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How nearshoring reshapes global deindustrialization

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ABSTRACT

Although recent decades were marked by within-country deindustrialization, this was not observed on the global level, as jobs moved from smaller, highly productive countries to large, less productive ones. We provide new empirical evidence that this trend reversed in the mid-2010s. We compiled annual employment data for 64 industries in 45 economies for 2010–2020 that are compatible with the multi-regional input–output tables provided by Eurostat in the FIGARO 2022 database. The data show that global employment generated by vertically integrated manufacturing activities has started to decline. The regionalization of global value chains was identified as the main driver that has reversed this trend, as the level of offshoring from most regions has declined.

1. Introduction

There are two stylized facts about deindustrialization documented in the literature: the trend of decreasing manufacturing employment and value added shares at the national level, and stable manufacturing employment and output shares at the global level. Felipe and Mehta (2016) were among the first to zoom in on this paradox. They showed that, globally, manufacturing productivity did not grow faster than aggregated labor productivity. This is in sharp contrast to the country-level evidence. The main mechanism that resolves this puzzle points to a massive reallocation of manufacturing activities from rich countries to more populous and lower-productivity economies.

Evidence of the declining importance of manufacturing at the national level has been further challenged by literature emphasizing that the distinction between manufacturing and services is becoming increasingly blurred (Ciriaci and Palma, 2016). Tregenna (2014) and Tregenna (2016) shows that the outsourcing of manufacturing activities to specialized service providers has led to an overestimation of the observed deindustrialization. This issue has been addressed recently in Lábaj and Majzlíková (2022) by providing a unified framework for the analysis of the role of outsourcing, offshoring, and participation in global value chains for deindustrialization. In this framework, the importance of manufacturing is studied in terms of vertically integrated activities referred to as subsystems.[1] Statistics derived from a subsystem approach show that over the 2000–2014 period, jobs in manufacturing subsystems accounted for more than one quarter of total worldwide employment as opposed to 15% recorded in direct statistics. Both statistics are valid and important but for different reasons. Direct employment in manufacturing might be important because of increasing returns to scale and above average labor productivity of manufacturing, while a subsystem approach shows the importance of manufacturing in generating employment and value added in other sectors through interindustry linkages. Moreover, offshoring has become the dominant driver of deindustrialization in G7 countries. While direct manufacturing employment and intersectoral outsourcing declined between 2000 and 2014, offshoring increased by 6.5 percentage points, from 29% to 35.5% of the total employment generated under the G7 manufacturing subsystem.

More recent analyses of vertically integrated manufacturing activities for the last decade have not been possible due to the

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[1] A multi-regional subsystem approach to deindustrialization has been developed in parallel in Berardino et al. (2021) and Berardino and Onesti (2021). It is important to stress that in this stream of literature the definition of outsourcing and offshoring follows a sectoral/locational principle rather than an ownership principle and firm boundaries. Thus, we refer to outsourcing in terms of interindustry linkages, and offshoring is defined in terms of a country's dependence on foreign production in terms of direct and indirect imports of intermediate goods. This is considered in the literature to be a reasonable proxy for the extent of offshoring as it is commonly understood.

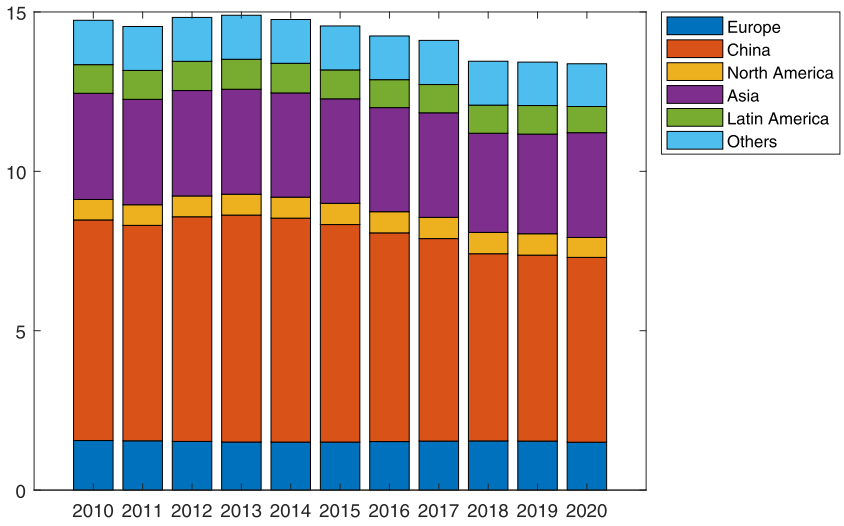

Fig. 1. Observed employment in manufacturing in %.
Source: Authors´ calculations based on FIGARO 2022 and own compilation of employment data.

unavailability of employment data integrated with multi-regional input–output tables. As far as we know, we are the first to compile annual employment data for 64 industries in 45 economies for 2010–2020 period that are fully compatible with the multi-regional input–output tables provided by Eurostat in the FIGARO 2022 database. Using these data, we cover almost 65% of world population, 78% of world manufacturing employment, and 80% of world GDP. Applying the multi-regional subsystem approach to deindustrialization developed by Lábaj and Majzlíková (2022) to this dataset, we provide new empirical evidence on the importance of manufacturing in global employment. We identify the regionalization of global value chains as the main driver that has reversed the trend of relatively constant global shares of manufacturing activities.

2. Data

FIGARO stands for '**F**ull **I**nternational and **G**lobal **A**ccounts for **R**esearch in input–**O**utput analysis' and consists of the EU inter-country supply, use, and input–output tables. Since 2021, they are produced annually by Eurostat as official statistics and provide the most up-to-date global inter-country input–output tables. Currently, years 2010–2020 are covered in the FIGARO 2022 release. All data represent transactions in nominal million euros, valued at basic prices, covering 64 industries and 64 products as defined in the ESA 2010 National Accounts transmission program. They facilitate the analysis in terms of gross production and value added but comprehensive data on employment by industry and country are missing.

Therefore, we have compiled employment data for all 45 countries in thousands of people to enable their wider use in empirical research. Data from several data sources have been used: (i) National accounts employment data by industry (available in a detailed breakdown for 64 industries, (ii) Trade in Employment data by industry from OECD (available for 45 industries), (iii) OECD Labour Force Survey Employment data (macro level), and (iv) World Bank Employment data from the World Development Indicators database (macro level).

We have used the Eurostat data for the EU-27 countries, Great Britain, Norway, and Switzerland. With a few exceptions, employment data were available for all 64 industries matching those in the FIGARO 2022 tables and for 2010–2020. We have imputed missing data for some countries based on value added shares for the closest aggregated level of data available.

For the remaining countries, the OECD Trade in Employment database, 2021 edition, provides employment data for 45 industries and overlaps with the FIGARO 2022 tables for the years 2010 to 2018. The OECD (Labour Force Survey Employment database) and the World Bank (World Development Indicators database) data have been used to combine Trade in Employment database with the FIGARO 2022 tables[2]

3. Analysis

Fig. 1 documents the share of employment in manufacturing on global employment over time. The colors represent the contribution of six regions of the world.[3] In the mid-2010s, this share of global manufacturing employment started to decline which is at odds with the relatively stable trend documented before this period (Felipe and Mehta, 2016; Lábaj and Majzlíková, 2022). This decline has been driven mainly by a decrease in the contribution of China and Latin America to the global employment share in manufacturing. In 2014, China's manufacturing employment was about 7 percentage points, but it gradually declined to 5.8 percentage points in 2020. In contrast, the share of employment in manufacturing has been relatively stable in Europe and North America in the second half of the 2010s.

Using the subsystem approach (Fig. 2), the evidence is even stronger and points to a possible mechanism. The subsystem approach is based on a multiregional input–output model and captures the complex interdependencies among countries that arise from international trade in intermediate and final goods. A subsystem consists of vertically integrated activities used to produce the final goods and services. In this way, a manufacturing subsystem consists of all direct and indirect activities used to deliver manufacturing products to final consumers. Unlike direct statistics, this approach is more robust to reclassification between industries and includes outsourced and offshored activities. Formally, we define subsystems as columns in a multi-regional input–output matrix **E**. This is a square matrix with

[2] A detailed description of the compilation procedure, the imputations, and the replication codes can be found in the Mendeley Data Repository, https://data.mendeley.com/datasets/gzp7rh25g7, DOI: 10.17632/gzp7rh25g7.1.

[3] Namely: (i) Europe: 27 EU countries, Switzerland, Norway, Great Britain; (ii) China; (iii) North America: Canada, United States; (iv) Asia: Indonesia, India, South Korea; (v) Latin America: Argentina, Brazil, Mexico; (vi) Others: Australia, Japan, Russia, Saudi Arabia, Turkey, South Africa.

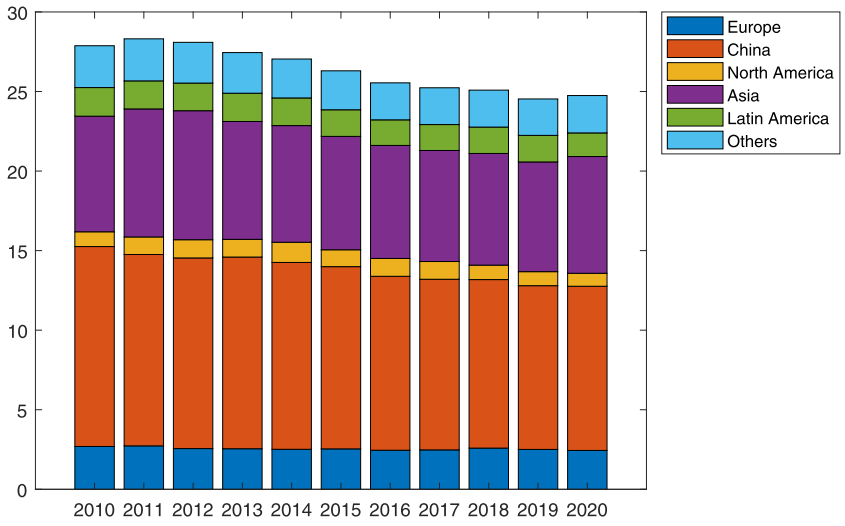

Fig. 2. Subsystem employment in manufacturing in %.
Source: Authors´ calculations based on FIGARO 2022 and own compilation of employment data.

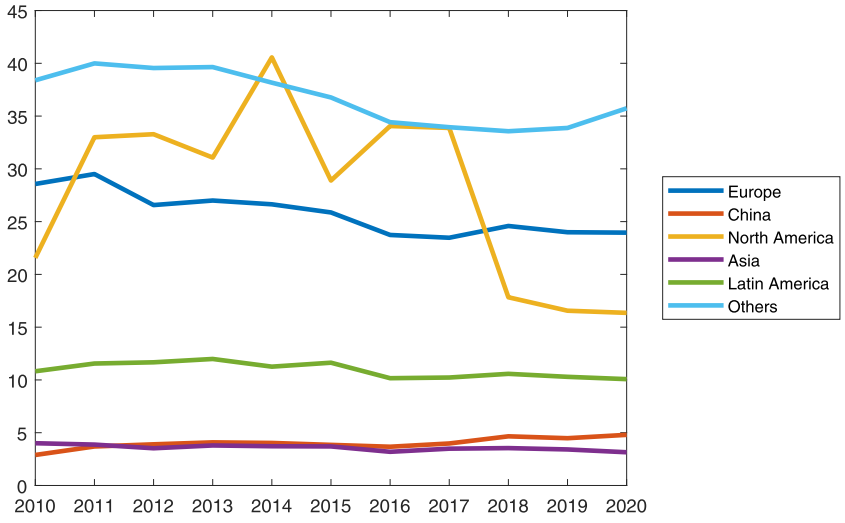

Fig. 3. Offshoring trends by region (in %).
Note: Offshoring is expressed as a share of total employment under the manufacturing subsystems of the corresponding regions generated outside these regions.
Source: Authors´ calculations based on FIGARO 2022 and own compilation of employment data.

dimensions ($NR \times NR$), where N refers to the number of industries and R corresponds to the number of countries. The matrix $\mathbf{E}$ is calculated as follows:

$$\mathbf{E} = \hat{\mathbf{e}}_c \mathbf{L} \hat{\mathbf{y}}, \tag{1}$$

where $\hat{\mathbf{e}}_c$ is a square matrix (diagonalized vector) of employment coefficients per one unit of production in industry i in Region r, and $\hat{\mathbf{y}}$ is a square matrix (diagonalized vector) of final demand for commodities in industry j in Region s. $\mathbf{L}$ is a Leontief inverse matrix that captures the direct and indirect production in industry i in Region r (in rows) to satisfy one unit of final demand in industry j in Region s (in columns).[4] The elements in a matrix $\mathbf{E}$ show the amount of labor required directly and indirectly from industry i in Region r to satisfy the final demand for commodities in industry j in Region s. The sum of elements in individual columns of that matrix shows the total number of workers that fall under a specific subsystem j in a given region.

Fig. 2 shows that jobs in manufacturing subsystems accounted for almost 30% of the total worldwide employment at the beginning of the 2010s, in contrast to just 15% recorded in direct statistics. Moreover, this subsystem decline has been even more prominent compared to the direct approach depicted in Fig. 1. While the share has remained relatively stable in Europe, North America and Asia, the most visible decline can be documented in China and Latin America. While direct manufacturing employment in China declined by about one percentage point between 2010 and 2020, the decline documented by the subsystem approach was more than twice as large (17 million jobs versus 36 million jobs).

This corresponds to the shift in the development of offshoring and nearshoring in Europe and North America over the period. Fig. 3 depicts the declining role of offshoring as a main driver of deindustrialization in these two regions. A major decrease in North America coincides with the shift in the U.S. policies that aimed to bring manufacturing jobs back to the United States.[5]

[4] A comprehensive elaboration of multi-regional input–output approach to subsystem analysis can be find in Lábaj and Majzlíková (2022).

[5] See Broz et al., 2021 for a detailed analysis of the political consequences of manufacturing decline in the US and Europe.

Table 1
Nearshoring in EU-15 and United States in %.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU-15	66.8	66.7	70.0	69.6	70.0	70.9	72.9	73.0	71.9	72.7	73.0
USA	83.1	70.7	70.5	72.5	62.8	75.3	69.9	70.1	87.4	88.8	89.6

There has been also a significant decrease in offshoring from Europe to China (by 3.7 percentage points). According to the GGDC Economic Transformation Database, the share of manufacturing employment in African, Asian and Latin American countries in their total employment, which is not covered in our dataset, remained relatively stable between 2014 and 2018 (11.3% in 2014 and 11.7% in 2018). However, we cannot rule out the possibility that some of these jobs have moved to these countries. Even though the values for offshoring in China are relatively low percentage-wise, they have been steadily increasing, mostly supported by the demand in Asia and Latin America. While offshoring in Europe was close to 30% in 2010, it was less than 25% in 2011, and Fig. 3 shows a gradual decline. In the United States, we observe the same decline in offshoring, but its development has been steeper compared to Europe. It peaked in 2014, when it was 40%, but fell to 17% in 2020.

The decrease in the level of offshoring in Europe and North America may be driven by nearshoring of economic activities within these two regions. Therefore, we decomposed them to smaller sub-regions. We reclassified and decomposed Europe into the old EU Member States (EU-15) and the new EU Member States (EU-12), and North America into the US economy and Canada with Mexico. For the EU-15, we define nearshoring as the share of employment generated in the EU-27 out of the total employment generated by the manufacturing subsystem of the EU-15. For the United States, we define nearshoring as the share of employment generated in the United States, Canada, and Mexico in the total employment generated by the U.S. manufacturing subsystem. While the level of nearshoring in Europe increased gradually over the entire period from 67% to 73% in 2020, the development of U.S. nearshoring resembles a U-shaped pattern reaching a minimum in 2014. The increase in U.S. nearshoring is more prominent from 2018 onwards. In this short period, it increased by almost 20 percentage points (see Table 1).

4. Conclusions

The employment data we have compiled extend the use of the FIGARO 2022 multi-regional input–output tables. They allow the analysis of global value chains in terms of employment rather than value added alone. We have shown that since the mid-2010s, the trend of massive offshoring from smaller, highly productive countries to large, but less productive ones might have changed. This trend reversal has implications for the observed decline in the share of global manufacturing employment which is at odds with its stable development since the 1970s. The evidence for the vertically integrated manufacturing subsystem is even stronger, pointing to nearshoring and deglobalization of global value chains. We assume that this trend may have become the new normal for the coming decade, as the coronavirus pandemic and the Russo-Ukrainian War have disrupted the global supply of goods and services in ways not seen in postwar development.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

A detailed description of the compilation procedure, the imputations, and the replication codes can be found in the Mendeley Data Repository DOI: 10.17632/gzp7rh25g7.1.

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Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.econlet.2023.111239.

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