a process of relative deindustrialisation, which helps to understand why the lower weight of the manufacturing sector has not translated into a deterioration of their relative position with respect to HICs.

Figure 11 – *Countries with a decreasing share of manufacturing GVA until a year after which it increases (% total GVA)*



Source: Our calculations, based on the AMECO database.

Table 4 – *Real GDP per capita (constant 2015 USD)*

	Maximum value manufacturing GVA			Minimum value manufacturing GVA			2022	
Country	**Year**	**Real GDP per capita**	**% Real GDP per capita in HIC**	**Year**	**Real GDP per capita**	**% Real GDP per capita in HIC**	**Real GDP per capita**	**% Real GDP per capita in HIC**
Cyprus	1995	19,454	74.4	2013	22,738	58.8	30,557	75.6
Germany	1970	17,894	118.2	2009	36,190	109.0	43,361	107.3
Latvia	1991	7,137	28.8	2009	11,237	33.8	17,015	42.1
Netherlands	1969	20,378	137.3	2009	44,028	132.6	50,547	125.1

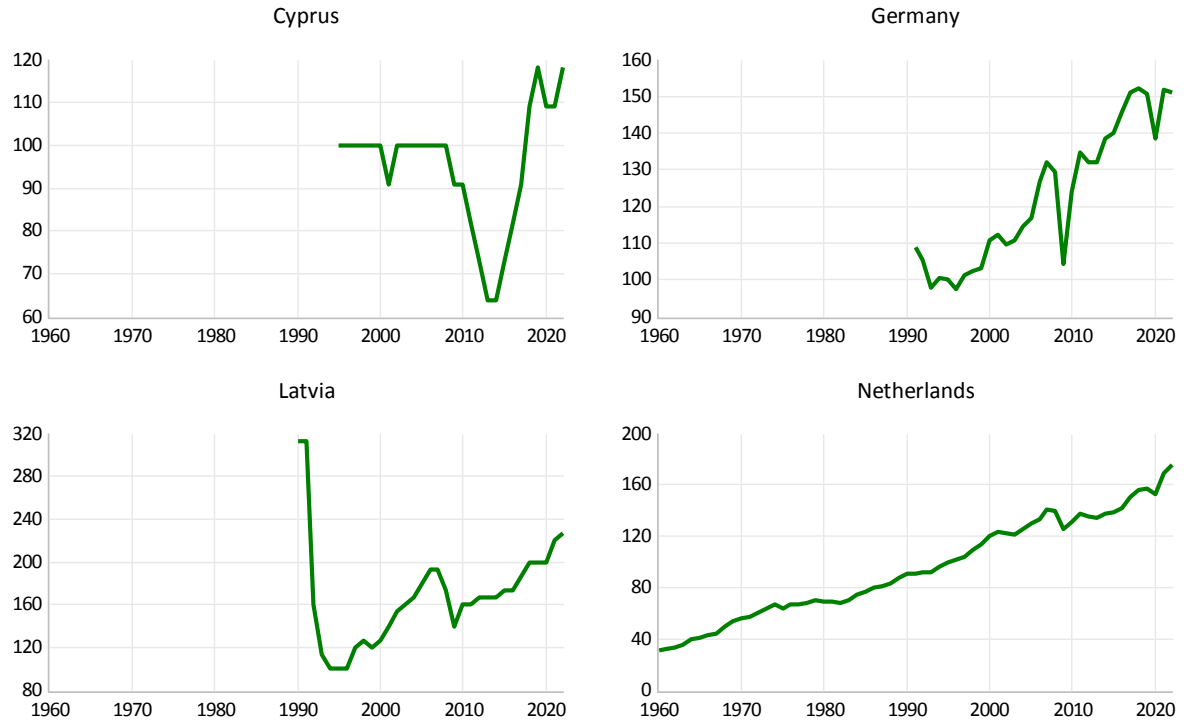
Source: World Bank, *World Development Indicators* (accessed 24/09/2024).

The cases of Germany and the Netherlands share the common feature that the weight of manufacturing reached its lowest value in 2009. Until 2007, the share of manufacturing had declined slightly: by 1.1 p.p. of total GVA since 1969 in the Netherlands, and by 1.5 p.p. since 1991 in Germany. Because of the financial crisis, the share of manufacturing in Germany in 2009 was 3.8 p.p. lower than in 2007, and in the Netherlands it was 1.3 p.p. lower. However, since 2009, manufacturing once again gained weight, and between 2009 and 2022 its share increased by 3.6 p.p. of GVA in Germany and by 1.4 p.p. in the Netherlands.

These data again highlight the negative impact of the financial crisis on the European manufacturing sector, but they also call into question whether the process of deindustrialisation is a natural and inevitable process in most advanced economies.

The data presented in figure 12 provide corroboration for the conclusions previously outlined. The value of manufacturing output has increased in all countries between 1995 and 2022.[3] It is evident that the financial crisis had a detrimental impact on the manufacturing sector, leading to a decline in the value of its output. However, despite the significant magnitude of this decline, it is a transient phenomenon. Consequently, from 2009 (or 2014 in the case of Cyprus) onwards, the manufacturing sector begins a new path of growth.

Figure 12 – *Real manufacturing GVA in Cyprus, Germany, Latvia, and the Netherlands (1995=100)*

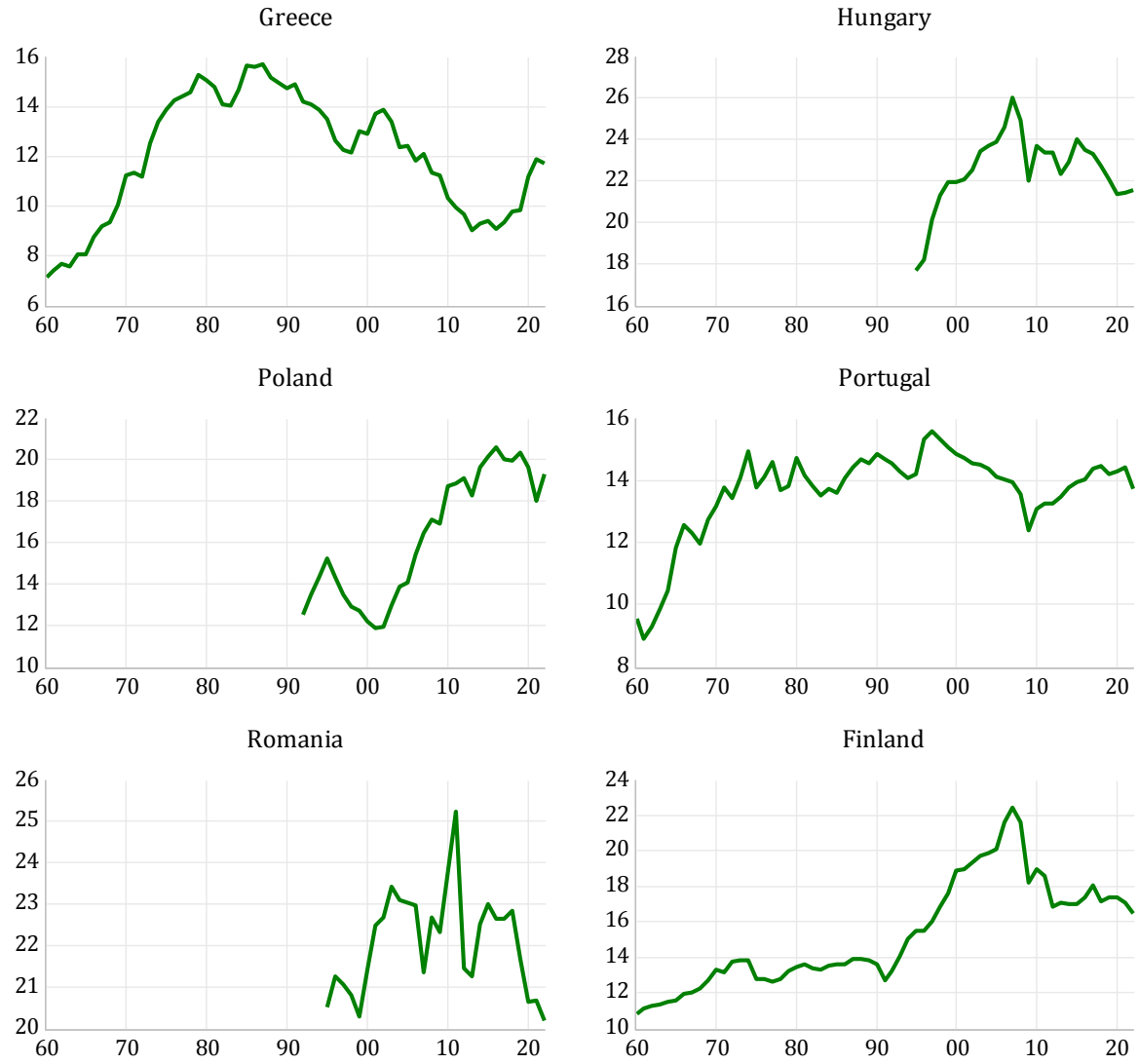


Source: Our calculations, based on the AMECO database.

[3] It should be noted that, after its independence, between 1990 and 1994 the real value in euros of manufacturing production in Latvia fell by 68%. There was a subsequent recovery, but in 2022 the value was still 28% lower than in 1990. This suggests that the process of deindustrialisation in Latvia has an origin unrelated to its level of development, being the result of the effects derived from its process of independence.

In the fifth group, we have six countries (Finland, Greece, Hungary, Poland, Portugal, and Romania). In these countries in the year 2022 the share of manufacturing was higher than in the first year for which data are available, but there is a peak or turning point after which the weight of manufacturing in total GVA declines (see figure 13). Thus, in Finland the share of manufacturing has fallen by 6 p.p. of total GVA since 2007, in Greece by 4 p.p. since 1987, in Hungary by 4.5 p.p. since 2007, in Poland by 1.3 p.p. since 2016, in Portugal by 1.3 p.p. since 1997, and in Romania by 5 p.p. since 2011.

Figure 13 – *Countries where the share of manufacturing increases up to a point, beyond which it declines (% total GVA)*



Source: Our calculations, based on the AMECO database.

It is important to note that, in Greece and Romania, the decline in the share of the manufacturing GVA begins to take place in a situation in which, according to the World Bank classification, both countries are considered as upper middle income; thus, since the country is not fully considered as an advanced or high-income country, one could speak of a process of early or premature deindustrialisation.

Table 5 shows that all the countries in this group increased their level of development, approximated by the percentage of their real income per capita with respect to that of the HICs, during the period in which the weight of manufacturing increases. However, in the HICs, such as Finland, Greece, and Portugal, the process of the loss of weight of manufacturing is accompanied by a decline in their relative level of development, slowing down Greece and Portugal in the catching-up process towards the HICs.

Table 5 – *Real GDP per capita (constant 2015 USD)*

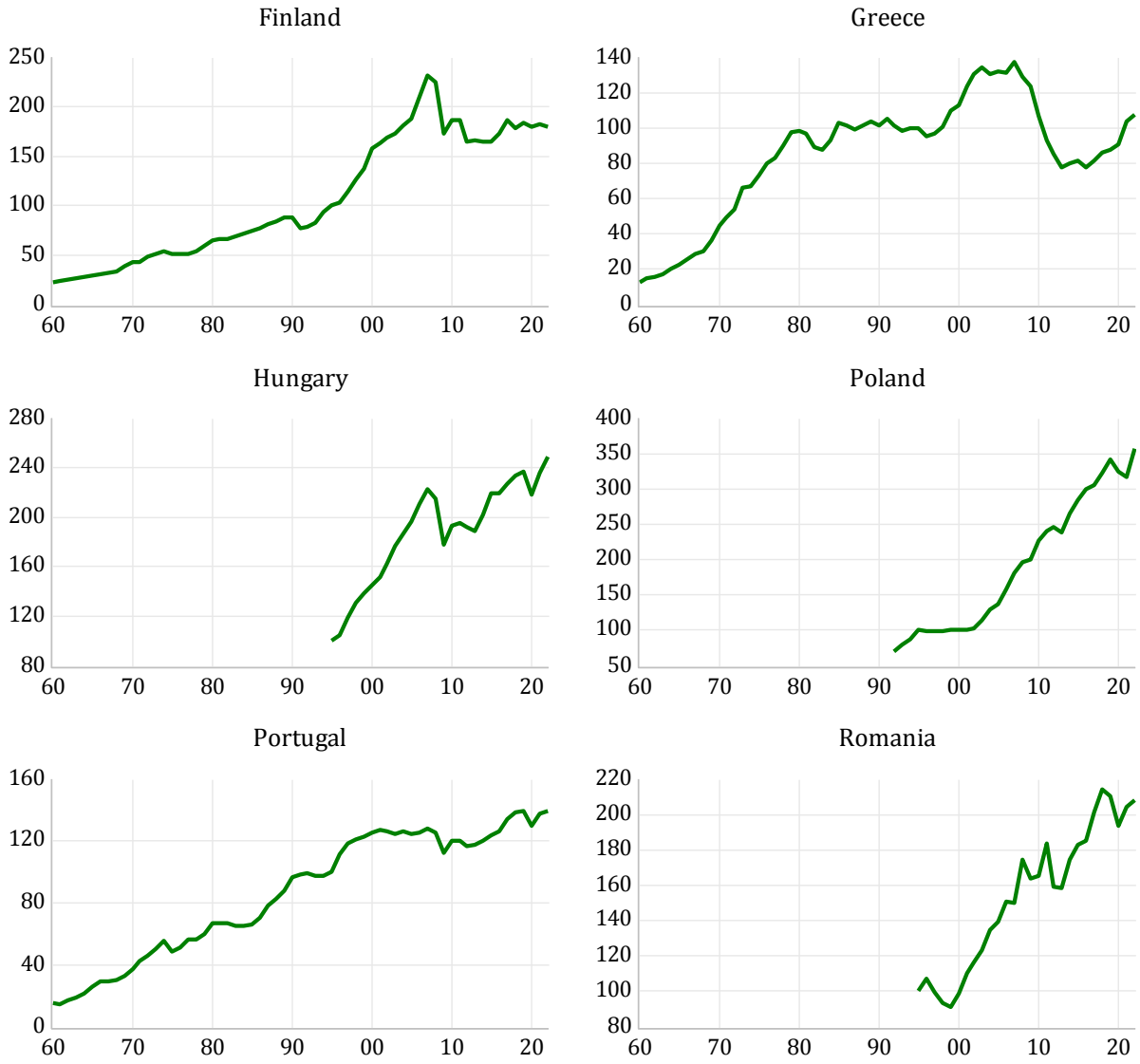
	Minimum manufacturing GVA			**Maximum value manufacturing GVA**			**2022**	
Country	**Year**	**Real GDP per capita**	**% Real GDP per capita in HIC**	**Year**	**Real GDP per capita**	**% Real GDP per capita in HIC**	**Real GDP per capita**	**% Real GDP per capita in HIC**
Finland	1960	11,143	108.4	2007	46,213	133.5	46,655	115.5
Greece	1960	5,014	48.8	1987	14,624	64.8	20,288	50.2
Hungary	1995	7,676	29.4	2007	11,793	34.1	16,345	40.5
Poland	2001	7,439	24.5	2016	12,937	35.0	17,179	42.5
Portugal	1961	4,252	40.01	1997	16,922	61.5	22,126	54.8
Romania	1999	4,452	15.4	2011	8,043	23.3	12,132	30.0

Source: World Bank, *World Development Indicators* (accessed 24/09/2024).

Figure 14 shows the evolution of manufacturing real GVA since 1995. The figure highlights the virtual stagnation of manufacturing production in Portugal, which has grown by only 8.9% since 2007. Particularly noteworthy are the cases of Greece, where real manufacturing GVA has fallen by 21.8% since 2007, and Finland, where manufacturing GVA has fallen by 22.3% since 2007. Again, these data reflect the impact of the financial crisis on manufacturing industry in this group of countries; the exceptions are Poland and Romania, where manufacturing output has not been significantly affected by the Global Financial Crisis

In sum, we can conclude that, in the last two decades, both Finland and Greece have been immersed in a process of deindustrialisation, relative and absolute, and that this process affects both a country whose per capita income, and therefore a level of development, is above the European Union average, and Greece, a country whose level of per capita income, and development, is well below the European Union average.

Figure 14 – *Real manufacturing GVA in Finland, Greece, Hungary, Poland, Portugal, and Romania (1995=100)*



Source: Our calculations, based on the AMECO database.

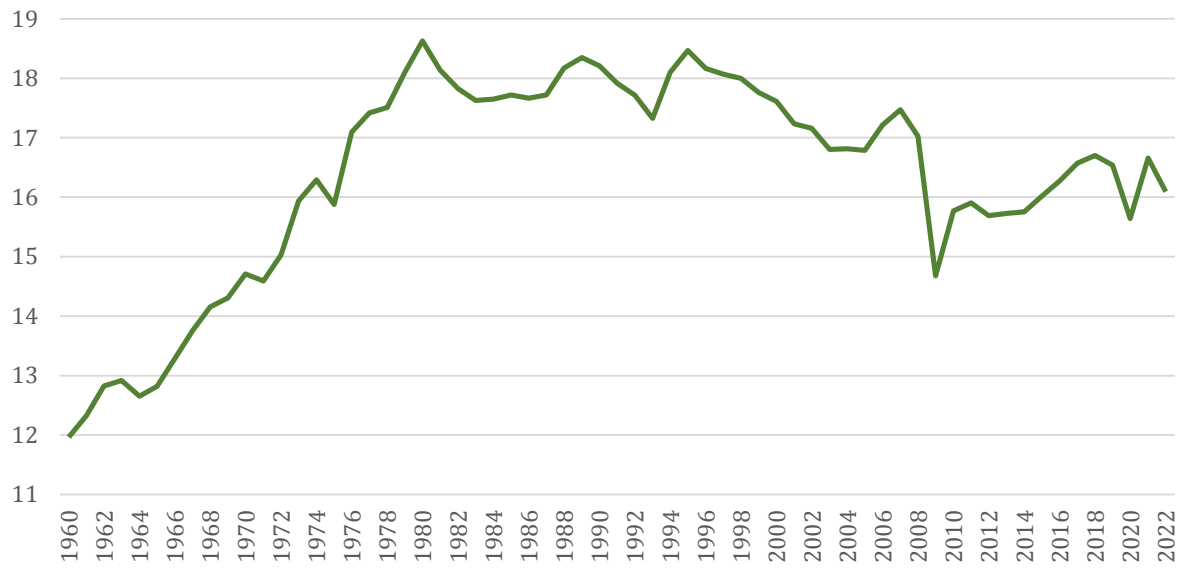
The last group studied consists of a single country, Italy. From 1960 to 1980, the manufacturing sector steadily gained weight, reaching 18.6% of total GVA (see figure 15). This share was maintained, with cyclical fluctuations, until 1995, when manufacturing lost weight in the Italian economy. Although, from 2005 onwards, its weight increased, the financial crisis had a huge impact on the manufacturing sector, which declined from 17.5% of total GVA in 2007 to 14.7% in 2009. From that year onwards, the share of manufacturing entered a phase of growth that lasted until the Covid-19 crisis, which halted the growing trend in the weight of the manufacturing sector.

Figure 16 allows us to study, as we did in the previous groups, the relationship between the weight of the manufacturing sector and the level of economic development in Italy. The data show that, until the end of the 1970s, the higher share of manufacturing was associated with a higher level of development, so that Italy was placed in the group of highest-income economies, with a real GDP per capita above the average of the HICs. However, since the mid-1990s, the lower weight of the manufacturing sector has been accompanied by a lower level of development, and, since 2006, the real GDP per capita in Italy has been lower than the average of HICs. This process came to a halt in the middle of the last decade, when the rebound in the weight of manufacturing made it possible to halt the deterioration in Italy's relative economic position; this again points to the key role played by the manufacturing sector in economic development and growth, not only in advanced and emerging economies but also in developed ones.

In order to assess the existence of a deindustrialisation process in Italy, we again analyse the behaviour of real manufacturing GVA. The data in figure 17 show that, between 1995 and 2022, manufacturing GVA has grown by a mere 4.1% (compared to growth in total GVA of 19.5% in the same period).

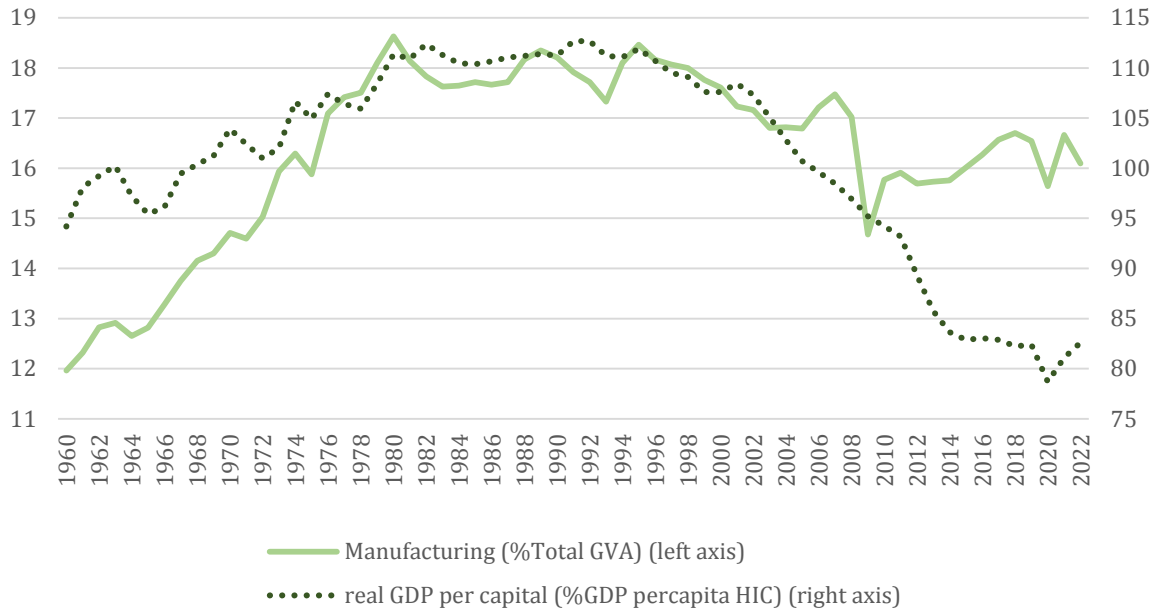
Therefore, we can conclude that, in the last two decades, Italy has suffered a process of relative and absolute deindustrialization. Nonetheless, what is relevant in the Italian case is that the apparent process of deindustrialisation that has taken place over the last couple of decades, with a decline in the real value of manufacturing output of 8% between 2007 and 2022, is entirely explained by the effects of the Global Financial Crisis and the Covid-19 crisis, so that we can speak not of a natural deindustrialisation process but of a phenomenon caused by two extraordinary episodes of crisis.

Figure 15 – *Share of the manufacturing sector in Italy (% total GVA)*



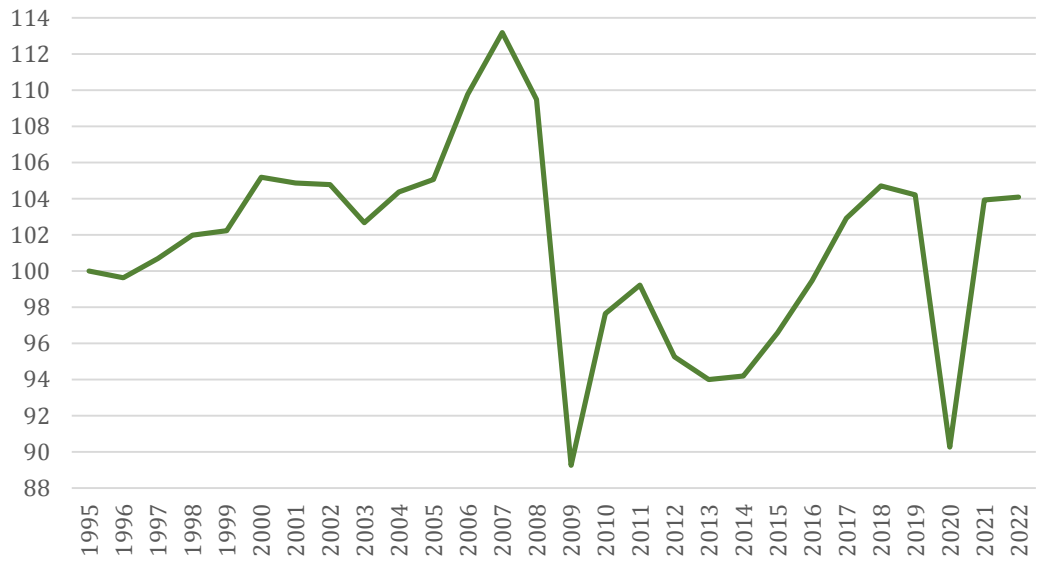
Source: Our calculations, based on the AMECO database.

Figure 16 – *Relative share of manufacturing and real GDP per capita in Italy*



Source: Our calculations, based on the AMECO database and World Bank, *World Development Indicators* (accessed 24/09/2024).

Figure 17 – *Real GVA of manufacturing in Italy (1995=100)*



Source: Our calculations, based on the AMECO database.

4. Conclusions

The results of our study allow us to conclude that the existence of a natural process of evolution of the manufacturing sector as a country progresses along its development path is by no means generalised. Thus, although the share of manufacturing employment in total employment is gradually decreasing in all European countries, there are some countries at different levels of development where manufacturing employment has increased in recent decades. In fact, in all countries, manufacturing employment figures, both in absolute and relative terms, show how the Global Financial Crisis and the subsequent Great Recession had a huge negative impact on manufacturing employment; thus, in most European economies, the decline in the share of manufacturing employment is a direct consequence of the crisis rather than a natural process.

If we analyse the behaviour of manufacturing GVA, we again find similar results. In 11 countries, some of them highly developed, the share of manufacturing in total GVA has increased in recent decades. This rising share of the manufacturing sector is also associated with a growth in per capita income in these countries, especially in those classified as upper-middle-income or middle-income countries, which would confirm the hypothesis that the manufacturing sector plays a key role in long-term economic growth, not only in emerging or developing countries but also in more developed economies such as those in Europe.

On the contrary, there is a group of countries, Finland, France, Greece, Luxembourg, Norway, and Spain, for which we can speak of a process of absolute deindustrialisation, as the fall in the share of manufacturing GVA is the result of a fall in the real value of manufacturing output. Moreover, with the exception of Luxembourg, the fall in manufacturing output is accompanied by a deterioration in the relative income position of these countries with respect to the high-income countries, This implies a slowdown in the catching-up process in the case of Greece and Spain and the loss of inclusion as a highest-income country in the case of France, a result that also occurs in the case of Italy

This result suggests that absolute deindustrialisation processes have severe negative consequences for the long-term growth potential of the economies concerned and thus for their relative position vis-à-vis more advanced economies, confirming the hypothesis of the central role of the manufacturing industry in long-term economic growth and development processes.

On the other hand, the results show that, in all countries, the financial crisis had a significant negative impact on the performance of the manufacturing sector, much more so than in other sectors. This raises the need to analyse the mechanisms through which the financial crisis may have affected manufacturing in Europe more severely.

Finally, the study shows that the behaviour of the manufacturing sector in Europe is very different between countries with similar levels of development or per capita income. This implies that the evolution of the manufacturing sector does not necessarily follow a natural pattern of behaviour but can be influenced by institutional, social, or public policy factors, such as industrial policy, which can condition, favour, or harm manufacturing.

References

Dávila-Fernández M.J. and Oreiro J.L. (2023), "Competitiveness and dynamic cumulative causation in an export-led growing economy", *Industrial and Corporate Change*, 32, pp. 522-520.

de Sousa L.N.E. and Oreiro J.L. (2024a), "Reindustrializing Brazil: a comprehensive analysis of industrial trajectory, policies and a forward-looking agenda", presented at the *7th International Astril Conference*, Rome, 25-26 January.

de Sousa L.N.E. and Oreiro J.L. (2024b), "Industrial policies for reverting the premature deindustrialization of the Brazilian economy", *International Review of Economic Policy*, 6(1), pp. 70-88.

Gabriel L.F., de Santana Ribeiro L.C., Jayme Jr F.G. and da Costa Oreiro J.L. (2020), "Manufacturing, economic growth, and real exchange rate: empirical evidence in panel data and input-output multipliers", *PSL Quarterly Review*, 73(292), pp. 51-75.

Isabella F. (2024). "Structural change, commodity dependence and middle-income trap: Emerging approaches to a traditional agenda", *PSL Quarterly Review*, 77(310), pp. 329-350.

Kaldor N. (1967), *Causes of the slow rate pf economic growth in the United Kingdom: Inaugural lecture at the University of Cambridge*, Cambridge: Cambridge University Press.

Kaldor N (1966), *Strategic factors in economic development*, New York: Ithaca.

Landesmann M.A. and Stöllinger R. (2019), "Structural change, trade and global production newworks: An 'appropriate industrial policy' for peripheral and catching-up economies", *Structural Change and Economic Dynamics*, 48; pp. 7-23.

Lautier L. (2024), "Manufacturing still matters for developing countries", *Structural Change and Economic Dynamics*, 70, pp. 168-177.

Oreiro J.L. and Araujo E. (2013), "Exchange rate misalignment, capital accumulation and income distribution theory and evidence from the case of Brazil", *Panoeconomicus*, 60(3), pp. 381-396.

Oreiro J.L., da Silva K.M. and Dávila-Fernández M. (2020), "A *New Developmentalist* model of structural change, economic growth and middle-income traps", *Structural Change and Economic Dynamics*, 55, pp. 26-38.

Oreiro J.L., Manarin D'Agostini L.L. and Gala P. (2020), "Deindustrialization, economic complexity and exchange rate overvaluation: the case of Brazil (1998-2017)", *PSL Quarterly Review*, 73(295), pp. 313-341.

Oreiro J.L., Missio F. and Jayme Jr. F.G. (2015), "Capital accumulation, structural change and real exchange rate in a Keynesian-Structuralist growth model", *Panoeconomicus*, 62(2), pp. 237-256.

Özçelik E. and Ozmen E. (2023), "Premature deindustrialisation: the international evidence", *Cambridge Journal of Economics*, 47, pp. 725-746.

Rocha I.L. (2018), "Manufacturing as driver of engine growth", *PSL Quarterly Review*, 71(285), pp. 161-182.

Rodrik D. (2016), "Premature deindustrialization", *Journal of Economic Growth*, 21(1), pp. 1-33.

Rowthorn R. and Wells J.R. (1987), *De-industrialization and foreign trade*, Cambridge: Cambridge University Press.

Szirmai A. (2012), "Industrialization as an engine of growth in developing countries, 1950-2005", *Structural Change and Economic Dynamics*, 23, pp. 406-420.

Szirmai A. and Verspagen B. (2015), "Manufacturing and economic growth in developing countries, 1950-2005", *Structural Change and Economic Dynamics*, 34, pp. 46-59.

Trofimov I. D. (2023), "The effects of structural change on economic growth: a panel data analysis", *Panoeconomicus*, 1-43. Available online.

Villanueva L. and Jiang X. (2018), "Patterns of technical change and de-industrialization", *PSL Quarterly Review*, 71(285), pp. 161-182.