

Reshoring, nearshoring and developing countries

Citation for published version (APA):

Pietrobelli, C., & Seri, C. (2023). *Reshoring, nearshoring and developing countries: Readiness and implications for Latin America*. UNU-MERIT. UNU-MERIT Working Papers No. 003
<https://www.merit.unu.edu/publications/wppdf/2023/wp2023-003.pdf>

Document status and date:

Published: 16/01/2023

Document Version:

Publisher's PDF, also known as Version of record

Document license:

CC BY-NC

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.



**UNU
MERIT**

Working Paper Series

#2023-003

**Reshoring, nearshoring and developing countries:
Readiness and implications for Latin America**

Carlo Pietrobelli and Cecilia Seri

Published 16 January 2023

Maastricht Economic and social Research institute on Innovation and Technology (UNU-MERIT)
email: info@merit.unu.edu | website: <http://www.merit.unu.edu>

Boschstraat 24, 6211 AX Maastricht, The Netherlands
Tel: (31) (43) 388 44 00

UNU-MERIT Working Papers

ISSN 1871-9872

**Maastricht Economic and social Research Institute on Innovation and Technology
UNU-MERIT | Maastricht University**

UNU-MERIT Working Papers intend to disseminate preliminary results of research carried out at UNU-MERIT to stimulate discussion on the issues raised.



Reshoring, nearshoring and developing countries. Readiness and Implications for Latin America *

Carlo Pietrobelli

UNESCO Chair at United Nations University
UNU-MERIT and University Roma Tre

carlo.pietrobelli@uniroma3.it

Cecilia Seri

United Nations University UNU-MERIT

seri@merit.unu.edu

This draft January 12, 2023

Abstract

This paper discusses the concepts of reshoring and nearshoring that are gaining increasing popularity. We contribute to the literature in three main ways. First, building on previous theories we define a theoretical framework and consider how recent developments – COVID-19 and Industry 4.0 technologies – may impact on these patterns. Secondly, we process some preliminary evidence to test whether Latin American and Caribbean economies are indeed participating in this reshoring trend. Thirdly, we propose a measure of “Reshoring Readiness”, to assess whether Latin American countries appear to be ready to host relocations and benefit from them. Overall, we find limited evidence of nearshoring to the region so far, except for Mexico, and we highlight strengths and weaknesses of the region for attracting and benefitting from future relocations.

Keywords: Global Value Chains; Latin America; Reshoring; Nearshoring; Industry 4.0; FDI.

JEL codes: F21, F23, L24.

* The authors wish to thank Rodolfo Stucchi for the many useful conversations. A preliminary draft of the paper was presented at the Globelics 2021 Conference in Costa Rica. We acknowledge the financial support of IDB-Invest. Responsibility for the opinions expressed is only ours.

1. Introduction

The last decades of the twentieth century have been characterized by a fast globalization process. Trade and industrial productions were drastically restructured, reflecting the strategic decisions of many companies to offshore stages of production to exploit cheaper resources, access markets and technologies, and take advantage of geographically dispersed production networks. Global Value Chains (GVCs) was the name of the game (Timmer et al., 2014; Baldwin, 2016, Ponte et al., 2019), increasingly encompassing more sectors, including services, and emerging markets (UNCTAD, 2020).

However, after three decades of accelerating globalization, since 2010 international production has slowed down, with sluggish growth of trade and FDI. This may be explained by the changes in the international context, with rising labor costs in once cheap locations, rising uncertainty and protectionism (UNCTAD, 2020). Within this framework, the once common offshoring practices were challenged, and some companies started to reconsider their international location decisions to eventually “re-shore” (or “back-shore”), that is to bring production back into the country - or in its proximity -, or at least some slices of the value chain.

From the standpoint of developing countries, for which foreign investments remain a crucial source of capital, nearshoring practices could represent an opportunity. However, the conditions to attract nearshoring and benefit from it are complex and hard to achieve for many countries. Moreover, thus far the literature on nearshoring has mainly taken the perspective of firms in advanced economies and the likely impact on the latter. Given the firm-level nature of the phenomenon, often secretly implemented, the available evidence is still largely impressionistic.

To address these gaps, in this paper we contribute to the literature in three main ways. First, we structure the terms of the debate on reshoring and nearshoring by proposing a theoretical framework of analysis considering existing theories. Second, we suggest an original measurement of the phenomenon at the macro and trade levels, and remedy the scant evidence on reshoring. Thirdly, we investigate nearshoring from the perspective of developing countries, and measure the nearshoring readiness for Latin American (LAC) countries, i.e. whether LAC countries appear to be ready to host relocations and benefit from them.

The theoretical framework, based on existing literature, is presented in section 2. We then consider how recent developments such as the emergence of new technologies and the COVID-19 pandemic may impact nearshoring (section 3). In section 4 we use available macro and trade data to measure reshoring activities to LAC countries. In sections 5 and 6, we discuss and measure the reshoring readiness of LAC and conclude with some policy implications.

Overall, we observe limited evidence for nearshoring from US MNEs to LAC so far. Mexico is an exception and seems to be playing an increasingly relevant role. However, our analysis shows that it is far from displacing China. The region proves to have strengths and weaknesses in attracting potential nearshoring: the relatively high human capital may attract higher value-added stages of the value chains, but the region still has a long way to improve its logistics and strengthen its digital infrastructure to respond to the rising concerns of buyers and investors.

2. The economics of reshoring: key concepts, rationales and impacts

The concepts of reshoring and back-shoring first, and that of nearshoring later, became a topic of discussion among policymakers and the press before grabbing the attention of academic research.

Despite this growing attention, there is not yet a unified framework of analysis, and multiple perspectives overlap, with the ensuing varied terminology. In line with most of the previous literature, we use the term reshoring to refer to a generic relocation of production activities in the opposite direction than offshoring. Back-shoring and nearshoring would then describe different types of reshoring, respectively all the way back to the home country, or in its proximity. For example, if a US firm were moving part of its offshored production from China back to the US, this firm would be back-shoring, while it would nearshore if the same production were relocated in Mexico.

In the academic literature, these phenomena have mainly been studied by international business scholars stressing the standpoint of the firm.¹ In this sense, reshoring practices have been considered as part of a firm dynamic location strategy within which, given an earlier decision to offshore, this is revised and reversed, sometimes “correcting previous strategies” (Kinkel, 2014; Fratocchi et al., 2014).

However, corporations’ location and relocation decisions do not only impact firms’ efficiency and profitability, but they also have remarkable effects on the wider economy, entailing a transformation in the international division of labor and a reconfiguration of global production. While this aspect remains less explored, some efforts have been made in this direction (Casson, 2013; OECD, 2016; UNIDO, 2019, UNCTAD, 2020).

2.1 Firms’ internationalization decisions

Corporate internationalization strategies involve both the choice of *where* to carry out production (i.e. the shoring decision) and of *how to organize production and source* production factors (i.e. the corporate boundary, or sourcing, choice). In table 1 we present a simple layout of the various possible options obtained by combining the various corporate strategic decisions. On the vertical axis we classify possible corporate boundary decisions, and on the horizontal axis the possible location decisions. Using this table, we can analyze the implications for trade, FDI flows and GVCs configurations of offshoring, back-shoring and nearshoring.

During the years of the globalization expansion companies increasingly offshored their production activities using different organization and sourcing modes. Thus, they either chose to establish foreign affiliates, enter in strategic partnerships with other firms, or outsource to foreign suppliers. The former case resulted in growing FDI flows, initially between Europe and the US and, after 2000, in Asian markets (UNCTAD, 2018). The partnerships and the non-equity modes of internationalization have also been widely used, as they allowed MNEs to concentrate in higher value-added segments of the value chain and outsource non-core activities.²

Offshoring location decisions, whatever the source mode chosen by the MNE, involve an expansion of global production networks. Conversely, nearshoring can be intended as a shift to a smaller geographical scope, with a movement from the last right-hand side column to the central one, that is relocating activities from a distant country to one in the same region of the company’s headquarters. Therefore, in the case of nearshoring, FDI and international trade flows would still be observed, but with a reconfiguration of their geographical composition implying a regionalization of value chains. If, on the other hand, production segments are repatriated to the home country (back-shoring), a reduction of international exchanges of inputs and products would appear, with more production

¹ Whilst most of this literature has focused on large manufacturing firms, sometimes also SMEs are analysed (Gray et al. 2013; Stentoft et al., 2016).

² However, while outsourcing practices have first been related to low value-added activities, they have also expanded to some higher value-added segments in the upstream (e.g. R&D activities) and downstream (e.g. customer services) stages of the value chain (UNCTAD, 2020, Pietrobelli et al., 2011).

carried out domestically by the company's domestic divisions, or by domestic partners and suppliers in the same value chain.

Looking from a different perspective, nearshoring could be visualized as an expansion from total (mainly) in-shoring to offshoring in the same region, in the proximity of the home country. This would imply an expansion abroad, even if limited to nearby countries, by establishing affiliates in neighboring countries, or regional value chains, or sourcing from near but foreign suppliers.

In the literature on reshoring, there is a substantial consensus about considering it as a (re)location decision, regardless of the ownership mode. However, Dachs et al. (2019) distinguish between relocating production activities previously carried out offshore in plants owned by the company itself (*captive back-shoring*) and *outsource back-shoring*, in the case the relocated activities were previously outsourced to offshore suppliers.

Table 1. Shoring and Sourcing: possible corporate decisions

			Location (shoring) decision		
			Inshore	Nearshore	Offshore
			<i>same country</i>	<i>same region</i>	<i>distant country</i>
Corporate boundary (sourcing) decision	Insource	<i>make</i>	Domestic divisions and affiliates	Establishing affiliates in a foreign nearby country (FDI)	Establishing foreign affiliates (FDI)
	Partnership* (e.g. value chains)	<i>hybrid</i>	Domestic partnership	Regional partnership	Foreign partnership
	Outsource	<i>buy</i>	Source from domestic suppliers (trade)	Source from foreign nearby supplier (regional trade)	Source from foreign supplier (international trade)

Source: Authors' adaptation from Foerstl et al., 2016 * Partnerships can take various forms, like for example joint ventures, strategic partnerships, long-term contracts, captive suppliers. They can be equity- or transaction-based.

In addition, it is necessary to remark that in the context of a fragmented international production often organized along GVCs, the location decision does not necessarily involve the whole value chain, but frequently only some specific segments. As a result, the back-shoring and nearshoring decisions also have important implications for the reconfiguration of GVCs.

In sum, the table shows how shoring (location) and sourcing (boundary) choices reflect two different strategic decisions, and how it is the intersection between the two that outlines the emergence of different forms of internationalization of production. Both decision domains are very relevant as they shape GVCs and impact value added creation, capture and distribution across countries.

2.2 Determinants of internationalization of production

A large body of literature, ranging from international business to economics and industrial organization, analyze the motivations for internationalization and the mode chosen to enter international markets (Buckley and Casson 1976; Hymer, 1976; Dunning and Rugman 1985; Dunning, 1980, 1988, 2000) seeking to explain the rationale for firms' offshoring decisions. Following Dunning's eclectic theory of international production, international location decisions can be mainly related to four broad determinants. First, companies might be motivated by the search for low-cost or high-

quality inputs such as natural resources, cheap low-skilled labor or high technological and management expertise. Secondly, in the case of market seekers, firms undertake foreign investment to supply external – typically large or fast growing – markets. Thirdly, production internationalization can be prompted by a search for efficiency. This is generally the case of large MNEs that produce standardized products seeking to rationalize their international structure. In this instance, existing capabilities, incentives, policies and institutions of different locations are likely to play a relevant role in the decision. Finally, corporations' international activity can be motivated by a promotion of the firm's long-term strategic objectives.³

Despite their enduring relevance, a shift in the perceived importance of the different determinants has been noticed by the emerging literature on back-shoring and nearshoring.

- i. First, reshoring practices have been explained by *push factors* from host countries particularly related to labor markets (Piatanesi and Arauzo, 2019). In this sense, the erosion of wage differentials between developed and developing countries has reduced the scope for arbitrage on labor costs and has operated as a push effect from offshore locations to home countries. In some cases, this has been compounded by low labor productivity and reduced availability of skilled workers (Gray et al., 2013; Kinkel & Maloca, 2009; Tate et al., 2014; Vanchan et al., 2018; Lampon et al., 2015).
- ii. On the other hand, some *pull effects* operate in some countries, with incentives and government policies driving the relocation to more advantageous sites (Gray et al., 2013; Lee and Park, 2021, Vanchan et al., 2018).
- iii. Several drawbacks related to the distance between home and host countries have also been highlighted, suggesting that reshoring would reflect a correction of misjudged preceding decisions, and the underestimated costs of distance. Therefore, the changing context, together with wrong past decisions, would force substantial strategy “corrections”. In this respect the literature has emphasized the importance of:
 - a. the actual transport and communication costs, far higher than what was expected;
 - b. the adverse effects related to reduced flexibility in highly complex production networks (Fratocchi et al., 2014; Kinkel and Maloca, 2009; Gylling et al., 2015);
 - c. the existence of supplier-consumer mismatches (Piatanesi and Arauzo, 2019), hard to settle when production is far from the final market;
 - d. the negative impact of far-away offshored production on innovation opportunities: user-producer interactions may be very important for learning and innovation in production (Pietrobelli and Rabellotti, 2011; Fratocchi et al., 2016; Gray et al., 2013; Chang and Andreoni, 2020);
 - e. discrepancies in institutional structures in relation to intellectual property rights (IPRs) (Gray et al., 2013; Tate, 2014), quality standards (Ancarani et al., 2015; Fratocchi et al., 2014; Stentoft et al., 2016), environmental and social conditions (Gray et al., 2013; Tate, 2014; Ashby, 2016) and other regulations.

Against this background, opportunities for nearshoring could increase soon. Nearshoring could offer the advantages of lower production costs relative to the domestic market without entailing the

³ The motivations have been named as natural resource seeking, market seeking, efficiency seeking, strategic asset or capability seeking (Dunning, 1980 and 1988).

limitations of far-away offshoring related to distance. Moreover, the increasing search for value chain robustness against disruptions, as well as geopolitical considerations in many advanced countries, are likely to motivate a diversification of supplier locations, as the “China Plus One” strategy appears to suggest.⁴

3. Possible forms of GVCs reconfiguration. The role of technological changes and of the international risky environment

It has been claimed that several already ongoing processes are coming to a tipping point and that this, together with the Covid-19 as well as other possible future pandemic, is likely to have disruptive effects on the international fragmentation of production. Indeed, while trade wars and political tensions were already inducing a tendency towards regionalization and protectionism (Enderwick and Buckley, 2020), the uncertainty brought about by the Covid-19 crisis and the vulnerability of many complex and geographically widespread production networks, might produce an acceleration of these trends. Moreover, these elements interact with the irruption of new technologies related to Industry 4.0, leading to potentially disruptive effects on GVCs reconfiguration (UNCTAD, 2020).

3.1 New technologies, Industry 4.0 and GVCs

In the traditional international business view, technological advancements and ICTs innovations, were believed to encourage the internationalization of production by reducing transaction, coordination and communication costs (Alcácer et al., 2016; Chen and Kamal, 2016). The emergence of the so-called 4th industrial revolution is further deepening these trends. The technological changes related to Industry 4.0, often called New Industrial Revolution (NIR) technologies, include artificial intelligence (AI), Big Data, clouds, the Internet of Things (IoT), automation and 3D printing. So far, these technologies have impacted existing production networks only marginally, and mainly in advanced countries (UNCTAD, 2021).

While digitalization is already affecting many value chains, leading to larger “servicification” of manufacturing and increased importance of intangibles in GVCs, additional changes may be on the horizon (UNCTAD, 2020). Some studies argue that Industry 4.0 technologies adoption could trigger reshoring activities (e.g. Brennan et al., 2015, on IoT and additive manufacturing, and De Backer et al., 2018, on robotics).⁵ Clearly, the effects of the diffusion of these technological changes will likely differ depending on the type of technology and industry. The first structured study of the potential impacts of different categories of NIR technologies on international production is offered by UNCTAD *World Investment Report 2020* (UNCTAD, 2020).

In relation to automation, increasing availability and affordability of robotics and artificial intelligence solutions is likely to affect manufacturing value chains and raise the incentives to re-shore. This tendency would be reinforced by the increasing wages in offshore locations, reducing the role of labor cost arbitrage in location decisions, and tempting reshoring. However, investments in robots are

⁴ “China Plus One” is a business strategy of international companies that consists of diversifying the foreign countries in which they invest avoiding an overconcentration of investment in China. Indeed, following a large expansion of Western MNEs investment in China, since 2008 changing patterns of costs and international instability motivated many companies to look for a more diversified and secure business strategy. “What is the China-plus-one strategy?”, *Business Standard*, 26.7.2022, https://www.business-standard.com/podcast/international/what-is-the-china-plus-one-strategy-122072600052_1.html accessed 10.1.2023

⁵ Similarly, Dachs et al. (2019) find a positive correlation between relocation decisions and NIR technologies adoption by companies but conclude that actual back-shoring is occurring in only 4% of the 1700 European manufacturing firms analyzed.

highly capital-intensive, enjoy economies of scale and are likely to be feasible only for larger firms in advanced countries, possibly limiting the scope of reshoring to these countries. Moreover, the increased relevance of intellectual property rights (IPR) protection is likely to foster a shift towards internalization and more hierarchical and tightly controlled forms of GVCs governance. The replacement of low-skilled labor with robots is predicted to spread the value-added distribution along the chain across many chain segments, and to lift total value added (i.e. shifting the whole smiley curve upwards) due to productivity gains (UNCTAD, 2020). However, while automation represents a challenge for developing countries relying on their lower cost of labor to attract foreign investment, some of them are responding to the threat investing in automation themselves. This has occurred, for example, in Czech Republic, Slovakia, and Slovenia, and has allowed them to retain many foreign productions (Marin, 2020).

The diffusion of digitalization, that is spreading to affect all sectors of activity, is likely to reduce coordination and transaction costs. The IoT, clouds, digital platforms, AI and Big Data make possible and easier to manage, monitor and control complex activities from distant locations as well as to reach remote markets without a physical presence. Digital technologies may favor more effective and safer remote communication, coordination, and control, reducing the risks involved in offshoring. As a result, fragmentation can be further enhanced. Small and medium-sized enterprises, including those from developing countries, might benefit from enhanced access to GVCs, but probably more concentrated in low value-added activities. In fact, the high knowledge and data-intensive segments of production are likely to be internalized by MNEs, which can also count on greater capabilities to deal with and benefit from the related technologies. However, GVC integration may in turn foster the development of firm-level capabilities in Industry 4.0 related technologies, that are still very little frequent and widespread in developing countries' firms (Delera et al., 2022).

Finally, 3D printing is also beginning to change the configuration of production of some industries, but its effects are likely to remain confined to niche industries with relatively limited implications for most developing countries. However, for the affected sectors, 3D printing could generate a configuration of international production characterized by small-scale and localized production. It could in principle produce a paradigmatic change in international production, through the simultaneous effects of rebundling and offshoring, with shorter value chains but geographically dispersed and very proximate to final consumers. In selected sectors, mass customization is likely to prevail, with larger shares of value added derived from the design phase and from customer-related activities, at the opposite extremes of the value-added curve.

Overall, the magnitude of the shifts to come will depend on the specific industries considered and on the country contexts. Some technological elements will push for increased complexity and dispersion of value chains, others may make regional and local value chains more likely, opening opportunities for nearshore relocations. However, the increased capital and knowledge intensity implied by new technologies is likely to exacerbate value creation concentration along these chains, with access limited to fewer countries, often relatively more advanced.

3.2 Covid-19 crisis and the increasing uncertainty

The disruptive effects of the Covid-19 pandemic on the global economy are multidimensional. The new crucial element is the increasing uncertainty, leading some authors to foresee dramatic changes to the GVC model (e.g. Barbieri et al., 2020; Javorcik, 2020; WEF, 2020), and an overall reduction of global supply chain activity (Marin, 2020).

A new push to reshoring activities could come both from managerial strategies at the firm level and from governmental actions (Elia et al., 2021). The pandemic has highlighted the vulnerability to supply chains disruptions arising from a large reliance of companies on offshore producers, and the resulting lack of countries' self-sufficiency. The example of the excessive dependence on China for medical supplies and components of key industrial supply chains was made clear by the pandemic (Barbieri et al., 2020). Therefore, the search for GVC robustness and minimization of disruptions might lead to some back-shoring, or to regional cooperation and nearshoring if the cost implications of a full relocation of the supply chain within the countries' boundaries were excessive (Barbieri et al., 2020), helping to achieve that balance between efficiency and resilience that some have called for (Golgeci et al., 2020). Other firms, however, could not be able to take any of these steps, given the scale and nature of the upstream activities they have outsourced over the years.⁶

On the other hand, some observers claimed that the crisis has made clear the positive role of GVCs in handling disruptions in some key sectors. For example, analyzing the GVC of medical devices, Bamber et al. (2020) observe that particularly in the first stages of the virus diffusion, GVCs helped smoothen shortages in the countries more heavily affected by the pandemic. Internationally integrated buyers have been able to differentiate their supply sources of essential goods that had suddenly become strategic. For example, gloves imports from non-traditional exporters like Sri Lanka and Thailand spiked, as have hospital gowns from the Dominican Republic, Honduras, and Vietnam. In sum, international production networks would have contributed to increasing resilience and improving response to shocks. On the contrary, back- or nearshoring would have reduced the range of options and hence increased risk (Bamber et al., 2020).

In this regard, a recent paper by Miroudot (2020) discusses the fine differences between *robustness* and *resilience* in GVCs, and what they imply for business strategies. While robustness – i.e. avoiding disruptions altogether – might be preferable and necessary in the supply chains of essential products, in most other cases, resilience may be preferred. That is, due to cost considerations, companies in non-essential productions (e.g. non-medical suppliers) may accept to undergo occasional disruptions while increasing their ability to resume normal operations as swiftly as possible.

In any case, value chain design and the selection of most reliable suppliers and sites are expected to be important in companies' future strategy to build both resilience and robustness (ECLAC, 2020). With companies looking for more secure sources of supply, countries that aspire to attract new segments of international production must provide reliability. In this regard, the precarious attitude of some Latin American countries may have not produced an increase in their dependability. For example, the unplanned management of the crisis by the Mexican government generated high uncertainty for firms in the automotive sector undermining the trustworthiness of the whole country as a supplier (The Economist, 2020).⁷

⁶ Coyle D., 2022, "Rethinking Supply Chains", *Project Syndicate*, June 10, <https://www.project-syndicate.org/commentary/rethinking-global-supply-chain-model-by-diane-coyle-2022-06>, accessed 20.12.2022.

⁷ The Economist (2020). "Covid-19's blow to world trade is a heavy one." <https://www.economist.com/briefing/2020/05/14/covid-19s-blow-to-world-trade-is-a-heavy-one> accessed 10.1.2023.

4. Recent trends in the international productive integration of Latin America and the Caribbean (LAC)

Despite the increasing attention to firms' reshoring decisions, solid empirical evidence is still scarce. Data on the location of companies and lead-firm suppliers are not openly disclosed, and this has made it difficult to obtain consistent evidence beyond many anecdotal stories and some isolated surveys. However, while preliminary and imperfect, traditional trade statistics can provide important information about countries' integration in international production. Moreover, changing patterns at the macro level over time reveal the ultimate effects of companies' relocation decisions, and may usefully inform the discussion on nearshoring. To this purpose, in this section we present some statistics to proxy backshoring and nearshoring practices through trade in finished and in intermediate products, trade in value added, and trade relative to domestic demand in the US.

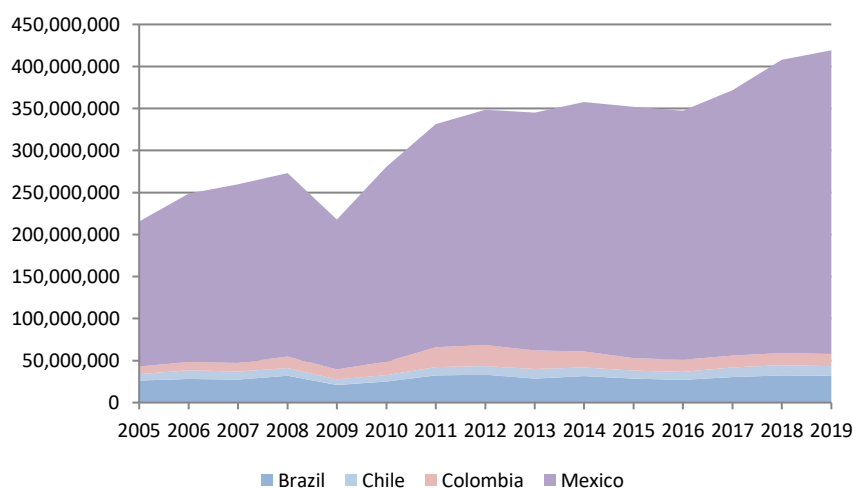
4.1 The relevance of LAC in US imports and shifting patterns

In our effort to find proxies to quantify the extent of nearshoring, we analyze bilateral data of US imports to explore if the macro-level evidence supports the hypothesis of nearshoring of US firms to LAC. Indeed, given current patterns of LAC integration in international production networks, the eventuality of nearshoring to Latin America would largely consist of US-owned MNEs shifting activities to the region. This could happen either as a shift from other previous offshore locations or as an expansion of MNEs activities seeking to diversify their supply chain to new sites. Either way, if nearshoring to Latin America is occurring, we would expect to see an increase of relative measures of US imports from the region.

Latin America and the Caribbean represent the second most important region in terms of imports for the US after China, followed by the EU27 and Canada. While imports from China fell after 2018, those from LAC stagnated between 2018-2019.

When looking at individual countries in LAC, the role of Mexico is clear, with Mexican imports accounting for almost 60% of total US imports from the region in 2005 and increasing to 76% in 2019 (Fig. 1).

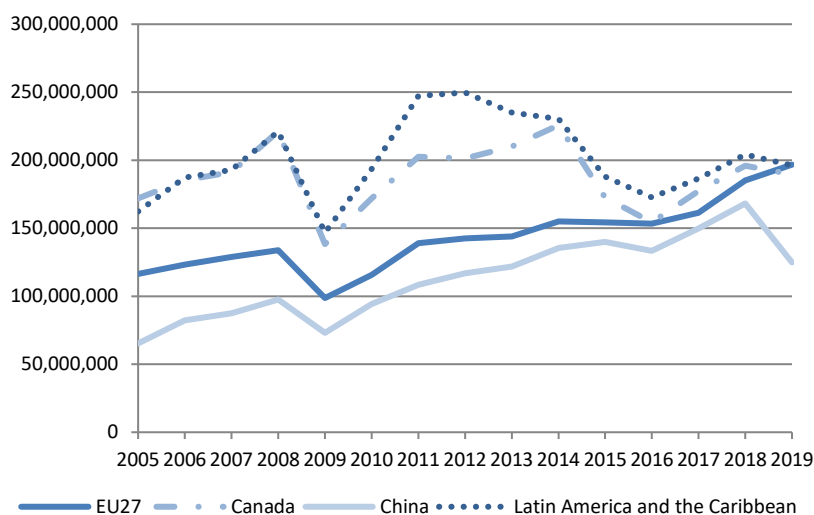
Figure 1 US gross imports from main exporter countries in LAC, thousands of USD (2005-2019)



Source: Authors' elaboration based on BTDIxE, ISIC Rev. 4 OECD and UNCTADSTAT

However, in a world dominated by internationally fragmented production processes considering only gross imports would be misleading. International trade often consists of intermediate products which are further processed in the importing country, and then eventually re-exported in a Global Value Chain logic. US imports of intermediates from LAC exceeded those from the EU27, China and Canada for most of the last fifteen years (Figure 2). However, they have been decreasing since 2012, differently from imports from the EU27. China’s moderate values relative to those of gross imports might be reflecting the prevalence of assembled goods for final consumption.

Figure 2 US intermediate imports from selected countries and regions, thousands of USD (2005-2019)



Source: Authors’ elaboration based on BTDIxE, ISIC Rev. 4 OECD and UNCTADSTAT

With respect to the relative participation of individual countries from the region, the figure mirrors that of gross imports (Fig. 1). Mexico leads followed by Brazil, and its relative importance is rising. Looking at US imports from different regions as a share of total US imports (Fig. 3) we can observe that the contribution of LAC has been decreasing, especially after 2012, both in terms of gross and intermediate imports. That is, in 2019 Latin American countries exported more value to the US compared to 2005 (Fig. 2), but they have not displaced other countries as US trading partners during this period. This figure appears to suggest that the relocation of US MNEs activities to Latin America, i.e. nearshoring, has been limited, except for Mexico, whose share of US total gross imports rose from 10 to more than 14 percent between 2005-2019. China has been a rising offshore destination until 2018, with a rapid fall thereafter (Fig. 3).

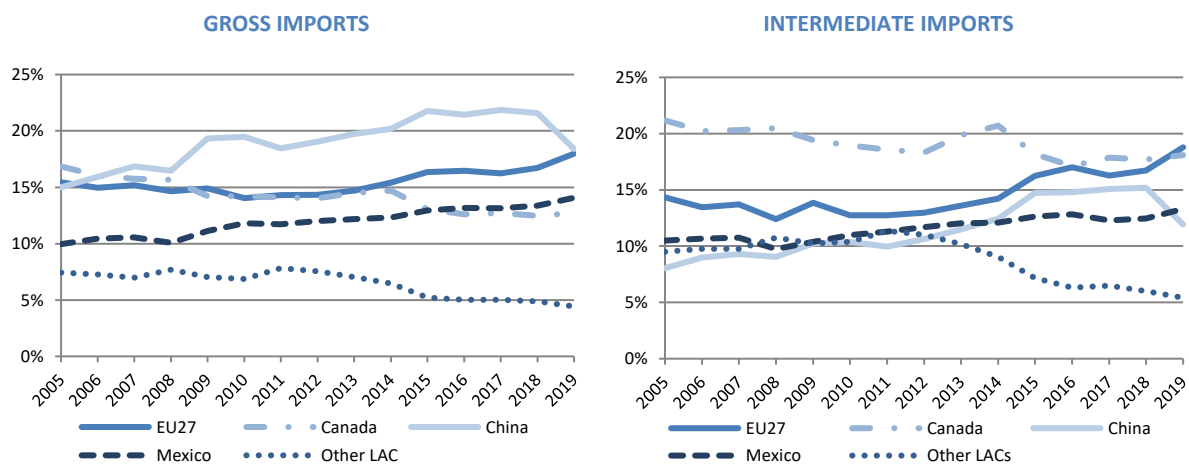
2.1 The share of US domestic demand served by imports as a proxy for reshoring

Another way to explore possible evidence of re-shoring by US MNEs is to consider the evolution of the share of US domestic demand served by imports.⁸ Indeed, the US import’s share of domestic demand gives an information on the relative relevance of other countries’ production in satisfying US final demand. For the hypothesis of increasing back-shoring to the US to be supported, we should observe a reduction in overall imports over domestic demand, meaning that internal consumption is increasingly satisfied by domestic production (displacing foreign productions carried out abroad, either by US subsidiaries, US MNEs’ suppliers, or foreign firms). On the other hand, shifting shares of

⁸ In this exercise, we follow De Becker et al., 2016.

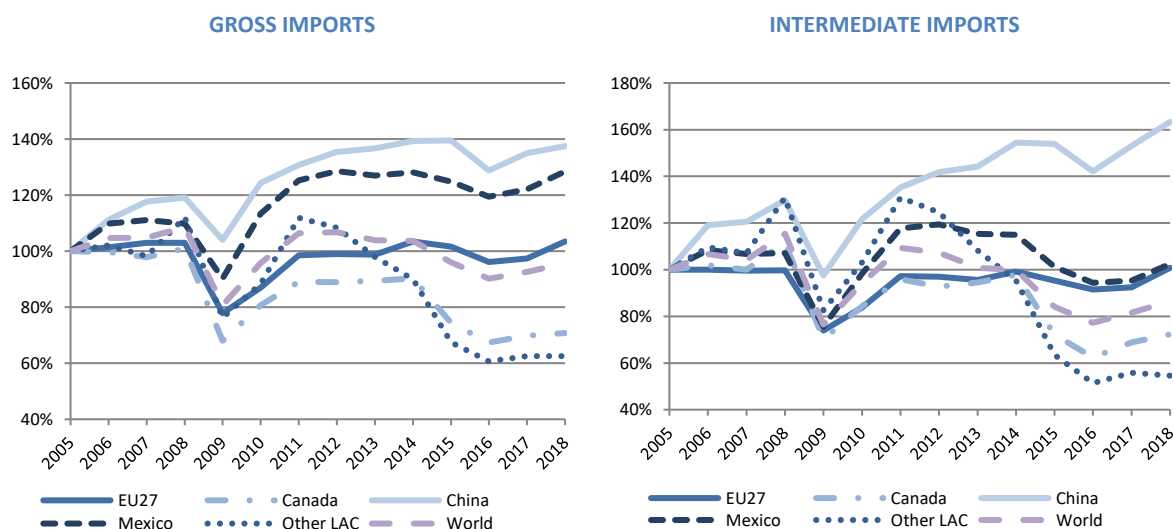
production carried out in different countries to serve US demand would be a proxy for the relocation of MNEs activities, and possibly for nearshoring.

Figure 3 US imports from selected countries and regions, share of US total gross imports, percentages (2005-2019)



Source: Authors' elaboration based on BTDixE, ISIC Rev. 4 OECD and UNCTADSTAT

Figure 4 Evolution in the share of US imports as a percentage of domestic demand (2005-2018, 2005=100)



Source: Authors' elaboration based on BTDixE, ISIC Rev. 4 OECD and UNCTADSTAT. Note: Other LAC = other Latin American countries

Looking at the evidence, we observe that the share of US domestic demand served by Canada (both gross and intermediate imports) is substantially declining during 2005-2018, while EU27 shares have remained stable (Fig. 4). Moreover, the share of US domestic demand satisfied by foreign production does not show a substantial decline, at least in terms of gross imports, thereby not supporting the hypothesis of overall back-shoring from US MNEs. Particularly striking is the evolution of imports from China. The share of US demand served by Chinese gross imports increased 40% from the baseline year, and even more for intermediate goods imports. Thus, China not only remains an important location for foreign activities of US MNEs, but it is also possibly changing the quality of its contribution, moving from a production based mainly on assembly of products to the export of intermediates to be further processed in the US.

Conversely, the share of US final demand served by gross imports from Mexico has been rising about 30%, but has remained overall stable for intermediate imports (Fig. 4). These patterns, while providing some evidence supporting the hypothesis of nearshoring to Mexico, also suggest that Mexico has become an increasingly important source of finished products to fulfill US demand. This figure lends itself to different interpretations. On the one hand, it could hide an exacerbation of the negative aspects of the Mexican maquila, with rising exports of final assembled products and possibly lower value added. On the other hand, this larger increase in gross exports relative to that of intermediate products might indicate an increase in the level of processing of Mexican products serving the US market. In this case, the implication would be opposite, with Mexico contributing to further crafting exported products, entering new stages of the value chain, and adding more value. More detailed data on trade in value added and GVCs statistics would be needed to offer a definite answer.

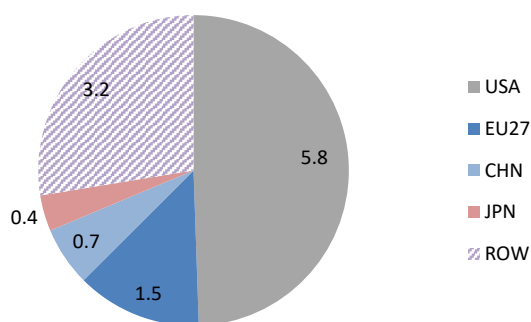
However, US gross and intermediate imports from all other LAC countries fell about 40%, suggesting no evidence of relocation of activities of US MNEs to LAC during 2005-19.

2.2 Fragmentation of production and trade in value-added

The fragmentation of production that has occurred since the last decades of the twentieth century has led to a fast growth of GVCs, with intermediate goods and services crossing several borders. This urged the interpretation of international trade as a trade in tasks, with countries specializing in “slices” of the value chain, and the ensuing necessity to measure trade differently, to avoid double counting and other mistakes (Baldwin and Lopez-Gonzalez, 2015). Indeed, value added is not evenly distributed along the chain, and an analysis of different countries’ value-added contribution is required to gain precise insights on international production integration, and its localization.

First, we observe that, excluding intra-region trade, the US were the main importer of LAC’s value added in 2015 (Fig. 5). This figure reinforces the expectation that, if nearshoring to the region is to occur, it is probable that it would involve US companies. When taking a closer look at different countries in Latin America however, we find significant differences across countries (Fig. 6). While for Mexico and Costa Rica the US imports a significantly higher-than-average share of value added (over 13 and 8 percent respectively), for countries in South America imports from other Latin American economies are particularly relevant. This finding is in line with the observation that while in Latin America value chains are more global than regional, regional linkages are significantly more important in Southern than in Central America (Cadestin et al., 2016 and World Bank, 2020).

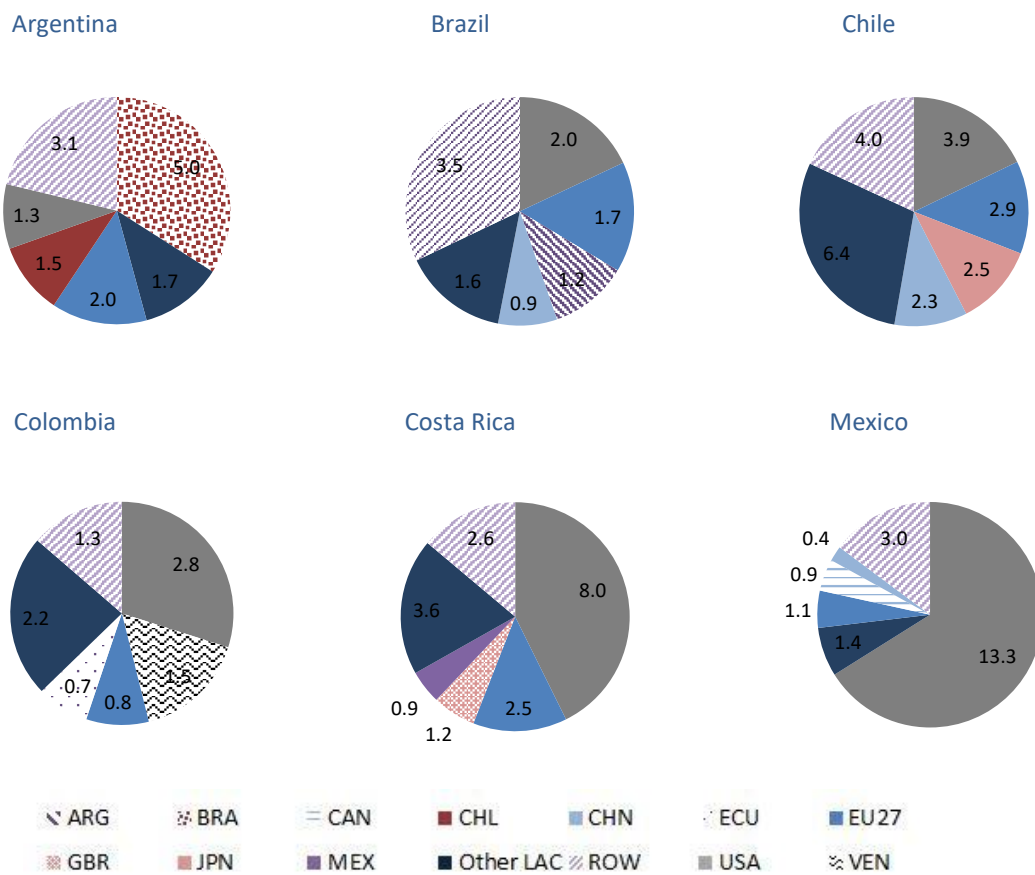
Figure 5 Foreign importers of Latin American value added in 2015 (% of value added produced)



Source: Authors’ elaboration based on EORA 199.82

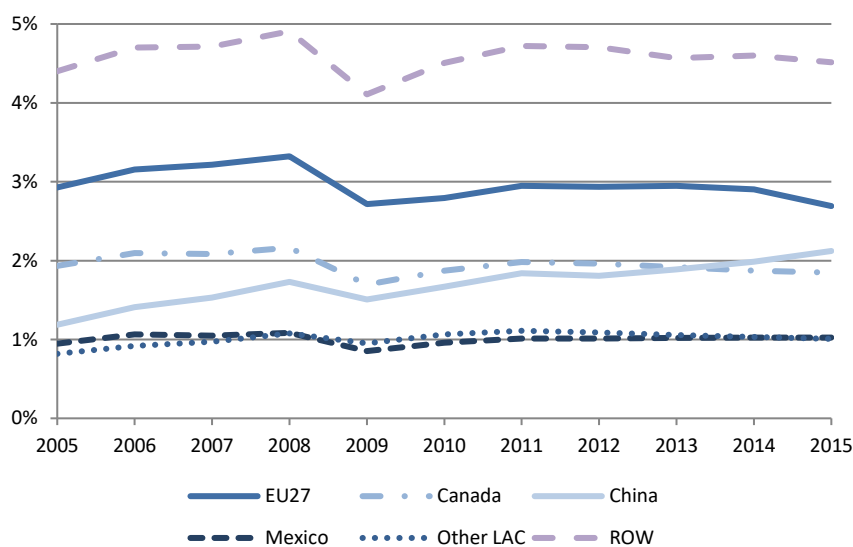
When taking the perspective of the US, that is, when observing the source of foreign value added used to satisfy US demand (Fig. 7), we observe similar results as in the analysis of US imports (Fig. 4). The EU27, China and Canada are the main foreign contributors to value added absorbed by the US in 2015. LAC contributes a mere 2%, with half of the value being explained by Mexico. More important for our discussion on nearshoring is the finding that not only Chinese exports to the US are rising, but also their value is. This suggests that the divergence between gross and intermediate flows observed should probably be interpreted as an upgrading of Chinese producers to higher value-added stages of the value chain. Conversely, the rather flat curve of Mexican value added into the US, suggests that the increase in Mexican exports to the US is not being accompanied by an upgrading in Mexican productions.

Figure 6 Foreign importers of value added produced in selected Latin American countries in 2015 (% of value added produced)



Source: Authors' elaboration based on EORA 199.82. Note: ARG = Argentina; BRA = Brazil; CHL = Chile; CHN = China; ECU = Ecuador; GBR = United Kingdom; JPN = Japan; MEX = Mexico; Other LAC = other Latin American countries; ROW = Rest of the world; USA = United States; VEN = Venezuela.

Figure 7 Source of foreign value-added serving US domestic demand (2005-2015, percentages)



Source: Authors' elaboration based on EORA 199.82.

3. How can developments in reshoring and nearshoring play out in LAC? Reshoring Readiness in the region

We have observed how reshoring and nearshoring practices are still rather limited in Latin American and Caribbean countries. Can we expect that this trend may be reversed soon? Are LAC economies prepared for this event to occur?

As we discussed in section 2, many factors contribute to determine MNEs' and lead firms' location and relocations decisions. While some traditional determinants (e.g. costs) remain crucial, others are gaining importance due to technological changes and to the new policies and contexts (Elia et al. 2021, Conley, 2022). Therefore, reshoring prospects would depend on several characteristics and assets available in each country, that determine the "Reshoring Readiness" of a country. These also include the factors influencing a country's capacity to maximize the possible benefits, together with those related to the country's attractiveness for companies' reshoring. In table 2 we analyze Latin American countries' "Reshoring Readiness" and compare it with the US and China.

Digitalization

One crucial element of the new scenario is digitalization. Indeed, the digitalization of production processes offers the potential to reduce the importance of costs in location decisions, and changes the determinants of countries' location attractiveness. According to the Digital Adoption Index (DAI), a composite measure of the digital technologies spread across the key agents in an economy – people, business and governments – LAC overall adoption of digital technologies is 30% lower than in the United States. However, substantial differences are observed within the region, with some countries showing digital adoption at a level similar or even higher (i.e. Chile) than that of the United States and some other countries, particularly across Central America and the Caribbean, lagging behind (Table 2). When decomposing the index across different user groups it becomes evident that the business sector is the largest user of digital technologies, while they are less adopted by governments and individuals. However, almost 65% of the LAC's population regularly used the Internet in 2019, a proxy for the level

of human capital in digitalization. Again, high heterogeneity exists in the region. Central American and some South American countries, such as for example Bolivia, Guyana and Suriname, should enhance the spread of digital technologies to start filling the gap.

Logistics and production costs

The initial miscalculation of the total costs of offshoring has been highlighted by the literature as a possible driver of the early processes of offshoring. The costs of management, logistical and operational problems related to offshoring started to be assessed more carefully recently. We use the Logistic Performance Index, a composite indicator ranging between 1 and 5, to assess the comparative logistic performance of LAC countries based on six dimensions: the efficiency of customs clearance process, the quality of trade- and transport-related infrastructure, the ease of arranging competitively priced shipments, the quality of logistics services, the ability to track and trace consignments, and the frequency with which shipments reach the consignee within the scheduled time. The overall indicator places LAC in a mid-table, unfavorable position. Only Chile and Panama, and to a lesser extent Mexico and Colombia have logistic performances competitive with those of China and the United States. As supply-chain related operational factors gain more relevance in location decisions, improving infrastructure and logistic services quality as well as transport efficiency in the region will become increasingly important to maintain competitiveness in international production networks.

Human capital and science, technology, and innovation systems

The co-location of research and productive activities has been considered as an important factor in enabling virtuous user-producer relations and beneficial feedbacks for innovation (Pisano and Shih, 2009). The literature on reshoring studies this as a possible determinant of back-shoring practices, as advanced countries' MNEs might want to reunite the R&D and production stages of the value chain at home (De Backer et al., 2016). The need for advanced capabilities to be employed in this knowledge-intensive stage of the value chain, together with the fear of losing the exclusiveness of specific expertise – particularly in countries with low levels of intellectual property rights protection – has motivated the belief that these circumstances would favor back-shoring rather than nearshoring practices. However, as some few successful experiences demonstrate (e.g. Intel in Costa Rica), countries that can offer a substantial supply of highly-skilled and cheaper human capital are in a better position to compete for the attraction of high-value knowledge-intensive activities.

The Human Capital Index, calculated by the World Bank to measure the productivity of a future worker based on its health and education, is lower in LAC than in other advanced countries, but at a level comparable with that of China. Some countries in South America, particularly Argentina, Chile, and Peru and to a lesser extent Brazil, also present a significant share of adult population having completed upper secondary education. Thus, some Latin American countries offer reasonable numbers of skilled and specialized workers.

Not only countries might supply trained and educated workers to be employed in foreign-owned R&D activities, but they can also be themselves home to scientific research that can potentially attract higher value segments of production. However, when analyzing data on R&D expenditure as a percentage of GDP, we find that this share in LAC is only 30% the level of China, and 23% that of the United States. In the region Brazil is the only significant exception with a share of GDP spent in R&D activities of 1.26 in 2017. Data on researchers per million inhabitants confirm this figure, that in LAC are about one tenth the United States' level and less than half of China. Relevant exceptions are Argentina, Brazil and Uruguay. Central American countries and even Mexico lag substantially behind. If the region wants to become competitive in higher value segments of production and leverage the

increasingly recognized importance of rebundling research with production activities, future policies should focus on strengthening Latin American science, technology and innovation systems.

Table 2 Indicators of Reshoring Readiness. South America, Central America and the Caribbean, China and United States

Variable	Digital Adoption Index (DAI)	Individuals using the Internet	Logistics Performance Index (LPI)	Human Capital Index (HCI)	Upper secondary educational attainment	R&D expenditure	Researchers per million inhabitants	Intellectual Property Rights	Resilience Index	Remoteness Index (RI)
Domain	Digitalization	Human Capital/Digitalization	Logistics	Human Capital	Human Capital	Science, Tech. & innovation	Science, Tech. & innovation	IPR protection	Risk	Proximity to markets
Unit of Measure	0-1	% of population	1-5	0-1	% of adult population	% of GDP	absolute values	0-10	0-100	0-1
South America										
ARG	0.69	74.29	2.89	0.60	37.20	0.54 ^(b)	1192.23 ^(b)	5.40	52.79	0.55
BOL	0.48	43.83	2.36	..	18.60 ^(d)	..	..	4.20	26.27	0.56
BRA	0.68	67.47	2.99	0.55	30.90	1.26 ^(b)	887.68 ^(e)	6.16	52.21	0.51
CHL	0.76	82.33	3.32	0.65	37.10 ^(b)	0.36 ^(b)	493.29 ^(b)	6.50	60.68	0.55
COL	0.64	65.01	2.94	0.60	28.50	0.24	88.02 ^(b)	6.25	49.54	0.53
ECU	0.57	57.27	2.88	0.59	29.60 ^(b)	0.44 ^(e)	399.49 ^(e)	5.33	35.78	0.54
GUY	0.36	37.33	2.36	0.50	..	..	..	..	..	0.48
PRY	0.54	68.52	2.78	0.53	24.10	0.15 ^(b)	135.14 ^(b)	3.83	41.54	0.57
PER	0.55	59.95	2.69	0.61	36.10	0.13	..	4.92	44.02	0.56
SUR	0.49	48.95	..	..	13.80 ^(g)	..	..	..	..	0.48
URY	0.76	76.95	2.69	0.60	17.10	0.48	696.38	4.91	63.50	0.53
VEN	0.49	72.00	2.23	..	26.50 ^(c)	0.34 ^(e)	300.26 ^(c)	2.48	8.86	0.53
Central America and the Caribbean										
ATG	0.48	76.00	..	0.60	..	..	..	..	..	..
BHS	0.53	85.00	2.53	..	50.00 ⁽ⁱ⁾
BRB	0.65	81.76	..	..	..	..	..	..	..	0.43
BLZ	0.40	47.08	..	..	19.40 ⁽ⁱ⁾
CRI	0.66	81.20	2.79	0.63	17.40	0.42 ^(b)	380.41 ^(b)	6.35	52.18	0.53
CUB	0.24	61.84	2.20	..	26.70 ^(g)	..	..	..	..	..
DMA	0.50	69.62	..	0.54	..	..	..	..	..	..
DOM	0.50	74.82	2.66	0.50	26.10 ^(c)	..	..	4.71	41.42	0.49
SLV	0.50	33.82	2.58	0.55	21.70 ^(b)	0.18 ^(b)	63.71 ^(b)	4.36	28.44	0.53
GRD	0.53	59.07	..	0.57	..	..	..	..	..	..
GTM	0.52	65.00	2.41	0.46	16.30 ^(e)	0.03 ^(b)	14.01 ^(b)	4.51	24.83	0.54
HTI	0.25	32.47	2.11	0.45	..	..	..	4.05	0.00	..
HND	0.43	31.70	2.60	0.48	13.20	0.04 ^(b)	..	4.48	25.08	0.54
JAM	0.50	55.07	2.52	0.53	..	..	..	6.09	..	0.50
MEX	0.60	70.07	3.05	0.61	19.20	0.31	315.26 ^(c)	5.95	48.82	0.54
NIC	0.46	27.86	..	0.51	..	0.11 ^(d)	..	3.94	24.08	0.55
PAN	0.57	63.63	3.28	0.50	20.10 ⁽ⁱ⁾	0.15 ^(b)	39.11 ^(f)	5.38	49.18	0.50
KNA	0.53	80.71	..	0.59	..	..	..	..	..	..
LCA	0.40	50.82	..	0.60	24.60 ^(f)	..	..	..	..	..
VCT	0.50	22.39	..	0.53	32.80 ^(b)	..	..	..	..	..
TTO	0.59	77.33	2.42	0.60	43.60 ^(h)	..	..	6.00	40.60	0.46
Average LAC, China and US										
LAC	0.52	64.29 ^(a)	2.66	0.56	24.86	0.67	515.40 ^(b)	5.04	38.49	0.52
CHN	0.59	54.30	3.61	0.65	13.50 ⁽ⁱ⁾	2.19	1307.12	6.02	47.93	0.48
USA	0.75	87.27	3.89	0.70	44.60	2.84	4412.40	8.69	90.30	0.41

Note: South America: ARG = Argentina; BOL = Bolivia; BRA = Brazil; CHL = Chile; COL = Colombia; ECU = Ecuador; GUY = Guyana; PRY = Paraguay; PER = Peru; SUR = Suriname; URY = Uruguay; VEN = Venezuela. Central America and the Caribbean: ATG = Antigua and Barbuda; BHS = Bahamas; BRB = Barbados; BLZ = Belize; CRI = Costa Rica; CUB = Cuba; DMA = Dominica; DOM = Dominican Republic; SLV = El Salvador; GRD = Grenada; GTM = Guatemala; HTI = Haiti; HND = Honduras; JAM = Jamaica; MEX = Mexico; NIC = Nicaragua; PAN = Panama; KNA = St. Kitts and Nevis; LCA = St. Lucia; St. Vincent and the Grenadines = VCT; TTO = Trinidad and Tobago; LAC = Latin America and the Caribbean; CHN = China; USA = United States.

(a) Data from 2018; (b) Data from 2017; (c) Data from 2016; (d) Data from 2015; (e) Data from 2014; (f) Data from 2013; (g) Data from 2012; (h) Data from 2011; (i) Data from 2010. All other data refer to the most recent available year of each dataset. LAC data are drawn from the original source or calculated as the simple average of all LAC countries for which data are available.

Intellectual Property Rights

Another factor of concern that can limit the attraction of knowledge-intensive segments of production is the weakness of intellectual property rights (IPR). However, this factor is highly controversial. If on the one hand IPR security might be a stimulus to private business research, it can also limit the diffusion and spillovers of innovation to the wider economy. In an index ranging from 0 to 10, IPR protection is given an average score of 5 in LAC. Brazil, Chile and Colombia, together with Jamaica, Costa Rica and Trinidad and Tobago, reach the higher scores. However, most LAC countries are considered to insufficiently enforce IPR protection, and this may discourage EU and US MNEs from relocating some activities to the region. Argentina, Brazil and Ecuador are included in the priority 3 list of the EU, but considered more reliable than China and India, included in the priority 1 and priority 2 lists respectively (European Commission, 2020). Conversely, the US consider Argentina, Chile and Venezuela as dangerous as the two Asian countries and include them in the priority watch list; other ten LAC countries are also in their watch list (Office of the United States Trade Representative, 2020). Ultimately, while some IPR protection should be guaranteed to earn the trust of MNEs, a balanced stance would probably maximize benefits. If a country offers other elements of attractiveness, a moderate level of IPR protection might not hamper relocations. Indeed, the low level of IPR protection in China and India, as in other Asian countries, has not prevented offshoring to these countries, considering that other substantial advantages prevail.

Risk and resilience

Resilience has become a very much used and eventually abused term during the recent pandemic. What is certainly true is that the reduction of the risk related to disruptions and the capacity to speed up the resume of operations after shocks have gained priority in international business. As firms look for increasingly reliable locations for their foreign productions, a resilience index providing an indication of countries' enterprises ability to recover after disruptive events gives a good measure of countries' attractiveness. The resilience index calculated by FM Global presented in table 2 is based on twelve core drivers pertaining to three major factors: economic, risk quality and supply chain factors. Overall, Latin America scores 38.5 on average on a scale of 0-100. This value is substantially lower than that of the United States (90.3) and also of China (47.9). However, many individual countries show significantly better performances, notably Uruguay, Chile, Argentina, Brazil, Costa Rica, Mexico, and Panama. The main weakness of the region appears to be related to the "Risk quality score". The inherent level of countries' exposure to natural hazards makes Latin America more vulnerable than other regions. However, increased quality and enforcement of building codes and standards may reduce vulnerability. Finally, supply chain-related factors, while not the main cause of weakness, score substantially far from the performance of China. As noted above, the increased efficiency of logistics may usefully interact with risk and resilience considerations and enhance the attractiveness to foreign investors.

Flexibility and proximity to markets

The level of flexibility and proximity to the market offered by alternative locations has become an increasingly relevant factor in shoring decisions. To increase flexibility and reduce the lead times of their products to the final consumers a number of European firms have already nearshored from China

to Eastern Europe or directly backshored at home.⁹ As most of LAC is not geographically close to many other countries, the majority of the region would in principle lack this factor of attractiveness. However, in a highly globalized world where new technologies are increasingly connecting people and countries regardless geographical distance, the proximity to markets concept becomes more nuanced. While geographical distance surely matters in influencing lead times and agility of transport, digitalization adoption and logistic capabilities can substantially affect the final perceived flexibility of operations and proximity to markets (Sturgeon et al., 2017). The remoteness index in table 2 measures this expanded concept of distance and includes – other than geographical proximity – broadband capacity, logistics capabilities and trading across borders’ time. According to the index, Latin American proximity to other markets is lower than that of the United States, but overall close to that of China. Ultimately, while geographical distance might hamper relocations particularly in those sectors where it acquires particular importance, Latin American distance to other markets does not seem to be insurmountable. Investments to improve logistics, infrastructure and new technology adoption could certainly help.

In sum, our preliminary analysis suggests that the “Reshoring Readiness” of Latin America is still limited. Many areas of weakness remain, from the diffusion of digital technologies to the quality of the logistics infrastructure and of the innovation systems.

4. Conclusions. What possible framework for public policies?

In this paper we discussed the emerging trend of reshoring of international productions, focusing on the current and likely dynamics of nearshoring to LAC. We reviewed the different approaches of the literature to these phenomena, the driving forces, and the implications for GVCs reconfigurations. We analyzed trade and value added to conclude that nearshoring to the region is still occurring to a limited extent. Finally, we proposed a measure of the “Reshoring Readiness” of the region, to highlight the areas of major strength and weakness in attracting and benefitting from relocations.

Our study reveals that very limited nearshoring of US firms to LAC has occurred so far. While LAC is not displacing other regions in this regard, Mexico is a relevant exception. However, even if Mexico is gaining importance in terms of gross and intermediate imports to the US, the analysis of trade in value added reveals that no major upgrading in Mexican productions appears to be occurring. Moreover, given that the LAC region, and particularly the Southern countries, is not near other more advanced regions, nearshoring from the US or MNEs from other developed countries still appears to have a limited potential. Moreover, the “Reshoring Readiness” of Latin America still suffers from substantial areas of weakness, from the diffusion of digital technologies to the quality of the logistics infrastructure and of the innovation systems. A deeper regional integration in South America could be leveraged, and a strengthening of regional value chains could be a viable alternative to increase international production ties and stimulate the internationalization of local suppliers. In turn, however, this would require policies at the international, national, and sub-national levels. In this regard, international policy coordination, as well as better and harmonized standards and regulations would certainly help.

⁹ <https://reshoring.eurofound.europa.eu/> accessed on 20.12.2022.

Appendix

Attractiveness indicators description and data sources

Variable	Domain	Description	Source	Year
Digital Adoption Index (DAI)	Digitalization	The Digital Adoption Index (DAI) is a composite index measuring the extent of spread of digital technologies. It is based on three sectoral sub-indices to measure digital technology adoption by the key agents in an economy: people, businesses (firms), and governments.	WB	2016
Individuals using the Internet	Human Capital/Digitalization	Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc.	International Telecommunication Union (ITU)	2019
Logistics Performance Index	Logistics	The Logistics Performance Index reflects perceptions of a country's logistics based on six dimensions: efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time.	World Bank and Turku School of Economics, Logistic Performance Index Surveys.	2018
Human Capital Index (HCI)	Human Capital	The HCI calculates the contributions of health and education to worker productivity. The final index score measures the productivity as a future worker of child born today relative to the benchmark of full health and complete education.	WB - HCI	2020
Upper secondary educational attainment	Human Capital	Educational attainment refers to the highest level of education that an individual has completed. The percentage of adult (25 years or older) population that completed the "upper secondary" education is the percentage of adults that completed higher level education to prepare for tertiary education or obtain specialized skills relevant to employment.	UNESCO (UIS)	2018
R&D expenditure	Science, technology and innovation	Gross domestic expenditure on R&D (GERD) as a percentage of GDP is the total intramural expenditure on R&D performed in the national territory during a specific reference period expressed as a percentage of GDP of the national territory.	UNESCO (UIS)	2018
Researchers per million inhabitants	Science, technology and innovation	Number of professionals engaged in the conception or creation of new knowledge (who conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods) during a given year expressed as a proportion of a population of one million.	UNESCO (UIS)	2018
Intellectual Property Rights	IPR protection	The Intellectual Property Rights (IPR) index is calculated based on three components: (i) protection of intellectual property rights, (ii) patent protection and (iii) copyright piracy. Data related to the first dimension are drawn from the WEF Executive Opinion Survey. Data related to patent protection are drawn from the Patent Rights Index, while information about copyright piracy is derived by the BSA Global Software Survey. The three items are merged to calculate the IPR index by the Property Rights Alliance.	Property Rights Alliance	2020
Resilience Index	Risk	Summary measure of resilience that provides an indication of countries' relative firm resilience to disruptive events. The overall index is a composite measure including three major factors: economic factors (productivity, political risk, oil intensity and urbanization rate), risk quality (exposure to natural hazards, natural hazards risk quality, fire risk quality, cyber risk) and supply chain (control of corruption, quality of infrastructure, corporate governance and supply chain visibility).	FM Global	2020
Remoteness Index (RI)	Proximity to markets	Measure of remoteness incorporating both geographical distance and an expanded measure of distance including broadband capacity, logistic capabilities and trading across borders' time.	Sturgeon et al., 2017	2015

References

- Alcácer, J., Cantwell, J., & Piscitello, L. (2016). Internationalization in the information age: A new era for places, firms, and international business networks? *Journal of International Business Studies* Vol.47, 499–512 <https://doi.org/10.1057/jibs.2016.22>
- Ancarani, A., Di Mauro, C., Fratocchi, L., Orzes, G., & Sartor, M. (2015). Prior to reshoring: A duration analysis of foreign manufacturing ventures. *International Journal of Production Economics*, 169, 141-155.
- Ashby, A. (2016). From global to local: reshoring for sustainability. *Operations Management Research*, 9(3-4), 75-88.
- Baldwin, R. (2016) The World Trade Organization and the Future of Multilateralism. *Journal of Economic Perspectives*, 30 (1): 95-116. [DOI: 10.1257/jep.30.1.95](https://doi.org/10.1257/jep.30.1.95)
- Baldwin, R., & Lopez-Gonzalez, J. (2015). Supply-chain trade: A portrait of global patterns and several testable hypotheses. *The world economy*, 38(11), 1682-1721. <https://doi.org/10.1111/twec.12189>
- Bamber, P, Fernandez-Stark, K., & Taglioni, D. (2020). Why global value chains remain essential for COVID-19 supplies. Voxeu.org at: <https://voxeu.org/content/why-global-value-chains-remain-essential-covid-19-supplies> accessed 12.31.2020.
- Barbieri, P., Boffelli, A., Elia, S., Fratocchi, L., Kalchschmidt, M., & Samson, D. (2020). What can we learn about reshoring after Covid-19? *Operations Management Research*, 13(3), 131-136. <https://doi.org/10.1007/s12063-020-00160-1>
- Buckley, P. J., & Casson, M. (1976). A long-run theory of the multinational enterprise. In *The future of the multinational enterprise* (pp. 32-65). Palgrave Macmillan, London.
- Cadestin, C., Gourdon, J., & Kowalski, P. (2016). Participation in global value chains in Latin America: Implications for trade and trade-related policy. DOI: 10.13140/RG.2.2.20501.32481
- Casson, M. (Ed.). (2013). *The Growth of International Business (RLE International Business)*. Routledge.
- Chang, H. J., & Andreoni, A. (2020). Industrial policy in the 21st century. *Development and Change*, 51(2), 324-351.
- Chen, W., & Kamal, F. (2016). The impact of information and communication technology adoption on multinational firm boundary decisions. *Journal of International Business Studies*, 47(5), 563-576.
- Dachs, B., & Zanker, C. (2015). Backshoring of production activities in European manufacturing.
- Dachs, B., Kinkel, S., & Jäger, A. (2019). Bringing it all back home? Backshoring of manufacturing activities and the adoption of Industry 4.0 technologies. *Journal of World Business*, 54(6), 101017. DOI: 10.1016/j.jwb.2019.101017
- Dachs, B. & Kinkel, S. (2013). *Backshoring of production activities in European manufacturing – Evidence from a large-scale survey*. Conference: 20th International Annual EurOMA Conference. Dublin, Ireland.
- De Backer, K., DeStefano, T., Menon, C., & Suh, J. R. (2018). Industrial robotics and the global organisation of production. DOI: 10.1787/dd98ff58-en
- De Backer, K., et al. (2016), "Reshoring: Myth or Reality?", *OECD Science, Technology and Industry Policy Papers*, No. 27, OECD Publishing, Paris, <https://doi.org/10.1787/5jm56frbm38s-en>.
- Delera M., Pietrobelli C., Calza E. and Lavopa A., 2020, "Does value chain participation facilitate the adoption of industry 4.0 technologies in developing countries?", UNU-MERIT Working Paper #2020-046, <https://www.merit.unu.edu/publications/working-papers/abstract/?id=8660>
- Dunning, J. H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of international business studies*, 11(1), 9-31. <https://doi.org/10.1057/palgrave.jibs.8490593>
- Dunning, J. H. (1988). The theory of international production. *The International Trade Journal*, 3(1), 21-66. <https://doi.org/10.1080/08853908808523656>
- Dunning, J. H. (1998). Location and the multinational enterprise: a neglected factor? *Journal of International Business Studies*, 29(1), 45-66. <https://doi.org/10.1057/palgrave.jibs.8490024>
- Dunning, J. H. (2000). The eclectic paradigm as an envelope for economic and business theories of MNE activity. *International business review*, 9(2), 163-190.

- Dunning, J. H., & Lundan, S. M. (2008). *Multinational enterprises and the global economy*. Edward Elgar Publishing.
- Dunning, J. H., & Rugman, A. M. (1985). The influence of Hymer's dissertation on the theory of foreign direct investment. *The American Economic Review*, 75(2), 228-232.
- ECLAC (2020). *Sectors and businesses facing COVID-19: Emergency and reactivation*. Santiago: The United Nations.
- Elia, S., Fratocchi, L., Barbieri, P., Boffellid, A., & Kalchschmidt, M. (2021). Post-pandemic reconfiguration from global to domestic and regional value chains: the role of industrial policies. <https://doi.org/10.18356/2076099x-28-2-3>
- Ellram, L.M. (2013). Offshoring, Reshoring and the Manufacturing Location Decision. *Journal of Supply Chain Management*, 49(2), 3–5. [doi:10.1111/jscm.12023](https://doi.org/10.1111/jscm.12023)
- Ellram, L.M.; Tate, W.L. & Petersen, K.J. (2013). Offshoring and Reshoring: An Update on the Manufacturing Location Decision. *Journal of Supply Chain Management*, 49(2), 14–22. [doi:10.1111/jscm.12019](https://doi.org/10.1111/jscm.12019)
- Enderwick, P., & Buckley, P. J. (2020). Rising regionalization: will the post-COVID-19 world see a retreat from globalization?. *Transnational Corporations Journal*, 27(2). <https://doi.org/10.18356/8008753a-en>
- European Commission (2020). Report on the protection and enforcement of intellectual property rights in third countries, Commission Staff Working Document.
- Foerstl, K., Kirchoff, J. F., & Bals, L. (2016). Reshoring and insourcing: drivers and future research directions. *International Journal of Physical Distribution & Logistics Management*. Vol. 46 No. 5, pp. 492-515. <https://doi.org/10.1108/IJPDLM-02-2015-0045>
- Fratocchi, L., Ancarani, A., Barbieri, P., Di Mauro, C., Nassimbeni, G., Sartor, M., & Zanoni, A. (2015). Manufacturing back-reshoring as a nonlinear internationalization process. In *The future of global organizing*. Emerald Group Publishing Limited.
- Fratocchi, L., Di Mauro, C., Barbieri, P., Nassimbeni, G., & Zanoni, A. (2014). When manufacturing moves back: Concepts and questions. *Journal of Purchasing and Supply Management*, 20(1), 54-59. <https://doi.org/10.1016/j.pursup.2014.01.004>
- Gereffi, G., & Lee, J. (2012). Why the world suddenly cares about global supply chains. *Journal of supply chain management*, 48(3), 24-32.
- Golgeci, I., Yildiz, H. E., & Andersson, U. R. (2020). The rising tensions between efficiency and resilience in global value chains in the post-COVID-19 world. *Transnational Corporations Journal*, 27(2). <https://doi.org/10.18356/99b1410f-en>
- Gray, J. V., Esenduran, G., Rungtusanatham, M. J., & Skowronski, K. (2017). Why in the world did they reshore? Examining small to medium-sized manufacturer decisions. *Journal of Operations Management*, 49, 37-51.
- Gray, John V.; Skowronski, Keith; Esenduran, Gökçe; Johnny Rungtusanatham, M. (2013). *The Reshoring Phenomenon: What Supply Chain Academics Ought to know and Should Do*. *Journal of Supply Chain Management*, 49(2), 27–33. [doi:10.1111/jscm.12012](https://doi.org/10.1111/jscm.12012)
- Gylling, M., Heikkilä, J., Jussila, K., & Saarinen, M. (2015). Making decisions on offshore outsourcing and backshoring: A case study in the bicycle industry. *International Journal of Production Economics*, 162, 92-100.
- Hymer, S. H. (1976). *International operations of national firms*. MIT press.
- Javorcik B. (2021). Reshaping of global supply chains will take place, but it will not happen fast, *Journal of Chinese Economic and Business Studies*, <https://doi.org/10.1080/14765284.2020.1855051>
- Javorcik, B. (2020). Global supply chains will not be the same in the post-COVID-19 world. In Baldwin R.E., Evenett S.J. (Eds.), *COVID-19 and Trade Policy: Why Turning Inward Won't Work*, CEPR Press, 111-116.
- Kinkel, S. (2014). Future and impact of backshoring—Some conclusions from 15 years of research on German practices. *Journal of Purchasing and Supply Management*, 20(1), 63-65. <https://doi.org/10.1016/j.pursup.2014.01.005>
- Kinkel, S. and Maloca, S. (2009). Drivers and antecedents of manufacturing offshoring and backshoring—A German perspective. *Journal of Purchasing & Supply Management*, 15(3), 154–165. [doi:10.1016/j.pursup.2009.05.007](https://doi.org/10.1016/j.pursup.2009.05.007)

- Kinkel, S., & Zanker, C. (2013). *New patterns of German production relocation and back shoring activities after the global economic crisis*. Paper presented at all'European Operations Management Association (EurOMA), Dublino, Irlanda.
- Lampón, J. F., González-Benito, J., & García-Vázquez, J. M. (2015). International relocation of production plants in MNEs: Is the enemy in our camp?. *Papers in Regional Science*, 94(1), 127-139.
- Lee K., and Park T. (2021). "Changing GVC in Post-Pandemic Asia: Korea, China and Southeast Asia, Seoul National University, working paper, IER of Seoul National University, EconPapers, October.
- Marin, D. (2020). How COVID-19 Is Transforming Manufacturing. <https://www.project-syndicate.org/commentary/covid19-and-robots-drive-manufacturing-reshoring-by-dalia-marin-2020-04?barrier=accesspaylog> accessed 10.1.2023.
- Miroudot (2020). Resilience versus robustness in global value chains: Some policy implications. In Baldwin RE, Evenett SJ (Eds.), *COVID-19 and Trade Policy: Why Turning Inward Won't Work*, CEPR Press, 117-130.
- Office of the United States Trade Representative (2020). 2020 Special 301 Report.
- Piatanesi, B., & Arauzo-Carod, J. M. (2019). Backshoring and nearshoring: An overview. *Growth and Change*, 50(3), 806-823. DOI: 10.1111/grow.12316.
- Pietrobelli C. (2021). New Industrial Innovation Policies in a World of Global Value Chains, in K. Lee, J.D. Lee, S. Radosevic, D. Meissner and N. Vonortas (Eds.). *The Challenges of Technology and Economic Catch-Up in Emerging Economies*, Oxford University Press.
- Pietrobelli C. and Rabellotti R. (2011). Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries? *World Development* Vol. 39, No. 7, 1261–69.
- Pietrobelli C. and Rabellotti R. (2007). *Upgrading to Compete. Global Value Chains, SMEs and Clusters in Latin America*, Cambridge Ma.: Harvard University Press
- Pietrobelli C., Rabellotti R. and Sanfilippo M., 2011, 'Chinese FDI strategy in Italy: the 'Marco Polo' effect', *Int. J. Technological Learning, Innovation and Development*, Vol. 4, No. 4, pp.277–291.
- Pisano, G. P., & Shih, W. C. (2009). Restoring American competitiveness. *Harvard business review*, 87(7/8), 114-125.
- Ponte S., Gereffi G., and Raj-Reichert G. (Eds.) (2019). *Handbook on Global Value Chains*, Cheltenham, UK, Edward Elgar.
- Stentoft, J., Olhager, J., Heikkilä, J., & Thoms, L. (2016). Manufacturing backshoring: a systematic literature review. *Operations Management Research*, 9(3-4), 53-61.
- Sturgeon T.J., Farole T., Ortega Moncada L., and Pietrobelli C., 2017, "Overcoming Scale and Distance and Upgrading in Global Value Chains", in Commonwealth Secretariat, *Future Fragmentation Processes. Effectively Engaging with the Ascendancy of Global Value Chains*, London.
- Tate, W. L. (2014). Offshoring and reshoring: US insights and research challenges. *Journal of Purchasing and Supply Management*, 20(1), 66-68.
- Tate, W. L., Ellram, L. M., Schoenherr, T., & Petersen, K. J. (2014). Global competitive conditions driving the manufacturing location decision. *Business Horizons*, 57(3), 381-390. <http://dx.doi.org/10.1016/j.bushor.2013.12.010>
- Timmer, M.P., Erumban A.A., Los B., Stehrer R., and de Vries G.J. (2014). "Slicing Up Global Value Chains." *Journal of Economic Perspectives*, 28 (2): 99-118. DOI: 10.1257/jep.28.2.99
- UNCTAD (2018) *World Investment Report 2018: Investment and New Industrial Policies*. New York: UN Publications.
- UNCTAD (2020) *World Investment Report 2020: International Production Beyond the Pandemic*. New York: UN Publications.
- UNCTAD (2021), *Catching technological waves. Innovation with equity. Technology and Innovation Report 2021*. Geneva: United Nations, forthcoming.

UNIDO (2019) Annual Report 2019. Vienna: UN.

Vanchan, V., Mulhall, R., & Bryson, J. (2018). Repatriation or reshoring of manufacturing to the US and UK: dynamics and global production networks or from here to there and back again. *Growth and Change*, 49(1), 97-121.

World Bank (2020). *World Development Report 2020: Trading for Development in the Age of Global Value Chains*. Washington, DC: World Bank.

World Economic Forum (2020). Here's how global supply chains will change after COVID-19. Available at: <https://www.weforum.org/agenda/2020/05/this-is-what-global-supply-chains-will-look-like-after-covid-19/> accessed 12.31.2020.

Data sources:

FM Global <https://www.fmglobal.com/>

International Telecommunication Union <https://www.itu.int/en/ITU/Statistics/Pages/default.aspx>

OECD.Stat <https://stats.oecd.org/>

Property Rights Alliance <https://www.propertyrightsalliance.org/>

UNCTADstat <https://unctadstat.unctad.org/EN/>

UNESCO (UIS) <http://data.uis.unesco.org/>

World Bank <https://data.worldbank.org/>

The UNU-MERIT WORKING Paper Series

- 2023-01 *Can international mobility shape students' attitudes toward inequality? The Brazilian case* by Cintia Denise Granja, Fabiana Visentin and Ana Maria Carneiro
- 2023-02 *Demand-led industrialisation policy in a dual-sector small open economy* by Önder Nomaler, Danilo Spinola and Bart Verspagen
- 2023-03 *Reshoring, nearshoring and developing countries: Readiness and implications for Latin America* by Carlo Pietrobelli and Cecilia Seri