Neither mechanical nor premature: deindustrialization and the New International Division of Labour (1970-2019)

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Abstract

This article studies the economic determinants – wage and productivity levels – behind the deindustrialization trends of 24 countries divided into three groups ("Developed", "East Asia", "Latin America") for the period 1970–2019. The data shows that deindustrialization, regardless of the country's level of income, is linked to lower wages in other countries. These determinants explain the origin of this worldwide phenomenon since the new international division of labour, the impact on both developed and developing countries in Latin America, and also the successive waves of industrializing countries in East Asia.

Keywords: deindustrialization, international division of labour, wages, labour cost

JEL Codes: L60, E24, J30, O57

1. Introduction

The literature locates the beginning of the deindustrialization process in the United States and the United Kingdom around the mid-1960s and in other developed countries a decade later (Sachs et al. 1994; Alderson 1999; Rowthorn and Ramaswamy 1999; Rowthorn and Coutts 2004; Schettkat and Yocarini 2006; Pilat et al. 2006; Kollmeyer 2009; Lawrence and Edwards 2013; Palma 2013; Rodrik 2016; Kandžija, Tomljanović and Huđek 2017). Deindustrialization is usually related to the relative decline in manufacturing employment, although the importance of considering variables such as value added, both in absolute and relative terms, as well as investment and innovation, has been pointed out for a more complete characterization (Tregenna

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2009; Herrera Bartis 2018). In rich countries, deindustrialization is presented as a mechanical result of the evolution of mature economies (Rowthorn and Wells 1987; Rowthorn and Coutts 2004; Palma 2005 and 2013; Schettkat and Yocarini 2006). However, there is no agreement within the literature about the net effects on the labour market and wage levels (Kletzer 2005; Palma 2005; 2013; Dasgupta and Singh 2006; Tregenna 2009 and 2016; Rodrik 2016; Bárány and Siegel 2018).[1] In addition, it has been pointed out that there are a variety of deindustrialization paths, which are key to fully understanding those processes (Herrera Bartis 2018; Dosi, Riccio and Virgillito 2021).

Countries such as South Korea and Taiwan, among others in East and Southeast Asia, faced industrialization processes that were the "flip side" of those happening in advanced economies (Tregenna 2009). However, since the 1990s, these countries also began to deindustrialize and were also presented as a mechanical result (Palma 2005; 2013). In the face of this decline, other countries in that region gained relevance, among which China stands out (Arceo 2005; Liu 2018).

Beyond East and Southeast Asia, other studies argue that deindustrialization also occurs in developing countries (Tregenna 2009; Frenkel and Rapetti 2012; Rodrik 2016; Herrera Bartis 2018; Graña and Terranova 2021). These cases are characterized as "premature", as they start at appreciably lower per capita GDP (Herrera Bartis 2018) or employment levels (Felipe, Mehta and Rhee 2019). This implies that they have not achieved the benefits linked to industrial development, which also has an impact on which service sectors grow (generally, substituting manufacturing with informal services) (Tregenna 2009; Palma 2013; Rodrik 2016; Herrera Bartis 2021).

From this summary, we propose that there are two problems related to this literature. First, deindustrialization is presented as a mechanical or natural process characterizing capitalist development. While this is explicitly expressed by the authors analyzing developed countries, it is implicit in the use of the term "premature", since this is the name given to a process that occurs before the correct moment. Second, the distinction between both classifications comes from the level of per capita income at the time of deindustrialization. This is problematic not only because per capita GDP was not necessarily shared by the countries classified in the same way (e.g., the US vs European countries) but also because per capita GDP at the start of deindustrialization falls over time. Given their income, the deindustrialization of South Korea and Taiwan, for example, should be labeled "premature" even though it is difficult to argue that they did not achieve full industrial development. Indeed, the distinction between types of deindustrialization (and

1. On the different views and the consequences predicted by the literature, consult Herrera Bartis (2018).

their varying determinants) is not fully developed, which casts further doubts about the mechanical character of the process.

We explain both the deindustrialization process and the decline in per capita income at the time of its beginning following the emergence and development of the new international division of labour (hereafter NIDL) since the 1970s (Charnock and Starosta 2016; Fröbel, Heinrichs and Kreye 1980; Iñigo Carrera 2013). We argue that deindustrialization is mainly caused by offshoring aimed at reducing labour costs, which was enabled by the telecommunications revolution of the late 1960s-early 1970s. Based on this possibility, capital offshored simple manufacturing production to East and Southeast Asia, where low wage levels outweighed reduced productivity. Further technological progress in automation enables manufacturing job simplification, which explains the reduction in the initial income at which deindustrialization takes place (Whittaker et al. 2010; Felipe, Mehta and Rhee 2019). Therefore, deindustrialization is not a mechanical process of mature economies, but the result of "some countries deindustrializing others".

The main contribution of this paper is to present key variables, usually absent in the literature, such as real wages, productivity, and unit labour costs, to illustrate how international wage differences are the economic determinants of the deindustrialization seen since the 1970s. For that purpose, we built a 24-country dataset of manufacturing exports, employment, productivity, value added, wages, and unit labour costs, covering developed, Latin American, and East and Southeast Asian countries since 1970. We believe that our series show why manufacturing employment moved to East and Southeast Asia and why it continued relocating within that region.

This article is organized as follows. The first section summarizes the literature and presents our theoretical framework. The second section explains the methodology for the construction of the database, complemented with an appendix. The third section presents the results regarding the evolution of world trade in manufactured goods, the deindustrialization process, and the economic determinants behind offshoring (wage, productivity, and unit labour costs). Finally, we present conclusions and the lines of research that emerge from this paper.

2. Theoretical framework

2.1. Deindustrialization in literature

The relative loss of manufacturing employment in developed countries has been dubbed "deindustrialization" and began around the 1970s (Martin and Rowthorn 1986; Rowthorn and Wells 1987; Sachs et al. 1994; Saeger

1997; Rowthorn and Coutts 2004). The reasons behind this process can be divided into "internal" and "external" factors (Palma, 2005; 2013; Schettkat and Yocarini 2006). Within the internal ones, one can find: 1) the increase in the level of per capita income, which generates a decrease in the elasticity of demand for manufactured goods, reducing sectorial growth and employment, and 2) faster productivity growth in manufacturing than in services or agriculture, leading to a relative reduction in the former's employment. Regarding external determinants, what stands out is that companies from developed countries relocated part of their production to countries characterized by low wages (initially East Asian economies), which explains the reduction in manufacturing employment (Milberg and Winkler 2013; Berardino and Onesti 2020). Thus, growth in the share of world trade of manufactured goods by East Asian countries is a significant factor explaining deindustrialization in advanced economies (Sachs et al. 1994; Saeger 1997; Alderson 1999; Rowthorn and Coutts 2004; Kollmeyer 2009; Tregenna 2016).[2]

As we can see, factors whose effects and temporal validity are qualitatively different are placed on equal footing. While "internal factors" have operated permanently in capitalism – which supports the idea of its "mechanical" nature – the offshoring process begins simultaneously with deindustrialization and has a global outreach.

Another stylized fact is the reduction, over time, of per capita income at which deindustrialization begins (Tregenna 2016). According to Palma (2013), there is no agreement in the literature on the causes driving this phenomenon, although globalization would be the main one. Felipe, Mehta and Rhee (2019) argue that increased competition from poorer countries is behind it, however neither authors present data to support that conclusion. In any case, if the income level at which deindustrialization begins is not precisely determined, it becomes difficult to establish its "natural" or "mechanical" character.

In addition, Palma (2005) and Dasgupta and Singh (2006) point out that developing countries also experienced deindustrialization. These dynamics are called "premature" – when they start at a lower per capita income level than the one observed in developed countries – or "negative" – when the industrial output declines in absolute terms (Palma 2013; Castillo and Martin 2016; Tregenna 2016; Herrera Bartis 2018). However, in both cases, the economies would not have fully obtained the advantages linked to the development of the manufacturing sector (better labour indicators than the rest of the sectors, dynamic economies of scale, upstream/downstream linkages, Keynesian-type demand multipliers, among others) (Tregenna 2009; 2016;

2. Besides, part of it can be assigned to a "statistical illusion", given that various activities started to be done in-house and outsourced (cleaning, accounting management, among others) (Tregenna 2009).

Frenkel and Rapetti 2012; Bogliaccini 2013; Cruz 2014; Graña 2015; Rodrik 2016; Herrera Bartis 2018).

In both premature and negative cases, deindustrialization would be the result of trade and financial openness or institutional modifications (Palma 2005; 2013; Shaffaeddin 2005; Brady, Kaya and Gereffi 2011; Bogliaccini 2013; Cruz 2014; Tregenna 2016; Rodrik 2016; Herrera Bartis 2018; Camacho Ballesta and Atencio 2018). In general, it is argued that after the external debt crises of the 1980s, import substitution industrialization was abandoned and policies linked to the "Washington Consensus" were introduced (Palma 2005; 2013; Shaffaeddin 2005; Dasgupta and Singh 2006). Contrary to what was postulated, the reduction of tariffs and other barriers to international trade did not turn these countries into export platforms (Bogliaccini 2013). Some researchers argue that part of the failure is due to the difficulty of achieving competitiveness in the context of China and other Asian countries' rise (Gallagher and Moreno-Brid 2008; Salama 2012; Bogliaccini 2013; Tregenna 2016).

Thus, these scholarships also implicitly link offshoring with deindustrialization leaving government policies in the background because, even with some differences in scale and scope, the Reagan-Thatcher consensus[3] policies have been applied worldwide (Shafaeddin 2005).

To sum up, there are two problems with this literature that we will develop in the following sections. One is the "natural" or "mechanical" nature of deindustrialization in the developed world, which is also implicitly present in the "premature" literature. The other is the lack of an explanation for the fall in the level of per capita income, which divides between different types of deindustrialization, and the diverse factors behind it.

2.2. The nature of deindustrialization

Presenting deindustrialization either as a "natural" or "mechanical" process in the development of a mature economy (due to technical progress, the development of complex services, etc.), is stating that economies follow a linear path, much in line with Rostow's contributions (1971). From this point of view, we could say that, with the passing of time, every country will industrialize and then deindustrialize, since this is what has happened in developed countries. The same idea is also implicitly behind the "premature" label.[4]

3. Palma (2013) points out that a possible difference is that the policies of developed countries did not aim so much at trade openness but at the reduction of the welfare state.

4. The comparisons that link deindustrialization and the birth of post-industrial societies with the change from agricultural to industrial societies confirm this sort of predetermined path. In some cases, the idea of a path to be followed goes as far to the point of sustaining that some Sub-Saharan countries are going through "pre-industrialization deindustrialization".

This is a problematic idea because we would be supporting a straight-line dynamic in the development of capitalism, when in fact it has gone through stages in which its technical conditions of production, social institutions, and the relationships between companies and states have been radically modified.

In our opinion, until the emergence of the NIDL, this linear approach had some resemblance to reality, because it was possible to imagine a relatively autonomous development process within each country (Graña and Piqué 2017). Moreover, during the classic international division of labour, developed countries were industrialized and developing countries were commodity exporters which looked to catch up through industrialization (Prebisch 1986).

However, by the late 1960s, the world economy began to experience problems with the declining profit rate and productivity, higher inflation, and unemployment (Wolff 2003; Basu and Vasudevan 2013; Shaikh 2016). As a result of these trends, companies began experimenting with new production schemes and technologies to deal with those problems.

First, the revolution in telecommunications allowed the offshoring process and management of the global value chains. Second, flexible automation – among other technical and organizational modifications – expanded the universe of relocatable activities by reducing the complexity of manufacturing jobs (Alcorta 1999; Balconi 2002; Biewener 1997; Kaplinsky 1989).

So, developed countries began relocating the simplest parts of their manufacturing production to low-wage countries, mainly in East and Southeast Asia, which eventually became the industrial hub of the world, while retaining the most complex tasks and productions lines (related to design, development, and research) (Fröbel, Heinrichs and Kreye 1980; Milberg and Winkler 2013; Charnock and Starosta 2016; Baldwin and Forslid 2020; Reijnders, Timmer and Ye 2021).

Briefly stated, the reorganization of the international division of labour generated three types of countries: 1) developed countries that now focused on the most complex tasks and managing global value chains; 2) East and Southeast Asian countries that became exporters of simple manufacturing goods and, 3) the rest, that remained as commodity exporters.

However, the relevance of the transformation from the classic international division of labour to the NIDL appears in the literature as merely a framework for these quantitative changes since the 1970s, without considering that it implied a qualitative transformation. In fact, changes in the forms of production and technologies are typically not even mentioned.

Therefore, deindustrialization since the 1970s, regardless of the country's stage of development, has nothing natural or mechanical about it. It is the result of a transformation in capitalism on a global scale, with the technological revolution in telecommunications and automation enabling the emergence

of the NIDL at its core. Through this thesis, it is possible to explain why the deindustrialization of diverse countries (e.g., developed countries and those of Latin America) occurred at the same time as the industrialization of East and Southeast Asia.

2.3. The per capita income level reduction at which deindustrialization begins

Although the decline in per capita income levels at the beginning of deindustrialization is a stylized fact (Palma 2013; Tregenna 2016; Felipe, Mehta and Rhee 2019), there is no consensus about its causes. This is especially problematic because this variable is used to differentiate between deindustrialization types (Tregenna 2016). While it is explicitly argued that Latin America and Africa deindustrialized prematurely, the same should also be held for South Korea and China since, when they deindustrialized, they showed lower levels of per capita income than developed countries in the 1970s (Salama 2012; Palma 2013). While the distinction between types of deindustrialization is necessary and useful, this variable is not fit for purpose.[5]

As we mentioned earlier, problems in the distinction also involve their determinants: while for developed countries the latter are found to be mainly technology, income or demand elasticities, and imports from less developed countries (Liboreiro, Fernández and García 2021), it was economic policies that led to reduced prominence of manufacturing in developing countries. Considering that trade policies, the breakdown of the welfare state, and the attack on trade unions have been the characteristic features of "neoliberalism" throughout the world (although with different scopes and intensities) (Shaffaeddin 2005), we consider that this differentiation is not precise either.

With the development of technologies linked to ICT and automation, manufacturing jobs were progressively deskilled over time. Particularly, flexible automation schemes advanced over the tacit knowledge of workers by reducing complexity (Alcorta 1999; Balconi 2002; Grinberg 2014; Kaplinsky 1989). This enabled the employment of a less qualified and lower-wage workforce in manufacturing, allowing its relocation to new – poorer – countries, just as new locations opened in East Asia in the 1970s. It is this deepened competition among developing countries to attract simple manufacturing production which explains why deindustrialization begins at lower levels of income (Felipe, Mehta and Rhee 2019; Baldwin and Forslid 2020).[6]

5. Taking the argument to the absurd, if we take the US level as the standard, all other deindustrializations would be "premature".

6. This is also what lies behind why similar policies produced different outcomes. Specifically, this is related to productivity and wage levels – as well as on the branches of specialization – at the time of the generalization of the NIDL. With this, we are not trying to dismiss

In the following sections, we will present the data that shows why, once technology enabled the offshoring process and the NIDL began, relative wages are driving the industrialization of East and Southeast Asia and the deindustrialization of the other regions. Taking this into account, far from being a natural, mechanical, or premature process, what has happened is that "some countries deindustrialize others" based on lower labour costs.

In the next section, we present the methodology used to build the database. Later, we will present the empirical analysis of the factors that determine the conditions of competitiveness of the manufacturing sectors (wages and productivity), to have a better understanding of the underlying conditions of the deindustrialization phenomenon.

3. Sources and methodology

We analyze the emergence of the NIDL from the 1970s until the present day for a broad set of countries. Knowing the various sources of information, in this section, we briefly present the methodology used which is supplemented by the appendix.

We work with a 24-country dataset and group them by "region": *Developed* countries number 14 (Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, United States, United Kingdom); the *Latin America* group includes 4 (Argentina, Brazil, Chile, and Mexico), and in *East and Southeast Asia* there are 5 (China, South Korea, Japan, Malaysia, and Taiwan). Despite the smaller size of our dataset related to other papers,[7] we present long-run wage and productivity data, which are difficult to construct because of data availability. In any case, our sample covers approximately 75% of the total manufacturing trade since 1980 (Graph 1).

In the next section, we deal with the manufacturing goods trade. The data comes from the World Trade Organization (WTO) database for the 1980–2019 period and from the United Nations' trade statistics (COMTRADE) for the period 1970–1980.[8]

Regarding data on the deindustrialization process, we focus on the number of employees and total employment, along with the value added at cur-

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the relevance of public policies, nor to deny their influence on the observed outcome, but rather to point out that they have an economic determination "behind the scenes".

7. For example, Palma (2013), Tregenna (2009), Liboreiro, Fernández and García (2021), Lavopa and Szirmai (2015) and Felipe, Mehta and Rhee (2018) work with bigger datasets – both in number of countries and/or periods – but fewer variables, mainly value added and employment.

8. In the COMTRADE database, there is no information for Taiwan and China, so these countries are not available prior to 1980.

rent prices of manufacturing and the total economy as well as employee compensation in manufacturing.[9] With those, we calculated the average monthly wage and value added per worker.

To build the database we began with the statistical compilations of Eurostat, OECD, and LA-KLEMS. However, other sources were needed to cover the period. Therefore, these sources were supplemented with the UNIDO "Industrial Statistics Database at the 2-digit level" revision 3, the data of the Growth and Development Centre Research of the University of Groningen, and the national accounts publications of each country. In all cases, the levels were taken from the most recent publications (and whenever possible from a shared source) and spliced backward through their rate of change.[10]

Finally, for cross-country comparisons, we present the information in purchasing power parity (PPP) based on World Bank conversion factors for the period 1990–2019.[11] To cover the entire period, we extended the data through the coefficient obtained between each country's consumer price index with that of the United States.[12] As Lavopa and Szirmai (2015) explain, the PPP series can affect the comparison between developed and undeveloped countries, but nominal exchange rates (hereafter NER) yield similar results but with extreme volatility. For the international comparison of wage costs for the firms, we use the NER series, provided by the World Bank.[13]

4. The New International Division of Labour and its effects

4.1. Global manufacturing trade in data

To contextualize the NIDL, let us start with the analysis of world trade in manufacturers. In Graph 1 we show each country's share in world manufacturing trade for the period 1970–2019. The first thing that stands out is that our sample countries represent more than 75% of world trade in manufacturing in a period where there was a sustained increase in manufactured

9. We use current prices data because it better reflects the economic relevance of manufacturing in the economy, given not only their production but also their relative price. Moreover, the obsolescence of the price structure fixed in the constant prices' series can generate biases in such long-term trends.

10. A more detailed explanation of how the information was obtained for each country is presented in the methodological appendix.

11. We checked current dollars measures and results do not change. In this context, we do not use them because data becomes very "noisy", especially for the Latin American countries due to their volatility.

12. For Taiwan we used the coefficient of the 2011 WB benchmark, evolving it in the same way as for the rest of the countries.

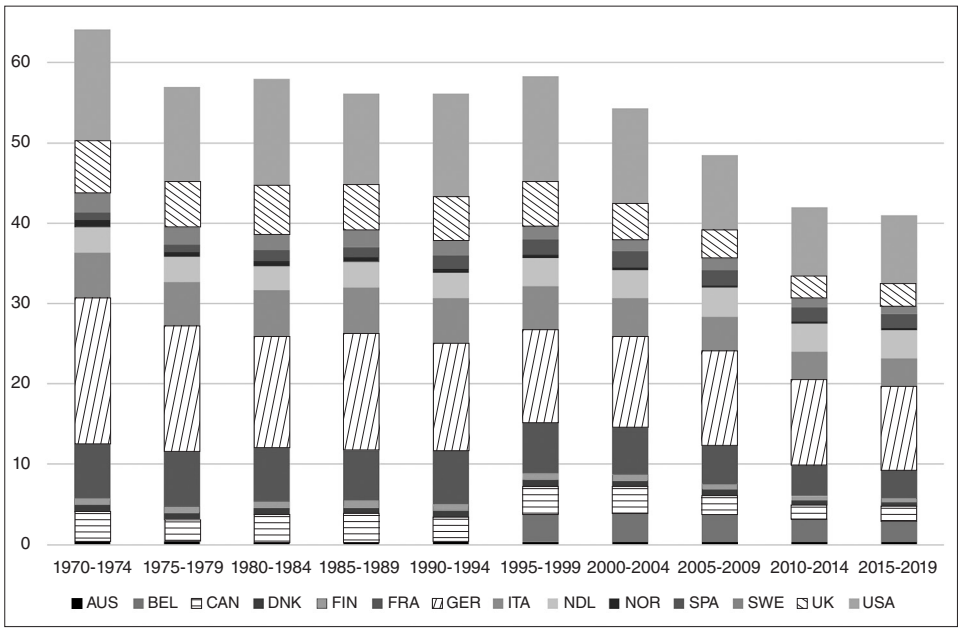
13. We obtained NER series for China (1970–1980) and Taiwan (1970–1983) from the Board of Governors of the Federal Reserve System (FRED).

goods exports:[14] in 1980 – the year with data for all the sample – the countries considered exported 2,619 billion dollars, while by 2019 the amount grew to 9,458 billion dollars. Among the Developed countries, exports increased more than twice since 1980; East and Southeast Asian countries multiplied their foreign sales by a factor of 6.4[15] and, finally, in Latin America, the increase is nine times the value of 1980.

In 1970, Developed countries represented around 67% of manufactured exports, followed by East and Southeast Asian countries, which barely exceeded 10%; lastly, Latin American countries showed marginal values, less than 1%.[16] By 2019, the picture changes substantially: East and Southeast Asia exceed 30% compared to 40% for developed countries, and Latin America represents 3.5% of the total manufacturing trade, which is mainly due to Mexico.

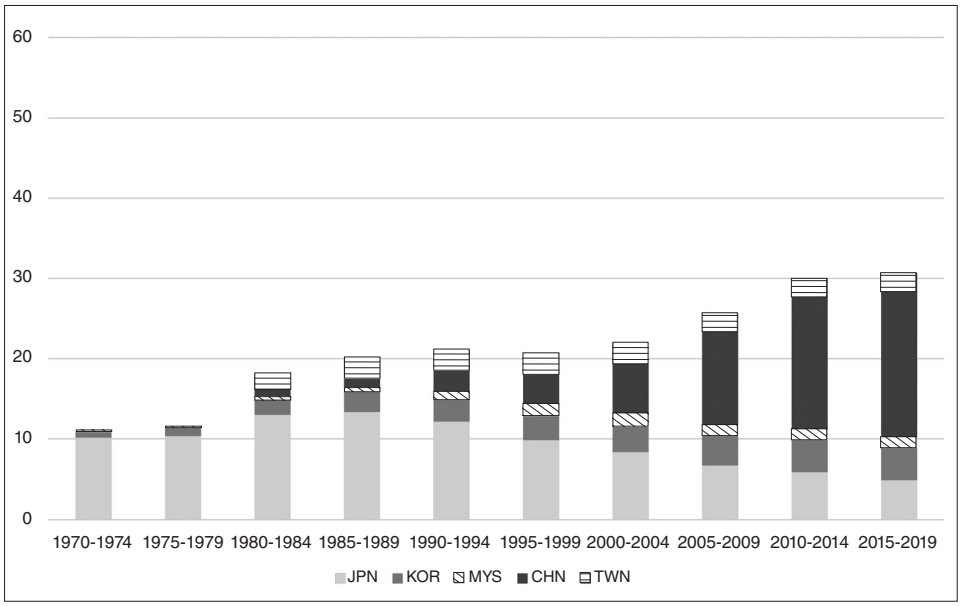
GRAPH 1 ▪ *World manufactures export share by country, 1970–2019*

Graph 1a

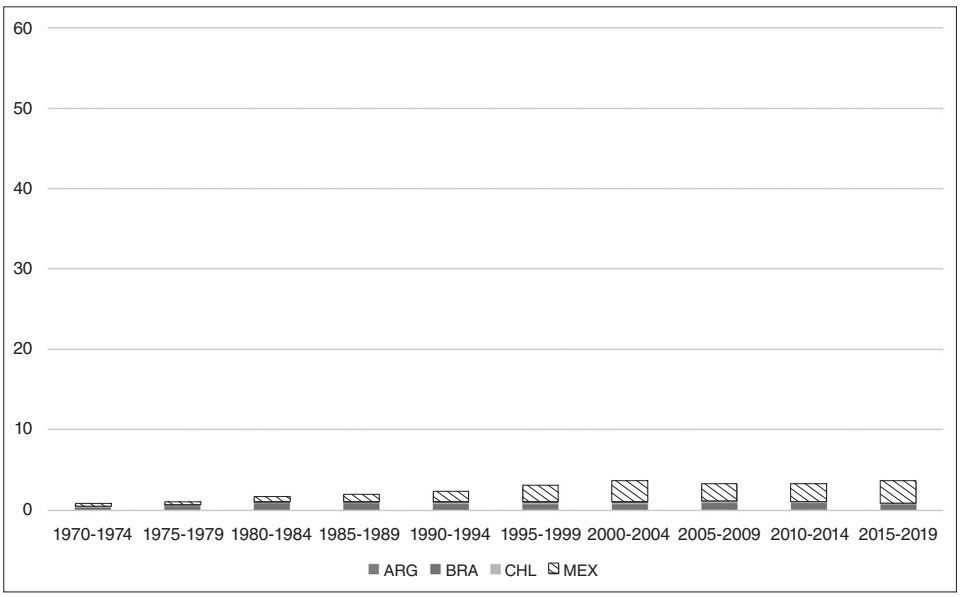


14. All data in this section refers to 2019 US dollars.
15. Part of the export growth is linked to intraregional commerce given their impressive economic growth.
16. While manufacturing trade data for China and Taiwan is missing for the 1970s, their contribution is reduced, as can be seen in 1980 when those countries first appear.

Graph 1b



Graph 1c



Sources: World Trade Organization (WTO) and the United Nations (UN-COMTRADE).

From these dynamics, two facts stand out: the different "waves" in which East and Southeast Asian countries join the world market, and the case of Mexico in the Latin American landscape.

Focusing on the first one, by the mid-1980s Japan had the largest share in the world market among East and Southeast Asian countries (14% in 1984-86), which declines to less than 5% by 2019. Meanwhile, South Korea represented around 1.4% in the 1980s and reached 4% nowadays. Taiwan already exceeded 1.5% in the mid-1980s and grew to 2.3% by 2019. On the other hand, China represented barely 1% in 1984 but takes off in the 1990s, reaching 18% today. Malaysia shares "stages" with China, although at a lower level.

Finally, within Latin America, the sustained increase in the Mexican share stands out, going from 37% of the total regional manufacturing exports to almost 80% in 2019.

As we mentioned earlier, the period of the NIDL has radically changed the global manufacturing trade not only in volume but also in national and regional relevance. Strictly speaking, the manufacturing centre of the world was relocated from the developed world to East and Southeast Asia from the 1970s onwards (Baldwin and Forslid 2020).[17] In this context, in the next subsection, the deindustrialization phenomenon is analyzed from a global perspective.

4.2. Deindustrialization in data

As the literature points out, the loss of manufacturing employment relevance is generalized since the 1970s (Graph 2). For the sample countries, the share of those employed in manufacturing went from 23.5% at the beginning of the series to 12.8% at present.

Nevertheless, there are striking differences between regions related to the moment at which deindustrialization starts. In the group of Developed countries, the peak in the percentage of manufacturing employment occurred in the 1970s, with an average of 23.2%, showing that deindustrialization in those cases is a long-term process. In East and Southeast Asia, this peak was observed in the decade of 1990s with percentages above 25%. Finally, for the Latin American countries, the highest proportion is observed in the 1970s, with values of around 15% of total employment.

The East and Southeast Asian countries panel clearly shows the different "waves" of the industrialization process. While Japan reduces its manufacturing employment share since the 1970s (although it ends at a level higher than

17. It is clear that Latin America, except in the case of Mexico which is closely linked to US offshoring, was a marginal region in terms of manufacturing both during the classical division as well as the NIDL.

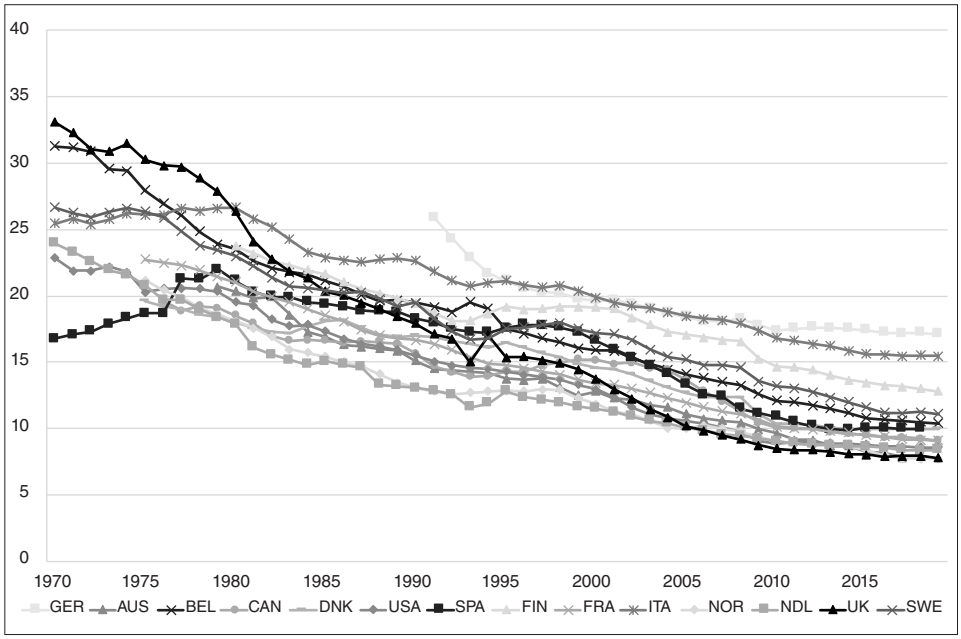
the average for the Developed countries, 15.7%), the "Asian tigers" faced this trend in the 1990s, with a sharper fall in South Korea (it went from 35% to 23%) than in Taiwan (35% to 27%). More recently, Malaysia experienced a decline during the 2000s (from 23% to 17.8% at present) and China began to decline in the 2010s, although it is still at 27%. However, except for the previously mentioned cases of Japan and Malaysia, all these countries end at around 25% (10 pp over the average of the Developed countries).

If we look closer at the Latin American countries, we can see differentiated situations between Argentina, Brazil, and Chile, which show a sustained fall, going from an average lower than 20% to 10% of total employment, similar to the Developed ones. Moreover, starting from relatively high levels for the region, Mexico saw a decline until the end of the 2000s, when there was an upturn, ending the series at values slightly lower than those of 1990 (around 16% of total employment).

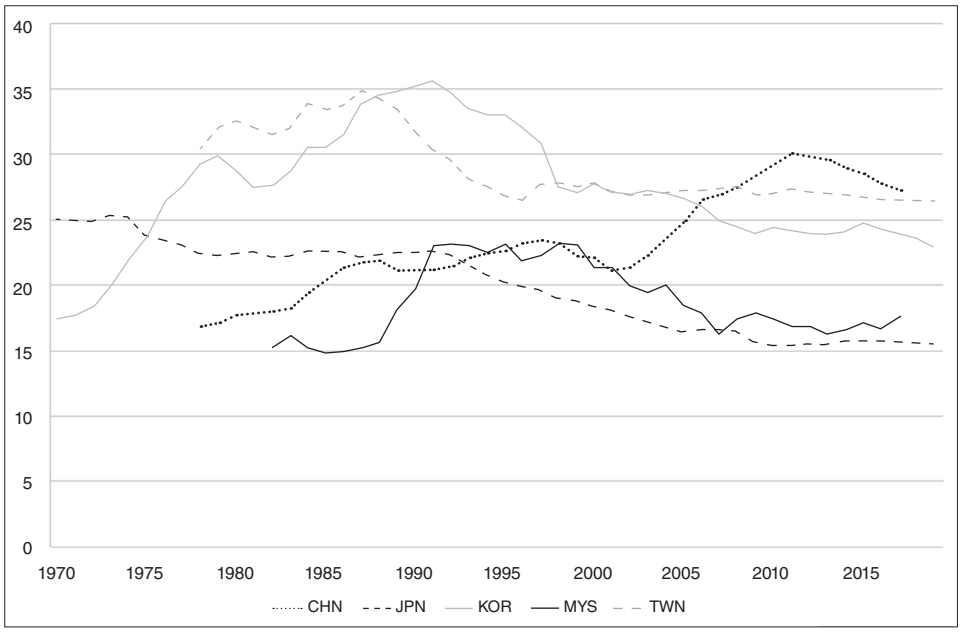
To summarize, we can conclude that deindustrialization continues in developed countries, despite a slowdown in its pace. Since 2000, on average, the share of manufacturing employment fell by 3 pp, whereas between 1970 and 1990 it had fallen 7 pp. Setting aside Mexico, similar conclusions can be drawn for Latin America. Finally, the East and Southeast Asian countries (except

GRAPH 2 ▪ *Manufacturing employment share, 1970–2019*

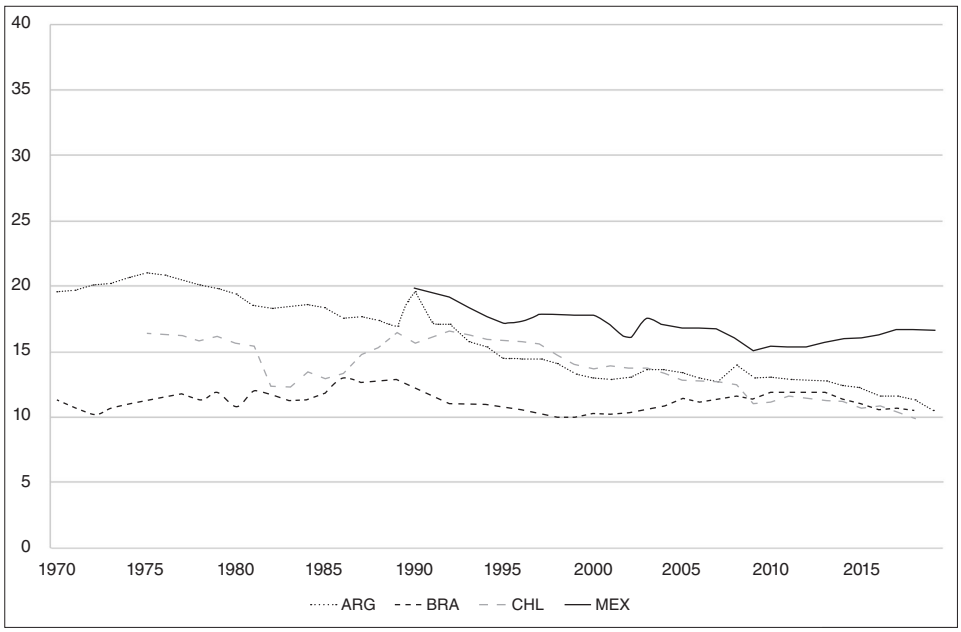
Graph 2a



Graph 2b



Graph 2c



Sources: EUROSTAT, Graña (2017), Graña and Terranova (2020), Kennedy, Pacífico and Sánchez (2018), University of Groningen, ILO-Stats, OECD-Stats, LA-KLEMS, UNIDO, World Bank, and national accounts of each country.

for Japan) went through remarkable industrialization followed by deindustrialization at different points in time.

However, all the countries in the sample show positive trends in their manufacturing value added at constant prices,[18] therefore none of these deindustrialization processes could be characterized as "negative".

In the theoretical framework, we stated that the deindustrialization of some countries is caused by the industrialization of others, due to the process of offshoring enabled by new technologies. To analyze this, in the first panel of Graph 3 we present the weighted average of manufacturing employment share by group of countries (Developed, East Asian, and Latin American). In the second one, the weighted average of the manufacturing value added share by group. The weightings come from each country's share in the sample's manufacturing employment or value added at PPP, respectively.[19] In this way, countries with higher industrial employment/value added have a greater weighting.

Similar to the findings of Felipe, Mehta and Rhee (2019), Graph 3 shows that the manufacturing employment share in our sample does not follow a linear downward trend but appears – with swings driven by East Asia – relatively stable. In fact, from the mid-2000s to 2011 we can see a positive trend.[20] In the same way, the share of manufacturing value added shows swings over time but generally rather constant values (the annual rate of change since 1970 was just -0.07%), with a recent peak (in 2011) which was caused mainly by China.[21]

18. We do not have enough space to present these data here. Nor do we graph the evolution of the share of industrial VA, since it shows similar dynamics to those of employment just presented.

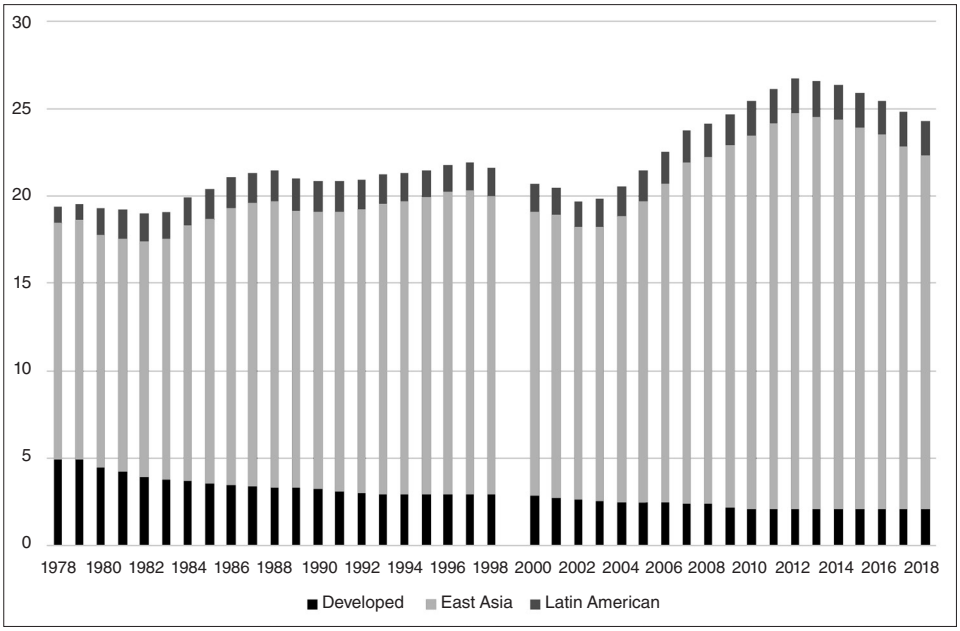
19. Because of the starting point of China's employment data (1978), and its relevance, we decided to show the calculations since that year.

20. Beyond these differences, our results for non-weighted averages are in line with those from Felipe, Mehta and Rhee (2019).

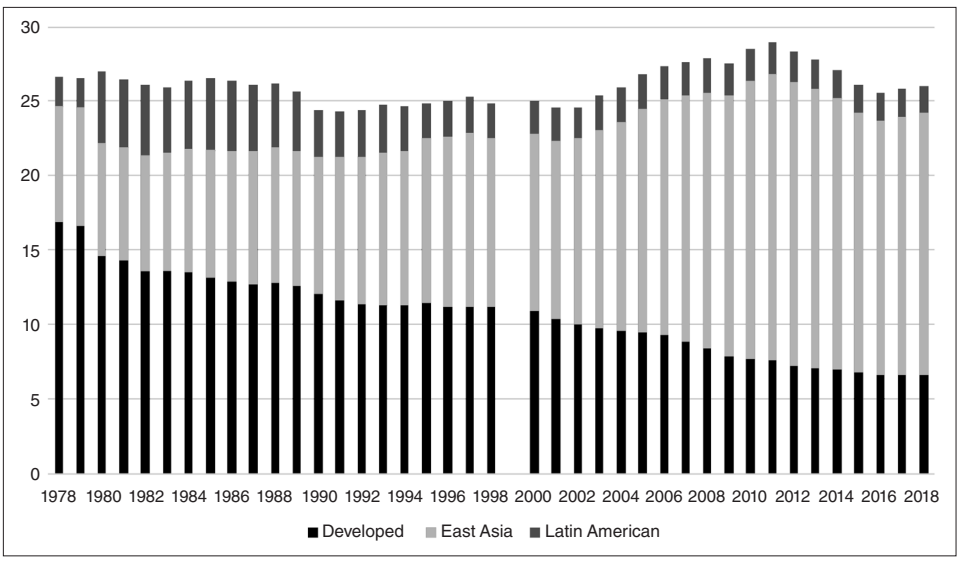
21. We also calculated the non-weighted mean for both constant and current prices share on total value added and the results from our sample countries were similar to those from Lavopa and Szirmai (2015) and Felipe and Mehta (2016).

GRAPH 3 ▪ *Dataset average employment and manufacturing value-added share, 1978–2018*

Graph 3a



Graph 3b



Sources: EUROSTAT, Graña (2017), Graña and Terranova (2020), Kennedy, Pacífico and Sánchez (2018), University of Groningen, ILO-Stats, OECD-Stats, LA-KLEMS, UNIDO, World Bank, and national accounts of each country. *Notes*: Due to the lack of total employment data for China in 1999, we decided not to include that year in the calculations.

4.3. Economic determinants of the offshoring process

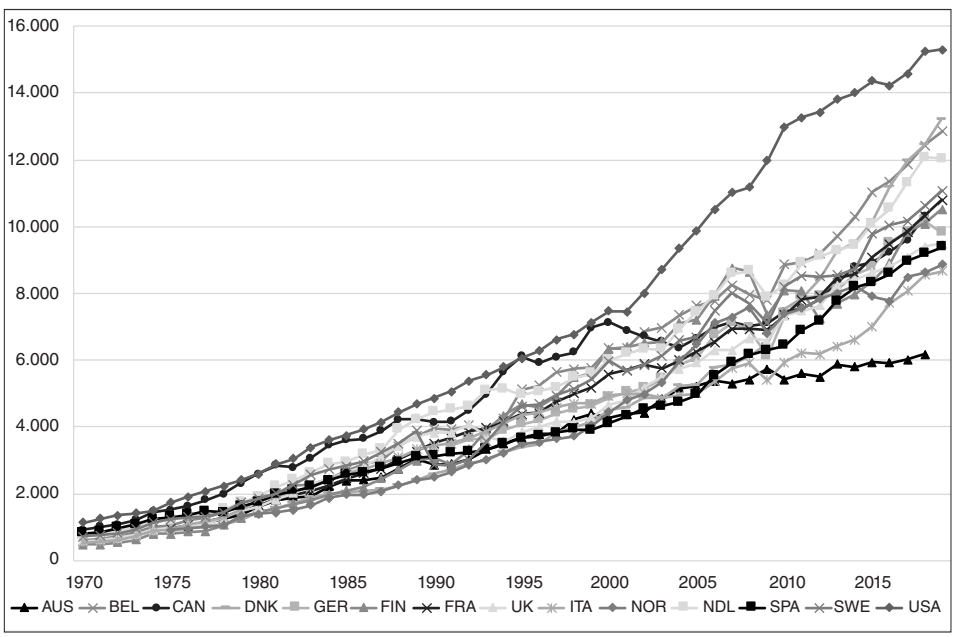
The first step to understanding the evolution of the manufacturing sector is to assess its productivity, which is calculated as VA per worker (Graph 4). Although all trends are positive, both the speed and levels differ across countries and regions. In this regard, productivity has increased by more than 900% in East and Southeast Asia since 1980, by 500% in the Developed countries, and only doubled since 1984 in Latin America. These trends – and their starting levels – determine the stratification presented: on average, the Developed are the most productive, followed by East and Southeast Asian countries and, at a considerable distance, the Latin American countries.

The average productivity of developed countries reaches $11,000 PPP dollars per month (from now on, dollars) in 2019, with the US, Denmark, Belgium, and the Netherlands leading. Norway and Italy (at around 8,700 dollars in 2019), and Australia (6,200 dollars in 2018) exhibit the lowest values.

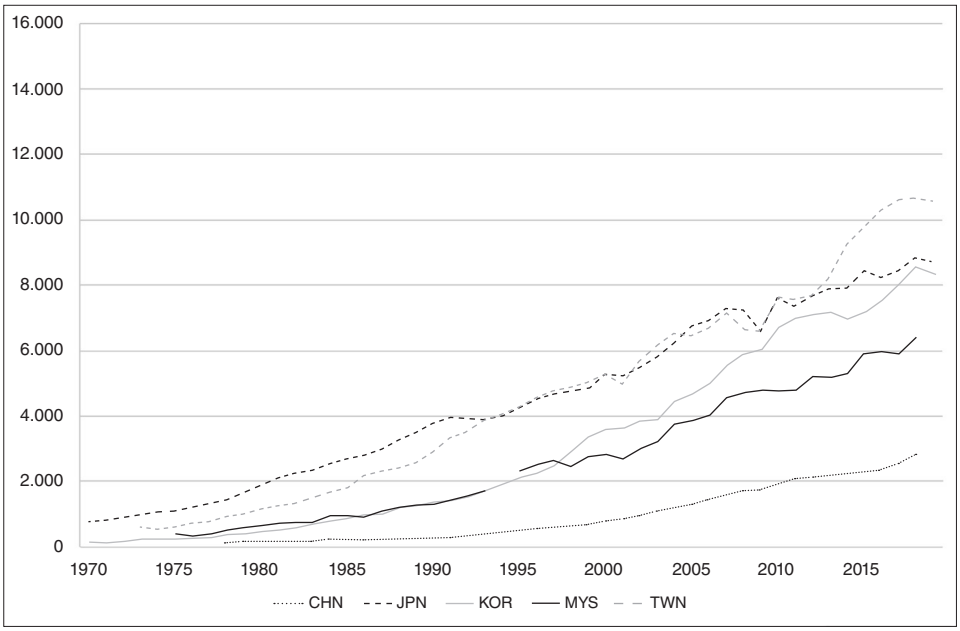
In 2018, the latest available date for the East and Southeast Asian countries, both productivity levels and evolution are very different amongst them. Regarding levels, Taiwan, Japan, and South Korea are the highest, close to those of Norway and Italy (10,700 dollars in the first case, around 8,600 dollars for the other two). Malaysia is in an intermediate position, with a pro-

GRAPH 4 ▪ *Manufacturing productivity in PPPs, by country group, 1970–2019*

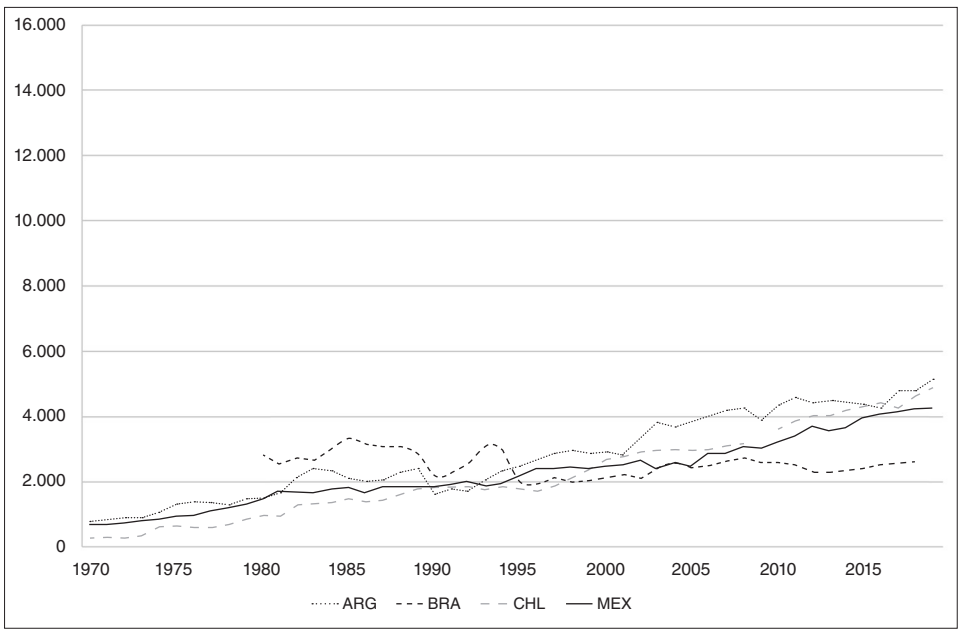
Graph 4a



Graph 4b



Graph 4c



Sources: EUROSTAT, Graña (2017), Graña and Terranova (2020), University of Groningen, ILO-Stats, OECD-Stats, LA-KLEMS, UNIDO, World Bank, and national accounts of each country.

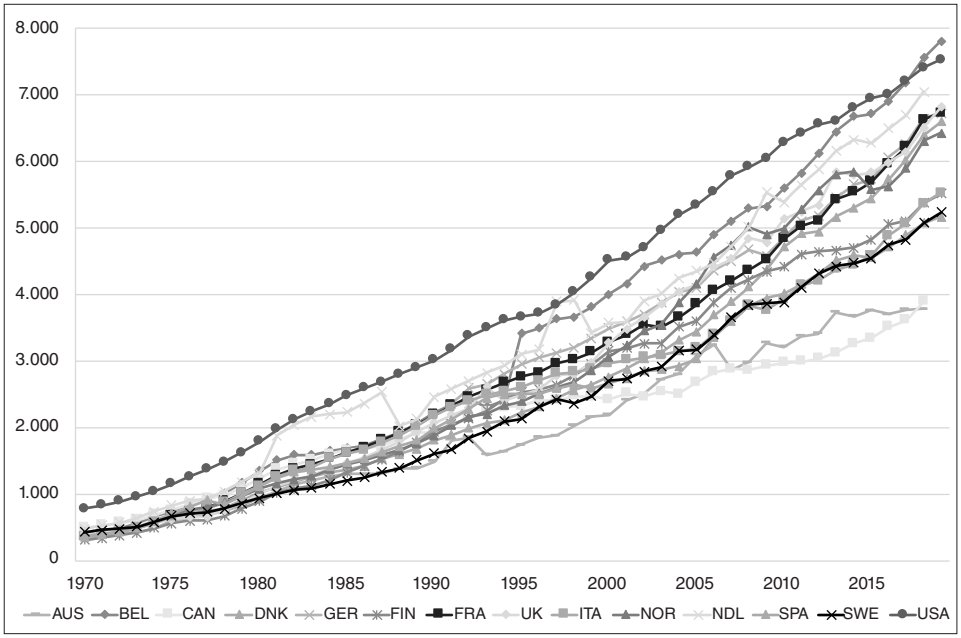
ductivity of around 6,370 dollars, higher than that of Australia, and finally China (at 2,800 dollars). As we have mentioned, the changes in this region were of a high magnitude: compared to 1980, Korea increased its productivity measured in PPP by 19 times, China by 17 times, Malaysia and Taiwan by nine times, and Japan by less than five times.

In 2018 in Latin America, Argentina and Chile, with 4,700 dollars in PPP each, are those with the highest productivity, with values that represent about 78% of Australia's, the lowest of the Developed countries. Behind them is Mexico, at 4,200 dollars, and, quite far behind, Brazil, which barely exceeds 2,500 dollars. In the case of Brazil, its long-term impasse calls our attention. In the meantime, Argentina and Mexico doubled their 1984 levels, and Chile tripled them.

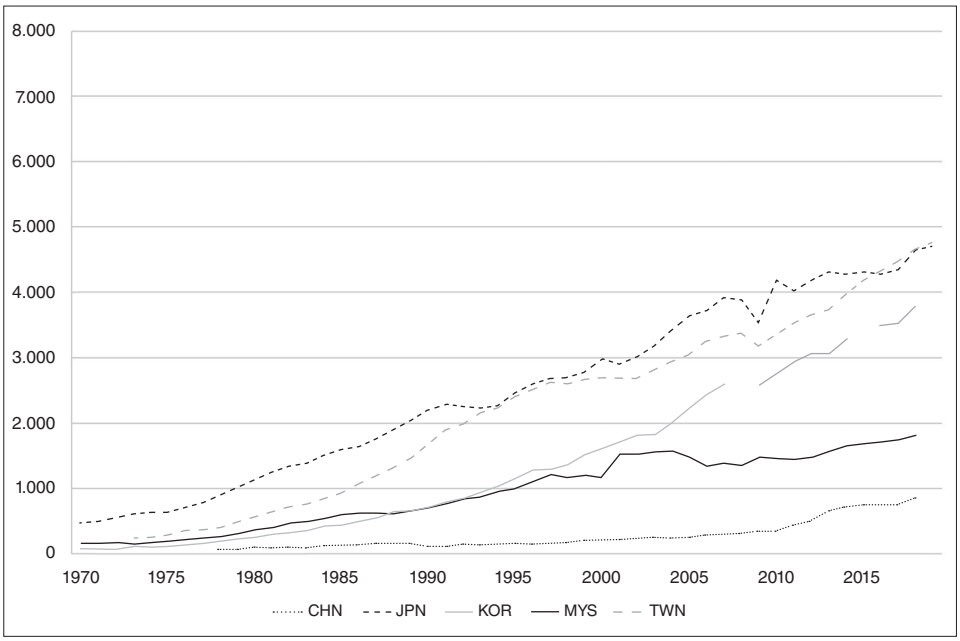
A key aspect in the discussion on deindustrialization and offshoring is the international differences in manufacturing wages, a more precise variable than per capita income because it shows the effective retribution to workers, while income per capita refers to an average measure according to the national output (Graph 5). The evolution is also positive in all cases, but the trends diverge; Developed countries' wages grew 450%, East and Southeast Asian countries close to 600%, and Latin countries only 180%. The stratification shown for productivity can also be seen in the wage level paid by each region.

GRAPH 5 ▪ *Manufacturing wages at PPP, 1970–2019*

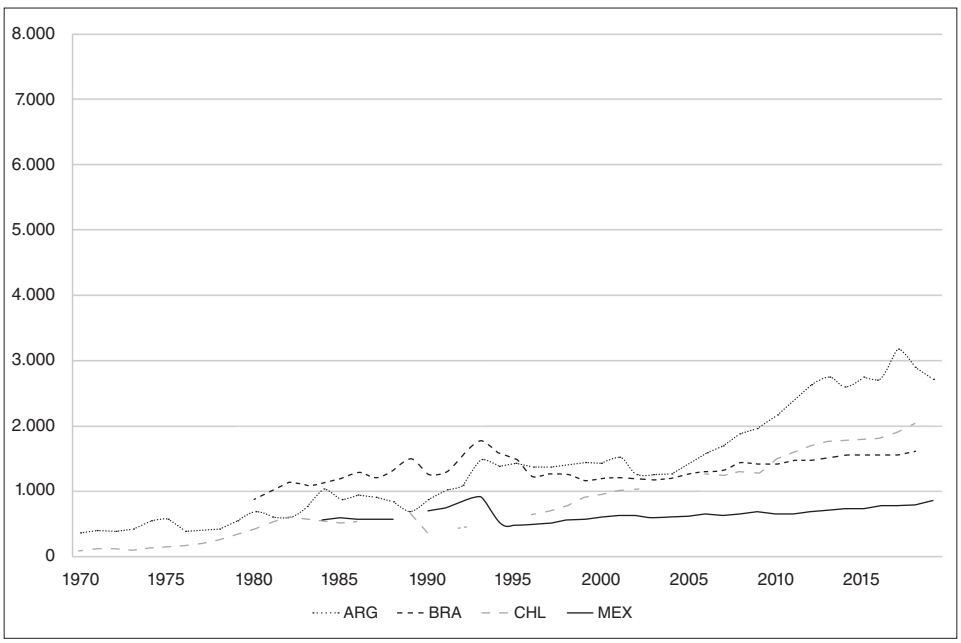
Graph 5a



Graph 5b



Graph 5c



Sources: EUROSTAT, Graña (2017), Graña and Terranova (2020), University of Groningen, ILO-Stats, OECD-Stats, LA-KLEMS, UNIDO, World Bank, and national accounts of each country.

Developed countries, while showing the highest levels, are more heterogeneous. Strictly speaking, for 2019, it was not the US with the highest wage level (7,500 dollars), but Belgium (7,800 dollars); for the lowest levels, Canada and Australia were at around 4,000 dollars.

In East and Southeast Asia, the situation is different. The first wave countries (Japan, South Korea, and Taiwan) are close to the level of the third group of Developed countries (around 4,000 dollars), but Malaysia is well below (1,780 dollars) and China is even lower, reaching only 845 dollars.

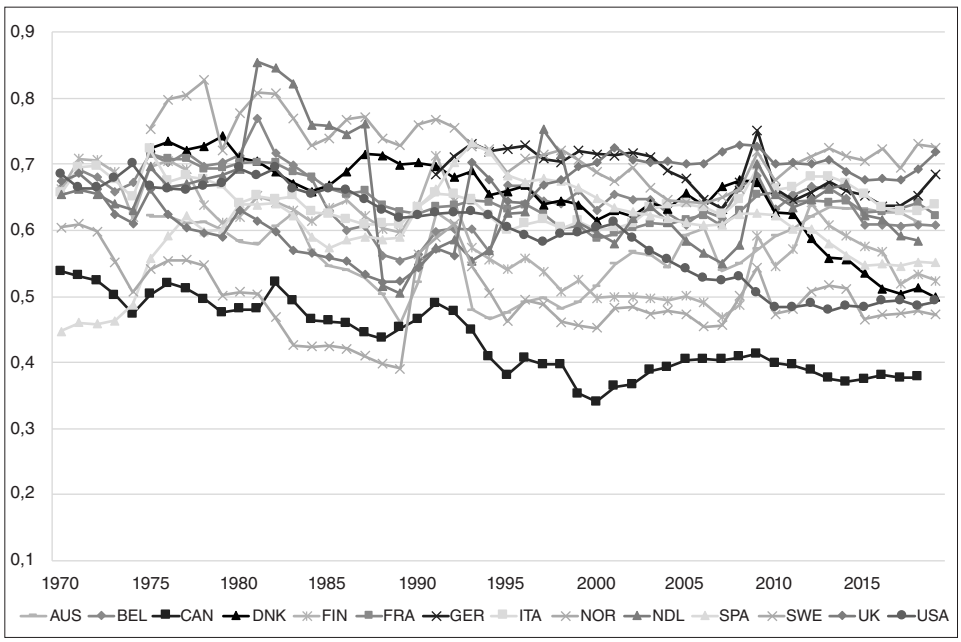
Latin America is – in some cases – further apart in terms of wages than in productivity. Argentina has the highest levels there, just below 2,800 dollars in 2019, followed by Chile, whose wages are just above 2,000 dollars (for 2018, the latest available data). Brazil presented a level of around 1,600 dollars for 2018 and, finally, Mexico, at less than 1,000 dollars for 2019.

To understand the differences identified between productivity and wages, we consider it relevant to analyze the unit labour cost (ULC) – the relation between wages and productivity – as an incentive for offshoring processes (Graph 6).

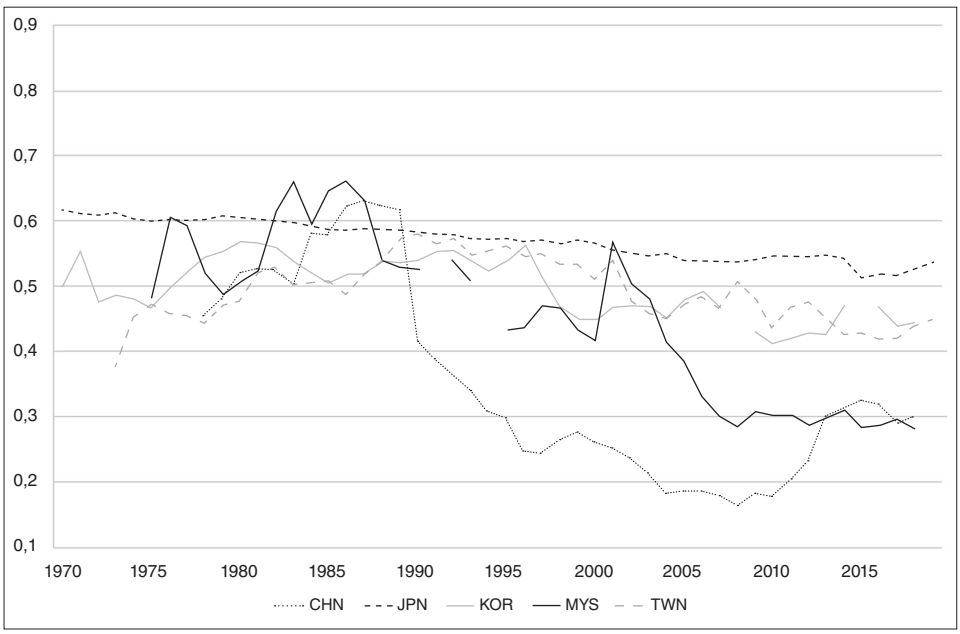
By 1980 the groups presented different situations: while the Developed countries had an average ULC of 0.64, East and Southeast Asia reached 0.52

GRAPH 6 ▪ *Unit labour cost, 1970–2019*

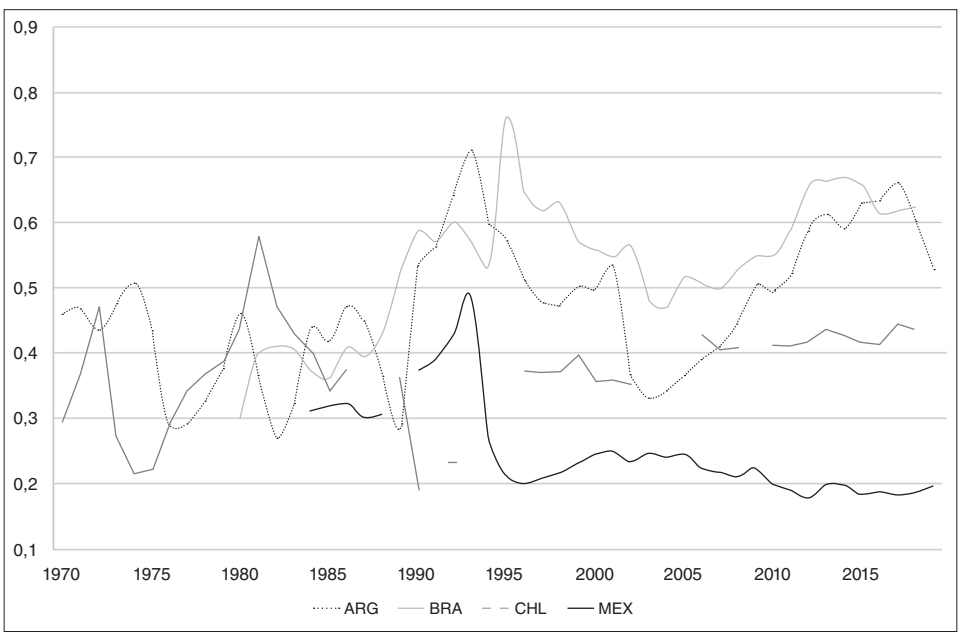
Graph 6a



Graph 6b



Graph 6c



Sources: EUROSTAT, Graña (2017), Graña and Terranova (2020), University of Groningen, ILO-Stats, OECD-Stats, LA-KLEMS, UNIDO, World Bank, and national accounts of each country.

– although with clear differences between Japan and the rest, while in Latin America – with data for Argentina and Chile – the ULC was 0.40 on average.

Since then, ULC has diverged. In the Developed countries, the faster pace in productivity generated a slight downward trend shared across the board (the average falls by 9.3% between 1980 and 2019). In East and Southeast Asia, the reduction is more remarkable, bringing the regional average to 0.39 by the end of the series. China and Malaysia stand out, with values of 0.27 and 0.3, respectively. In Latin America, for 2018, the average CLU is around 0.46, rising over time. Moreover, Argentina and Brazil end the stage at similar levels to the Developed countries (0.6 and 0.62, respectively), while Mexico has gradually reduced its cost (0.19 in 2018), the lowest of the sample.

As the literature shows, ULC has played a key role in the offshoring of manufacturing production since the 1970s. The information presented in Graph 6 indicates that the ULC level during the 1970s and early 1980s was indeed lower in both Latin America and East and Southeast Asian countries, excluding Japan.

But why did manufacturing production relocate to East and Southeast Asia instead of Latin America? During the period 1970–1985, South Korea and Taiwan inherited Japan's role in that region, increasing their share in world trade, as we showed in Graph 1. During those 15 years, ULC in these countries was around 0.5. On the contrary, Latin America's ULC was just 0.38. Up to this point, offshoring should have been directed to Latin America because of its lower ULC.

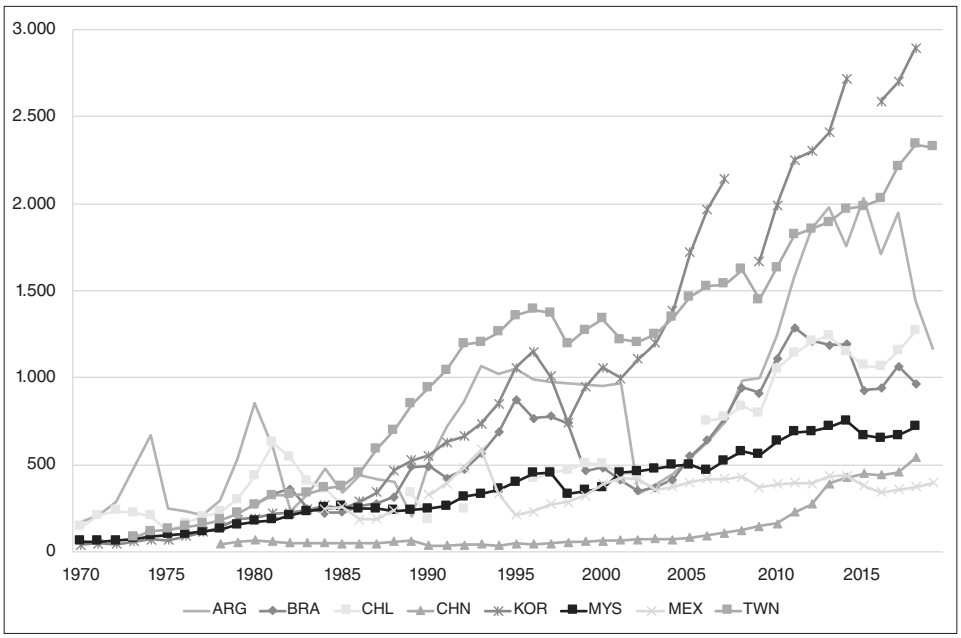
As we stated earlier in Section 1, the main concern of productive capital is to reduce costs, which is closely linked to wage costs, particularly in the manufacturing branches that lead to offshoring (textiles, toys, etc.). In other words, once minimum conditions are guaranteed (availability of the required skilled labour force, a certain prior manufacturing base, the possibility of scaling up production, and some guarantee regarding the profits to be received) between countries with lower ULCs than those of developed countries, the key issue becomes wages as a production cost. This is the reason why we present the comparison of manufacturing wages at the nominal exchange rate (NER) in Graph 7.[22]

In the 1970–1985 period, wages in South Korea and Taiwan represented only 56% of the Latin American ones, which operates as a clear incentive for manufacturing production to relocate to that region.

Moreover, in Latin America, wages were not only higher, implying larger capital investment, but also more volatile. For Latin American countries,

22. Although we will not deal with this, exchange rate overvaluation – or undervaluation – plays a key role in these comparisons and in deindustrialization processes (Arceo 2005; Frenkel and Rapetti 2012; Salama 2020).

GRAPH 7 ▪ *Manufacturing wages at NER, 1970–2019*



Sources: FRED, Graña (2017), Graña and Terranova (2020), LA-KLEMS, UNIDO, World Bank, and national accounts of each country.

wage annual standard deviation was 0.35 during the 1970–1985 period, while for South Korea and Taiwan it was only 0.12. The ULC, which relates wages and productivity, partly hides the fact that both variables do not have the same level of certainty for capital: while capital knows how much it will pay in wages, it does not know the productivity its workforce will achieve. All this evidence constitutes the economic determinants behind the relocation to East and Southeast Asia and the deindustrialization of both the Developed and Latin American countries.

As the literature recognizes, the offshoring process is carried out through "waves" within East and Southeast Asia (Kojima 2000). There, the process is driven by the impressive growth of wages in South Korea and Taiwan since the mid-1980s.[23] Indeed, if we focus on the period 1990–2019, we see that both China and Malaysia have lower ULC (0.32) in comparison with the other East and Southeast Asian countries (0.48 for Taiwan and Korea; 0.55 for Japan) and Latin America (on average, ULC of 0.38). Thus, for these years, the link between lower costs and the displacement of manufacturing production

23. In the five-year period from 1985 to 1990, both South Korea and Taiwan more than doubled the wage measured in NER.

to new countries seems clear. If we look at Graphs 6 and 7, we will see that this dynamic of the ULC of China and Malaysia is based on the level of wages at NER, which is lower than in the rest of the countries of East and Southeast Asia and Latin America. It is just at the beginning of the twenty-first century that China showed accelerated growth in wages (de Sousa and Poncet 2011; Li et al. 2012; Salama 2012), which also provides elements that help us understand the current process of offshoring, which has as its destination Vietnam or Bangladesh, or even the acceleration in the automation process in China itself (Whittaker et al. 2010).

This data provides empirical support to the explanation behind the reduction in the income level at which deindustrialization begins. As technological progress and manufacturing jobs are simplified, international competition barriers are reduced. As a result, regardless of the degree of industrial development that countries have achieved, as ULC rise, there are no longer obstacles for production to move to where it is more "convenient".[24]

5. Conclusions

This paper's contribution is providing data to support the thesis that the main driver for deindustrialization is the offshoring process linked to the new international division of labour (NIDL) and its economic determinants: wages and productivity. With that aim, we have addressed two problems in the literature: 1) the understanding of the process as "natural" or "mechanical", whether in developed countries or not, and 2) the lack of explanation for the decline, over time, in the level of per capita income at which deindustrialization begins.

Indeed, the emergence and consolidation of the NIDL and international wage differentials can explain not only the offshoring from developed countries – and hence their deindustrialization process – but also the "premature" deindustrialization in Latin America. In that period (1970–1985), manufacturing wages in South Korea and Taiwan represented only 56% of those in Latin America.

24. While not the focus of the paper, Mexico's performance stands out. In Graph 6 and 7, Mexico remains competitive even in comparison with China, which is a fundamental factor in explaining their role as a maquila-based export platform since the early 1990s (Bendesky et al. 2004; Gallagher and Moreno-Brid 2008; Gereffi 2010; Caligaris 2016). The Mexican strategy seems to be based entirely on the wage level, whose conversion via the nominal exchange rate shows an impasse over the last 20 years, which explains why production does not flee to other countries in Central America or Asia. In spite of this, some authors argue that the stagnation of productivity and the appreciation of the peso against the dollar are undermining Mexico's competitiveness (Gallagher and Moreno-Brid 2008; Gereffi 2010; Frenkel and Rapetti 2012).

Hence, there is nothing "natural" or "mechanic" about deindustrialization. Without the technological and organizational changes that are embedded in the NIDL, it is not possible to explain the global process of the deindustrialization of developed and Latin American countries while East and Southeast Asia were industrializing. Moreover, from our dataset and other papers, if "global" manufacturing employment or value added shares are calculated, global deindustrialization is not as clear as national evidence would suggest. That is why we believe the true nature of deindustrialization is linked to a process where "some countries deindustrialized others".

However, subsequent technological development gradually reduced the skill demand for manufacturing jobs, which allowed new offshoring waves to other – poorer – countries, such as China and Malaysia. And, although we do not present data on this, it would explain why the process continues in new countries like Bangladesh and Vietnam. This explains the reduction in per capita GDP levels at which deindustrialization begins. While we share the importance of differentiating between types of deindustrialization, relying on per-capita GDP is not very precise. For that, we believe that broadening the view to other variables, such as wages and productivity as we did, or to others linked to the complexity of the manufacturing sector, its innovative capacity, or its international insertion, is needed.

Regarding the specific causes of "premature" deindustrialization, we consider that it is difficult to argue that it is mainly explained by policies of openness and deregulation that have been characteristic features of neoliberalism around the world. Latin American countries adopted those changes in an attempt to become export platforms, but neither their wages nor their productivity allowed them to achieve that position against East and Southeast Asia. The exception is Mexico which, given its proximity and trade agreements with the United States and sustained wage repression, has achieved a "competitiveness" that cannot be reproduced by others.

Even though we have focused on economic determinants as the main drivers of NIDL and deindustrialization, there is no empirical evidence that can fully explain 24 countries' trends for such a long period. What other processes are relevant to include in the analysis? First, South Korea and Taiwan had particularities that could not be reproduced by Latin America in the 1970s. In fact, their relationship with the United States, which provided access to its domestic market and financing, and with Japan, from which the first wave of subcontracting originated, played an important role (Fajnzylber 1990; Chibber 1999). Second, there was a set of conditions in Latin America that prevented their transformation into export platforms: the cyclical balance of payments problems, as well as the set of regulations of the external accounts, and trade barriers, among others. Finally, labour regulations, and union power – in the face of long-term dictatorships and the massive population avail-

able in East and Southeast Asia – ended up reinforcing the wage disadvantage that we pointed out (Hung 2008).

These specific processes – and others – in each country and region are key to fully comprehending what happened, but they all operate on top of an economic determination at a particular phase of capitalism. The low-wage competition enabled by new technologies since the 1970s became a condition for the participation of the developing world in the global manufacturing trade. In the future, this could change based on a new technological package linked to the so-called Industry 4.0, but there are no signs of this yet.

All in all, we believe that these findings have an impact on public policies, particularly for middle-income countries that deindustrialize. As it is not a mechanical phenomenon and carries impacts on the labour market, industrial policy is key in order to achieve competitiveness through productivity and innovation – and not wage repression – as well as to upgrade to sectors where there is no "race to the bottom". As Dosi, Riccio and Virgillito (2021) state, the most important feature to consider is which role a country plays in global value chains rather than whether or not it participates.

Future research possibilities are linked to this paper's limitations. First, further work needs to be done to achieve a truly global sample, to analyze specificities in the deindustrialization patterns of the different regions of the world. Particularly interesting, and not dealt with here, are the Eastern European countries of the Soviet Bloc, as well as African economies. Second, abandoning total manufacturing to deal with specific branches could further illustrate how unit labour costs are pushing production to new countries and to what extent countries are managing to "replace" them with more complex ones.

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Author contribution statement

Both authors have contributed equally.

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Appendix

In this Appendix, we explain how each country's data is constructed.

For Germany, Denmark, Finland, and Norway we used EUROSTAT for all variables since 1975, both for manufacturing and total economy.[25] In Finland's case, the total economy data was spliced with UNIDO's series since 1980, in manufacturing this splicing was done with UNIDO's data for 1970–1980.

For United Kingdom's manufacturing, EUROSTAT was used for all variables since 1995 and we spliced it backward with UNIDO's data. For the total economy, employees and employment were obtained from the International Labour Organization (official estimates), while value added and employee compensation data were obtained from OECD.

In the case of Belgium, EUROSTAT variables were used since 1995 for the total economy and manufacturing. To complete the period, the manufacturing variables come from UNIDO. For the total economy, employees and employment were obtained from the National Bank of Belgium. Finally, for employee compensation and total VA, OECD's data was used.

In the case of the Netherlands, for manufacturing, we used UNIDO data for employees for the whole period. The rest of the variables since 1995 have been obtained from EUROSTAT. To complete the period, we spliced it backward: employee compensation with UNIDO's data and value added with GRONINGEN's data. Regarding the total economy, total employment and employees since 1995 have been obtained from EUROSTAT. This series was spliced backward with national accounts' data. Value added and employee compensation are both obtained from OECD.

For Sweden, all the variables were obtained from EUROSTAT since 1993. To complete the series, the manufacturing sector data was spliced by the rate of change with UNIDO's data. For the total economy, employees and total employment were obtained from EUROSTAT since 1993, splicing with GRONINGEN's data to complete the period. Both employee compensation and value added were obtained from OECD for all years.

For South Korea, Spain, the United States, France, Italy, Japan, and Taiwan, the methodology explained in Graña (2017) has been used and the values have been updated with national accounts data.

In the case of Argentina's manufacturing, the methodology used is available in Graña and Terranova (2020) for all variables. For the total economy, the information comes from Graña (2017) and Kennedy, Pacífico and Sánchez (2018) updated with national accounts data.

For Australia's manufacturing, employees and total employment data was obtained from ILO (for 1990–2018 and 2008–2018, respectively) and then spliced with

25. In the case of Germany, information has been presented since 1991.

OECD data (1985–2008 for total employment and 1985–1990 for employees) and finally with UNIDO (employees) and Australian official yearbooks (employment) until 1970. Employee compensation was obtained from UNIDO for the whole period and VA from the official yearbooks since 1990, splicing backward with UNIDO (1970–1990) to complete the period.

For Brazil's manufacturing, employees were obtained from UNIDO. Total employment, since 2000, from the Brazilian Institute of Geography and Statistics (IBGE). Thereafter, they have been spliced with Grinberg (2011). Value added was obtained from the IBGE and employee compensation from the UNIDO database. To have an extended series, we have used the annual variations of the average industrial wage in São Paulo from 1980 to 1992. For the total economy, all variables were obtained from IBGE and spliced backward with several sources (except for the VA, whose only source is IBGE): employees, for the period 2002–2008 with OECD; total employment with GRONINGEN (for 1970–1999), and employee compensation with OECD (1990–1999).

For Canada's manufacturing, both employees and employment were obtained from OECD since 1987. To complete the series, we spliced it with UNIDOs. In the same way, employee compensation and VA are obtained from UNIDO. For the economy, employees and total employment are obtained from ILO data; employee compensation and VA are obtained from the OECD database.

In the case of Chile's manufacturing, we use the annual national accounts of the Central Bank of Chile up to 2013 for the majority of the variables (from 1986 for employees, spliced with UNIDO for previous years). Backward splices are made as follows: for employee compensation and VA, we use the LA-KLEMS base (in the first case for 1995–2013, and the second one for 1990–2013) and then complete the period with UNIDO (until 1970). Total employment was obtained from the ILO-Chile employment survey database for the entire period.

For China's manufacturing sector, total employment, employee compensation and VA were obtained from the statistical yearbooks (SY). Employees are UNIDO's. For the total economy, all variables were obtained from the statistical yearbooks, except for employees, for which we used ILO based on official statistics. All variables, regardless of sector, are available since 1978. It is important to note that, for industrial and total employment, there is a methodological change since 1990 that raises the values considerably. Because of this, we have decided to apply the rate of change of total employment between 1990 and 1991 to the years 1989-1990 and, from there backward, to continue with the original data's rate of change.

For Malaysia's manufacturing, both employee compensation and employees were obtained from UNIDO. Value added was obtained from the same source, but since 2005 it was spliced with information from the Malaysian national accounts (for 1987–2005) and then with UNIDO again (1970–1987). Total employment data was taken from national accounts for the period 1982–2019, and for the previous years, it is spliced with the GRONINGEN's data (until 1975). For the total economy, all

variables were obtained through national accounts. In this sense, employee compensation was available from 2005, so it is spliced backward with the IMF data.

For Mexico's manufacturing, we use data from the Statistical Information Bank-National Institute of Statistics and Geography (BIE-INEGI) for all variables. Total employment (industry) was obtained from the same source, but since 1990 it was spliced with LA-KLEMS (for 1990–2005) and then with GRONINGEN for the previous the years (1970–1990). Employees and employee compensation were obtained from UNIDO from 1984 to 2018. On the other hand, for 1990–2018 VA was obtained from LA-KLEMS and spliced backward with UNIDO (1984–1990) and then with GRONINGEN (1970–1984). For the splicing of employees, we use UNIDO's data. Finally, for the total economy all variables are obtained from BIE-INEGI, and then backward spliced as follows: employees and total employment with EUROSTAT (for 1995–2004), and the latter with GRONINGEN to complete the entire period (up to 1970). For VA and employee compensation, we used OECD data for 1970–2019.

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Ni mecànica ni prematura: la desindustrialització i la nova divisió internacional del treball (1970-2019)

Resum

Aquest article estudia els determinants econòmics —nivells salarials i de productivitat— que es troben al darrere de les tendències de desindustrialització de vint-i-quatre països dividits en tres grups («Desenvolupats», «Àsia Oriental», «Amèrica Llatina») per al període 1970-2019. Les dades mostren que la desindustrialització, independentment del nivell d'ingressos del país, està vinculada als salaris més baixos d'altres països. Aquests determinants expliquen l'origen d'aquest fenomen mundial des de la nova divisió internacional del treball i l'impacte que té tant als països desenvolupats com als subdesenvolupats de l'Amèrica Llatina, però també en les successives onades de països en vies d'industrialització de l'Àsia oriental.

Paraules clau: desindustrialització, divisió internacional del treball, indústria manufacturera, salaris, costos laborals

Codis JEL: L60, E24, J30, O57

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Ni mecánica ni prematura: la desindustrialización y la nueva división internacional del trabajo (1970-2019)

Resumen

Este artículo estudia los determinantes económicos —niveles salariales y de productividad— que están detrás de las tendencias de desindustrialización de 24 países, divididos en tres grupos («Desarrollados», «Asia oriental» y «América Latina»), para el período 1970-2019. Los datos muestran que la desindustrialización, independientemente del nivel de ingresos del país, está vinculada a los salarios más bajos de otros países. Tales determinantes explican el origen de este fenómeno mundial desde la nueva división internacional del trabajo y su impacto tanto en los países desarrollados como en los subdesarrollados de América Latina, pero también en las sucesivas oleadas de países en vías de industrialización de Asia oriental.

Palabras clave: desindustrialización, división internacional del trabajo, industria manufacturera, salarios, coste laboral

Códigos JEL: L60, E24, J30, O57