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Some stylized facts about deindustrialization in Europe

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Abstract

This paper highlights three main trends concerning the evolution of the proportion of manufacturing in overall productive activity across European countries. Firstly, we are able to detect a non monotonic spatial pattern with deindustrialization prevailing both close to the European core and in remote areas. Secondly, industrialization appears to be faster in countries newly admitted to the European Union, whose trade costs with the European core are falling sharply. Finally, a specialization in high-tech, value added intensive sectors seems to prevent deindustrialization of core European countries but it has not the same effect on those which joined the European Union more recently.

Keywords: Manufacturing, Deindustrialization, Location

JEL classification: L6,O3, R3.

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1. Introduction

The change in the proportion of manufacturing in the aggregate productive activity has shown a considerable degree of asymmetry across the regions of the world economy. Most countries (but not all of them) have experienced of a global trend of *deindustrialization*, with the contraction of manufacturing and the relative expansion of service activities (see, among others, Spilimbergo, 1998).

According to Rodrik (2016), deindustrialization trends in the world economy are the effect of two shocks, namely a strong decline of transport or trade costs across regions and a fast, labor saving technical progress. A picture of the share of manufacturing in aggregate economic activity can be drawn by dividing the world economy in three main regions.

The advanced high income countries, where there is a strong decline in manufacturing employment. The evolution of the industrial output share in GDP varies across countries and it depends positively on technological advances and negatively upon competition by imports from low cost countries.

A low income region with a comparative advantage in manufacturing, such as China and other East Asian industrial exporters, where both manufacturing employment and output rise in relative terms.

A low income region without a comparative advantage in manufacturing, such as Latin America and sub-Saharan Africa, where a decline in both industrial employment and output is easily noticed.

The first main cause of deindustrialization is the general trend of transport and communication costs to fall, which was supported by a similar trend of trade costs, namely *ad valorem* tariffs and other non-tariff barriers to trade. In the

context of a general openness to trade, a stronger divergence in industrialization became clear, with countries without a comparative advantage in manufacturing experiencing a relative contraction of their industrial sectors.

Secondly, many authors (such as Fort et Al., 2018) explain deindustrialization through the fact that the growth rate of productivity derived from increasing automation appears to be much stronger in manufacturing than in services, thus causing a strong fall in the share of industrial activity in total employment. Furthermore, the relative productivity surge in the industrial activity reduces the prices of its products in relation to other goods, in particular to services, thereby decreasing the share of manufacturing in aggregate productive activity. However, it should be remarked that other authors, such as Kaldor (1966) and Rodrik (2016), regard instead the strong increase in industrial productivity as being interrelated with a rising share of manufacturing in overall productivity activity. On the one hand, a fast growth in manufacturing output tends to raise productivity through dynamic economies of scale, or "learning by doing". On the other hand, a relative increase in industrial productivity in a country makes its manufacturing exports more competitive in the context of an unified world market.

In the European Union, the deindustrialization of most countries of Western Europe (with the remarkable exception of Germany) bears a sharp contrast with many countries in Central and Eastern Europe, which have joined the EU more recently, since 2004.

2. Stylized facts about manufacturing growth across countries within the European Union

We show the following data concerning 24 countries belonging to the European Union, more precisely, the 28 member states, including the United Kingdom, while excluding very small states, such as Cyprus, Luxembourg and Malta. In addition, Bulgaria is excluded since we were unable to find comparable data for this country.

The variables selected from the AMECO database were,

$y \equiv$ Average annual growth rate of the share of manufacturing in total gross value added between 2000 and 2017.

$x \equiv$ Distance of capital city to Brussels in thousand Kms.

$w \equiv$ Year of country adhesion to the *European Union* (formerly *European Economic Community*). For Germany, the reported year is 1974, the simple arithmetic mean of 1958 (the date of entry of the *Federal Republic of Germany* in the *EEC* as a founding member) and 1990 (the year of German Reunification, with the annexation of the *German Democratic Republic* by the *FRG*).

$z \equiv$ Share (or percentage) of non-manufacturing sectors in total gross value

added in 2000.

EU countries	y	x	w	z	
Austria	0.7	1.1	1995	82	
Belgium	-0.2	0.0	1958	84	
Croatia	-0.5	1.3	2013	84	
Czechia	2.6	0.9	2004	83	
Denmark	-0.1	1.0	1973	86	
Estonia	2.8	2.1	2004	89	
Finland	-0.3	2.2	1995	81	
France	-0.4	0.3	1958	88	
Germany	0.5	0.8	1974	78	
Greece	-1.0	3.0	1981	90	
Hungary	3.8	1.4	2004	81	
Ireland	1.4	1.0	1973	76	(1)
Italy	-0.2	1.6	1958	82	
Latvia	-1.1	2.0	2004	82	
Lithuania	0.9	1.8	2004	81	
Netherlands	-0.2	0.2	1958	88	
Poland	3.0	1.3	2004	88	
Portugal	-0.2	2.1	1986	85	
Romania	0.0	2.2	2007	77	
Slovakia	4.3	1.2	2004	87	
Slovenia	0.6	1.2	2004	79	
Spain	-0.1	1.6	1986	84	
Sweden	-0.7	1.6	1995	83	
United Kingdom	-1.9	0.3	1973	88	

We can infer the following stylized facts about manufacturing evolution in the EU during the period 2000-2017.

2.1. *Relative manufacturing growth and centrality within the European Union*

Firstly, there is no simple relation between relative industrialization and the level of country centrality within the EU. This is clear from Figure 1, which plots the position of each country in the space with coordinates (x, y) . If a polynomial of second degree is fitted to this data set, we obtain the estimated structure (*p-values* of the coefficients and the significance of the F statistic are written below in parenthesis)

$$\begin{aligned}\hat{y} &\approx -0.804 + \underset{(0.049)}{2.806}x - \underset{(0.037)}{1.033} \\ R^2 &\simeq 0.19 \\ F &\approx \underset{(0.108)}{2.478}\end{aligned}\tag{2}$$

A scatter plot of (x, y) with the equation in (2) is given in Figure 1.

Several comments are in order. We cannot be sure that distance to Brussels is *per se* an explaining factor of the evolution of manufacturing share in overall productive activity. In order to reject the assumption of null influence, we should accept a error level just below 11%. However, the fact that each coefficient in (2) is significant at the 5% level, means that, conditioned to the fact that country centrality within the EU is relevant, the form of the relationship is as it is depicted in Figure 1. It is a *non monotonic* relationship, where countries that lie either near the European core or very far way from it experience deindustrialization, while countries somehow in between exhibit a relatively fast manufacturing growth.

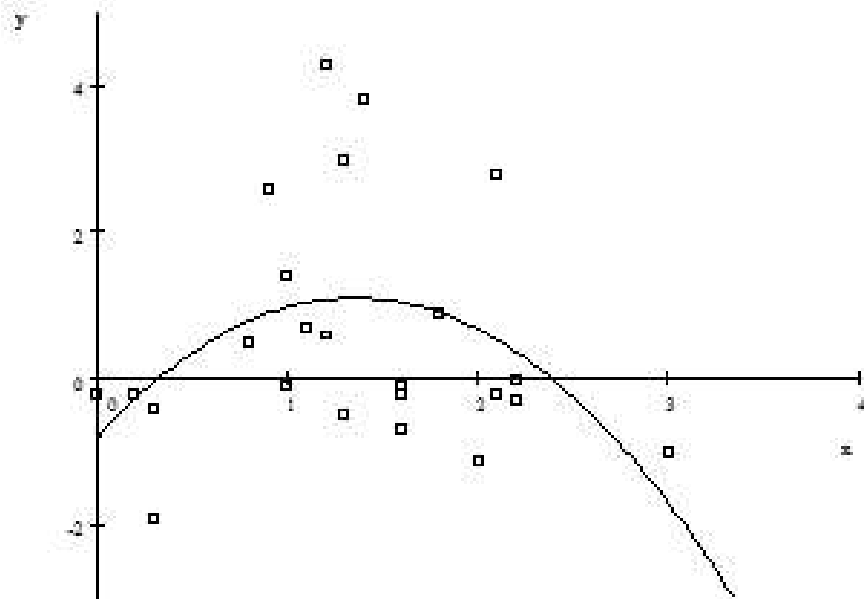


Figure 1: Industrialization rates and centrality within the European Union.

The explanation of these manufacturing trends might lie in that the European core has too high labor and land costs, which lead factories to relocate towards more peripheral countries with cheaper production factors. However, while relocating, industrial plants tend to avoid too remote locations since they are constrained to export back their output to the major market centers within the EU. Consequently, most decentralized manufacturers tend to remain within an intermediate distance to the core of Europe.

2.2. Country industrialization and the time of adhesion to the European Union

The year of accession of a country to the EU (or the its original label, the EEC) is a significant explanation of the increase in the share of manufacturing in total value added. If we estimate by OLS the model

$$y = \alpha + \beta w + \varepsilon$$

we obtain the result (the *p-value* of the coefficient β is written in parenthesis).

$$\hat{y} \approx -75.174 + \underset{(0.034)}{0.038}w \tag{3}$$

$$R^2 \approx 0.19 \tag{4}$$

The model is significant at the 5% level. This means that "old countries" within the EU seem to deindustrialize, while by contrast newly admitted states exhibit growth rates of manufacturing value added that exceed those prevailing in the overall economy. One should recall that the former group of countries have stabilized trade relations with the European core, whereas the latter has

experienced a fast trade integration, which implied a drastic fall in transport and general trade costs to other areas in the EU. Since manufacturing trends express a process of plant relocation away from high cost central areas to more peripheral territories, it is not surprising that this process concerns mainly countries that are currently engaged in a process of fast trade integration with the European core. Indeed manufacturers that relocate to those countries should be able to continue to export back their output easily.

2.3. *Industrialization and the level of efficiency in manufacturing*

The previous results led us to divide the 24 states that compose the EU into two subsets according to the year of their entry in the EU. Since the median year of entry is 1995 and three states joined the EU in this year, namely Austria, Finland and Sweden, we defined as "Old Europe" the set of countries that joined the EU in 1995 or before, and as "New Europe", the group of member states that became members in 1995 or afterwards. The two subsets have thus a non empty intersection and their detailed composition is, for "*Old Europe*"

$$\left\{ \begin{array}{l} \text{Austria, Belgium, Denmark, Finland, France, Germany, Greece,} \\ \text{Ireland, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom} \end{array} \right\}$$

while "*New Europe*" is composed by the following countries,

$$\left\{ \begin{array}{l} \text{Austria, Croatia, Czechia, Estonia, Finland, Hungary, Latvia,} \\ \text{Lithuania, Poland, Romania, Slovakia, Slovenia, Sweden} \end{array} \right\}$$

Then, we estimated by OLS for each subset separately the model

$$y = \alpha + \beta z + \varepsilon$$

A qualification of the meaning of variable z , the share of non manufacturing activities (i.e., services or agriculture) in total valued added, is in need at this point. We regard manufacturing as a branch whose specificity is to "refine" a raw material, thereby giving rise to a "light" and transportable product with a high value per unit of weight. Hence, variable z can be viewed as an inverse measure of average efficiency in industrial transformation, a low value of z denoting that the country specializes in activities that generate highly "transportable" and "valuable" products.

The results of the regressions are as follows. For "Old Europe" the estimated structure is (the p -value of $\hat{\beta}$ is written under in parenthesis)

$$\hat{y} \approx 12.053 - \underset{(0.002)}{0.146} z \quad (5)$$

The model in (5) is very significant. The countries of "Old Europe" that manage to avoid deindustrialization are those whose initial industrial structure is based on efficient, highly intensive in value added sectors.

The results of the OLS estimation for "New Europe" are less clear cut. The estimated structure becomes (with a p -value under the coefficient $\hat{\beta}$ in parenthesis).

$$\hat{y} \approx -21.926 + \underset{(0.064)}{0.28} z \quad (6)$$

Although we can not reject the assumption of nullity of β at the level of significance 5%, we are nonetheless able to reject the assumption that β is negative. Hence, it is not risky to suppose that the relationship across countries between the

relative dynamics of manufacturing in the period 2000 to 2017 and the starting level of industrial efficiency is qualitatively different between "Old" and "New" Europe.

3. Conclusions - the need for a theory of deindustrialization in Europe

We were able to conclude that the evolution of the relative importance of manufacturing across European countries can be summarized by three stylized facts. Firstly, we can not prove that centrality within the EU is *per se* an explaining factor of deindustrialization. Nevertheless, if we accept this assumption, we can depict that such a relationship as being non monotonic, inverse U shaped. Deindustrialization seems to take place both in regions adjacent to the European core and in remote areas, while countries with intermediate accessibility show in average a more dynamic manufacturing evolution.

Secondly, industrial activity seems to grow relatively faster in countries that were more recently admitted in the EU, which experience currently a fast process of fall in trade costs and commercial integration with the European core.

Finally, a specialization in efficient, value added intensive sectors appears to favor manufacturing growth in "Old Europe" countries, but it does not seem to play the same role in countries that were more recently admitted in the EU which are also the main beneficiaries of industrial decentralization.

Summing up, we need a theory that accounts for these trends of manufacturing relative distribution within the European Union.

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