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Reshoring to survive? The other side of de-globalization

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Abstract

As the costs of global production fragmentation rise, advanced economies have introduced policies that promote the relocation of previously offshored tasks back to the home country, encouraging investment in automation and green technologies. However, the evidence on reshoring remains limited. Drawing on Antràs (Deglobalisation? Global value chains in the post-COVID-19 age. National Bureau of Economic Research: Technical report, 2020), we offer a conceptual framework to understand why firms reshore and why such decisions remains relatively rare. Value chains are "sticky", particularly for large firms, and investment in automation implies new costs to firms already burdened by rising offshoring costs. As a result, globalization shocks have uneven impacts, varying by firm size and their ability to manage both explicit and "hidden" costs of offshoring. For larger firms, automation-driven reshoring may not be as profitable as alternatives like "nearshoring" or "friendshoring." In contrast, smaller and less internationally exposed firms may turn to reshoring to contain losses—ultimately, to survive.

Keywords Reshoring · Nearshoring · Offshoring · Global value chains · Deglobalization

JEL classification F12 · F13 · F21 · F23

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1 Introduction

Over the past decades, the secular trend of globalization has shown signs of inversion. Increasing factor prices in emerging countries, financial crises, trade wars, and geopolitical tensions have demonstrated the vulnerability of global supply chains and are altering the incentives to offshore production. Since the Great Recession, the growth rate of exports over global GDP has stagnated and Chinese-led global value chains have been regionalizing (Antràs, 2020; Baldwin & Freeman, 2022; World Bank, 2019). This has raised concerns about the sourcing and consumer price implications of Western economies' de-coupling from Russia and China (Farrell & Newman, 2020) and, more broadly, about the future of globalization.

The de-globalization debate holds substantial geopolitical relevance. The international fragmentation of production increases value chain dependency, and strategic raw materials and components are concentrated in specific countries (Schwellnus et al., 2023; Shih, 2020; Williams & Bushey, 2021). Governments in many advanced economies have introduced generous incentives to reconfigure global value chains (GVCs) towards greater autonomy and resilience (Javorcik, 2020; UNCTAD, 2020). These policies seek to diversify critical input suppliers, relocate production to reliable, "friendlier", or geographically closer countries, and build domestic manufacturing capacity in critical industries (European Parliament, 2021; OECD, 2022; World Bank, 2023).

Reshoring, the relocation of previously offshored tasks back to the home country, has become a key policy priority. Incentive schemes launched in different countries aim to build domestic capacity to advance digital and green technology adoption and increase automation (Baldwin & Freeman, 2022; EU Policy Department, 2021; Grossman et al., 2023; Javorcik, 2020; Piatanesi & Arauzo-Carod, 2019; UNCTAD, 2020). Policy support for reshoring may amplify the impact of increasing offshoring costs and contribute to reducing global production fragmentation. Multinational corporations have been pivotal drivers of the hyperglobalization phase (Antràs, 2003), making a potential shift in international trade patterns away from offshoring highly significant for global production structures, employment, and consumption trends (Hummels et al., 2014). Therefore, among the various aspects of globalization, we focus on the organization of production and the geography of sourcing (Antràs, 2003; Antràs & Helpman, 2004).

In the face of such changing incentives, flows of trade, capital, information, and people have so far proven remarkably resilient, leading some scholars to question the de-globalization narrative. For instance, Baldwin (2022) and Altman and Bastian (2024) highlight that bilateral decoupling between the US and China, along with Russia's reorientation of international flows, accounts for most of the observed declines in global trade. Yet globalization persists for much of the rest of the world. Furthermore, while manufacturing may be de-globalizing, services trade certainly is not. Digitalization and remote work spur opportunities for the "digital offshoring" of tasks, whose implications for globalization are still unclear (Autio et al., 2021; Baldwin, 2022; Choudhury, 2020; Sytsma, 2022).

Reshoring, too, remains particularly rare. The US Reshoring initiative reports 1,379 reshoring cases all over the US in 2018.[1] Freund et al. (2024) find limited evidence of reshoring in their analysis of the impact of US tariffs on imports from China. Survey-based efforts to measure this phenomenon in Europe tend to be biased toward large firms and report around 10–15 reshoring events per year-country (Dachs et al., 2019). Including smaller firms, the number of reshoring cases rises to approximately 40 per year-country (Canello, 2022; Canello et al., 2022).

This raises the question of whether the policy attention to reshoring will bear any practical implications and why we do not observe more reshoring. Antràs (2020) simple theoretical framework highlights that the "stickiness" of global value chains plays a crucial role in this dynamic. In this paper, we build on this framework to argue that, even with strong de-globalization incentives, reshoring may primarily appeal to a specific subset of firms—namely, the smallest and least productive ones.

According to Antràs (2020), the stickiness of global value chains is due to the importance of sunk costs in offshoring, which makes firms reluctant to reshore unless they perceive a negative shock as both substantial and persistent enough to threaten long-term profitability. Additionally, reshoring itself entails considerable sunk costs, meaning that the shock must be even more severe for reshoring to become a more attractive option than staying offshore.

Moreover, the effects of shocks on the relative profitability of remaining offshore versus repatriating production varies across firms of different sizes. Larger and more productive firms are better equipped to withstand negative shocks to their offshored operations. When the shock is small and temporary, reshoring costs may outweigh the benefits, and larger firms may prefer to endure reduced profitability in offshored production. For smaller and least productive firms, even small and short-lived shocks can substantially reduce offshoring profits, threatening survival and making reshoring a more attractive strategy. This is particularly the case when the sunk costs of reshoring are relatively low, for example when domestic production has been scaled down but not fully discontinued. Hence, the smallest and least internationally exposed among the offshorers have the most to gain from reshoring, and they may do so as a strategy to survive.

Furthermore, we note another underexplored implication of Antràs (2020)'s model. While reshoring and automation are often presented as two sides of the same coin, they are separate strategic decisions for firms and do not necessarily occur together. Investment in automation entails an increase in fixed domestic production costs that allows for variable cost savings. However, high variable costs—e.g., high energy prices—may erode the profitability of reshoring via automation.

This discussion contributes to the conversation on de-globalization by offering an explanation for why so little reshoring is observed despite the changing incentives for globalization. In the following sections, we present evidence on reshoring trends (Sect. 2). We then review the literature on the factors influencing reshoring decisions (Sect. 3), and dig deeper into the contributions analyzing the stickiness in global value chains and its heterogeneity (Sect. 4). In Sect. 5, we outline our answers to

[1] https://www.industryweek.com/the-economy/article/22027880/reshoring-was-at-record-levels-in-2018-is-it-enough.

question of why we do not observe more reshoring. The conclusion (Sect. 6) summarizes the key insights and offers a discussion of the policy implications and alternatives to reshoring. Our discussion draws on insights from the fields of economics, international business, and operations and supply chain management.

2 Evidence on reshoring

Reshoring is typically not captured in official statistics, yet it has been extensively studied in the fields of supply chain management, international business, and, more recently, economics. Across these studies, there is a consensus that reshoring remains relatively rare.

Earlier studies have attempted to measure reshoring relying on ad hoc surveys or secondary data. The European Reshoring Monitor was a pilot initiative launched by the European Foundation for the Improvement of Living and Working Conditions (Eurofound) to track reshoring activity in Europe based on international and national media, and corporate websites.[2] Over 2015–2018, it identified 250 reshoring events across 25 European countries, predominantly involving large firms (e.g., in the UK, Italy, France, and Germany). Fratocchi et al. (2016) and Brandon-Jones et al. (2017) employ similar methods. For example, Brandon-Jones et al. (2017) identify 37 reshoring announcements made by US companies between 2006 and 2015 using a keyword search in Factiva.

Among survey-based studies, the share of reshorers out of all offshorers ranges between 2.6 and 21%. Stentoft et al. (2015) investigate Danish firms and find that 10.3% (87 companies) reshored their production or supply chains. Johansson and Olhager (2018)'s survey of Swedish manufacturing firms with over 50 employees identifies 99 cases of reshoring between 2010 and 2015. Dachs et al. (2019) use data from the 2015 European Manufacturing Survey, covering 1705 firms from Austria, Germany, and Switzerland, and find that only 4.2% have reshored production between 2013 and 2014. di Stefano et al. (2022) use data from the Bank of Italy's Survey of Industrial and Service Firms and find that, among firms with at least 20 employees, only 2.6% had reshored production by 2021. Drawing on a survey of Spanish manufacturing firms, Bailey et al. (2018) find that, over 2007-2015, 7% of theoutsourcing firms shifted from foreign to domestic suppliers. In two studies on micro and small enterprises in the clothing and footwear industries in Italy, Canello (2022) and Canello et al. (2022) find that the reshoring shares among offshorers are 21% over 2006–2012 and 16% over 2008–2015. For the most recent period, a 2021–2022 survey by Confindustria Servizi and Re4It of 762 Italian firms (90% of which were small and medium-sized) reveals that 16% were offshoring. Among these, 16.5% had reshored part or all of their production, with 12% planning to relocate activities in the next 3–5 years.[3] Other studies have measured reshoring at the industry-country level leveraging trade data. Krenz and Strulik (2021) take the ratio of domestic to foreign inputs as a broad measure of reshoring intensity. Using data from the WIOD database

[2] The initiative was discontinued in 2018. For more details, see https://reshoring.eurofound.europa.eu/.

[3] For additional details, see Rapporto Catene di fornitura tra nuova globalizzazione e autonomia strategica.

over 2000–2014, they find that less than 25% of the industry-country observations show positive values for the reshoring index. Other studies employing a similar measurement approach find similar figures (e.g. Lamperti et al., 2025).

Finally, two studies attempted to account for the fact that reshoring is the reversal of a previous offshoring decision. Using ownership data from Bureau van Dijk's Orbis on parent-subsidiary ties across countries, Delis et al. (2019) define reshoring as a negative change in foreign subsidiary employment paired with an increase in parent company employment. Their analysis reveals that 13% of firms engaged in reshoring at least once between 2006 and 2013, with significant variation across countries. D'Ambrosio et al. (2024) propose a methodology to measure reshoring based on balance sheets and trade administrative data. Applying their methodology to Italian data, they identify 1559 reshoring firms over 2009–2015, amounting to about 9% of all offshorers.

3 Decreasing incentives to offshore

The long-term trend of hyperglobalization prevailing until 2008 was due to three key developments: advancements in information and communication technology, reductions in trade costs, and the removal of political and economic barriers. These developments collectively facilitated the inclusion of labor-intensive economies in global value chains, reshaping production and trade dynamics (Antràs, 2020; Contractor et al., 2010; Fort, 2017; Hummels, 2007).

The framework developed by Antràs (2020) examines how firms weigh the costs and benefits of domestic versus offshore production and contributes to shedding light on globalization and de-globalization processes. The model assumes monopolistic competition with two production stages—headquarter services and manufacturing—employed in fixed proportions. Producing abroad reduces marginal costs due to cheaper foreign labor, but entails additional shipping, communication, and tariff costs, along with higher fixed costs. Fixed costs include establishing local supply chains, reorganizing production processes, ensuring contract enforcement, and setting up local networks (Antràs & Helpman, 2004; Chaney, 2008; Porter & Rivkin, 2012). In Antras' framework, fixed costs increase with distance and are critical in shaping firms' decisions about production locations.

There will be cost advantages from offshore production as long as the marginal cost savings outweigh the fixed costs; the "slow-balization" observed since 2008 is partly attributable to the erosion of the cost advantages of offshoring. Reshoring, however, is not simply the reverse of offshoring. Many fixed costs associated with GVC participation are sunk, meaning that firms must incur new costs to relocate production domestically. Hence, reshoring is an entirely new re-location decision based on ex-post information collected once the firm has offshored.

By emphasizing the role of fixed costs, this framework explains why GVC configurations are often "sticky" and how changes in global economic conditions influence firms' production decisions over time. In the remainder of this section, we examine the factors leading to an erosion of the cost advantages from offshoring. These are (1) rising factor prices and non-tariff barreers; (2) hidden costs; (3) automation;

(4) geopolitical uncertainty; and (5) policy support for protectionism and reshoring. These factors can operate independently or jointly; for instance, automation may allow counteracting rising labor costs and facilitate reshoring, but firms may relocate production without automation when offshoring becomes prohibitively expensive.

3.1 Rising factor prices and non-tariff barriers

A large literature has emphasized increasing production costs in developing economies as drivers of reshoring (Eurofound, 2019). Most importantly, labor cost increases in emerging economies erode wage differentials, one of the main cost advantages of offshoring (Gray et al., 2017; Piatanesi & Arauzo-Carod, 2019). World Bank Poverty and Inequality Platform data show that the median income or daily consumption has grown in many offshoring destinations over the past 10 years. Over 2010–2020, median income has doubled in China and has grown by about 50% in Indonesia, Vietnam, and Bangladesh. The corresponding growth rates in USA and UK were 18% and 7% respectively.

Besides labor costs, shipping costs have escalated in recent years due to the COVID-19 crisis, climate change, and geopolitical tensions. Indeed, the sharp rebound in global manufacturing activity after the COVID-19 emergency caused a sudden rise in international orders and resulted in supply bottlenecks, increasing delivery times and shipping costs (ECB, 2021). Moreover, due to low water levels, the Panama Canal Authority had to cap the number of ships that may traverse its channel since November 2023. In the same period, the Houthi attacks on vessels going through the Suez Canal aiming to damage Israeli allies in the Middle East crisis have severely limited the transit in the area.[4] In both cases, the long-run implications are hard to predict and may be substantial, especially in case the current conflicts expand in neighboring areas.

As for energy prices, while geopolitical tensions have caused wholesale gas and electricity prices to reach all-time highs in 2023, these are less likely to drive reshoring as the price spikes have affected advanced economies much more strongly than emerging ones (European Commission, 2024; World Bank, 2024). Quite on the contrary, spikes in energy prices in advanced economies may have actually contributed to sustaining offshoring in recent years.

3.2 The "hidden costs" of offshoring

The international business literature has long emphasized that some offshoring costs become apparent only when the company is already abroad, referring to them as the "hidden costs" of offshoring (Larsen et al., 2013; Porter & Rivkin, 2012). These costs are difficult to estimate or anticipate, and materialize ex-post as a discrepancy between expected and realized costs. As firms learn that offshoring costs are higher than expected, they must adjust their strategies and may decide to reshore. Accordingly, Kinkel and Maloca (2009) argue that reshoring is effectively a correction of

[4] The Economist, "The dwindling of the Panama Canal boosts rival trade routes", Jan 9th 2024; The Economist, "Will spiking shipping costs cause inflation to surge?", Jan 11th 2024.

previous managerial errors. Hidden costs are not necessarily on the rise but can amplify the effects of cost rises and may, in turn, be exacerbated by uncertainty (see Sect. 3.4).

Among hidden costs, wage inflation, labor productivity, and quality differentials dominate. In offshoring countries, lower skill levels and cultural differences may translate into lower productivity and higher recruiting and training costs than expected (Lampón et al., 2015; Tate et al., 2014). The company may end up hiring more workers and using materials less efficiently to produce a given amount of products or require additional supervision and quality inspection to ensure the desired quality standards (Porter & Rivkin, 2012). Indeed, studies have emphasized that customers' perceptions about product quality are worse for goods produced offshore, making the "made-in" effect significant in marketing strategies and a potential reshoring driver (Ancarani et al., 2019; Fratocchi et al., 2014; Grappi et al., 2015; Kinkel & Maloca, 2009; Moradlou et al., 2017). Moreover, coordination and control costs may increase due to the greater organizational complexity, effectively implying higher communication costs than predicted (Larsen et al., 2013). The inability to quickly respond to demand shocks is another drawback of offshoring (Gray et al., 2017; Kinkel & Maloca, 2009; Moradlou et al., 2017).

The model in Antràs (2020) recognizes that the lower wages in foreign countries may imply lower productivity and therefore a higher number of workers to produce a target quantity of output, as well as the higher communication costs entailed by foreign production. However, building on insights from international business, management, and operations literature, the "hidden cost" interpretation suggests that ex-post, worker productivity may be lower and communication costs higher than foreseen.

Moreover, additional hidden costs of offshoring may arise, including risks of unintentional knowledge transfer and intellectual property leakage (Gray et al., 2017). The ability of firms to predict the size of these costs varies depending on managerial capabilities and host country knowledge, and it may be sensitive to changing geopolitical contexts. Substantial increases in intellectual property protection costs may induce firms to reshore or "friendshore". The ongoing discussion about imposing technology transfer requirements on Chinese firms operating in the EU in exchange for EU subsidies (Hancock et al., 2024), along with the recent policy emphasis on Strategic Autonomy in advanced economies and initiatives such as the Inflation Reduction Act, the Chips and Science Act, and the EU Chips Act, underscores the critical importance of production facility location for protecting knowledge, know-how, and intellectual property (see Sect. 3.5).

Intellectual property risks are not explicitly included in Antràs (2020)'s model but can be conceptualized as part of the fixed costs of producing abroad. This interpretation aligns with the consideration that, in his framework, fixed costs increase with distance—which is particularly appropriate if this is intended as geopolitical distance.

Related studies suggest that reshoring decisions may be influenced by the risk of losing know-how in the home country and the need to maintain geographical proximity between production and R&D activities—both critical for fostering innovation and product development in certain sectors (Pisano & Shih, 2012; Stentoft et al., 2015; Bailey et al. 2018). The role of proximity between production and R&D depends on the type of knowledge prevalent within a firm and the risk of intellectual

property leakages, being critical in sectors where knowledge codification is difficult and when innovation follows the manufacturing (Pisano & Shih, 2009, 2012). In contrast, when knowledge is more codified-intensive, unbundling becomes easier as knowledge exchanges across distances are smoother (Gray et al., 2015). Conversely, this may drive greater offshoring by encouraging the co-location of different functions abroad, such as R&D labs with production facilities (Castellani & Lavoratori, 2020).

3.3 Automation

Alongside rising costs, offshoring incentives may decrease because automation and Industry 4.0 technologies offer alternatives, allowing to substitute domestic capital for foreign labor (Antràs, 2020; Baldwin & Freeman, 2022; Castellani et al., 2022; Faber, 2020; Krenz et al., 2021; Laplume et al., 2016; Stapleton & Webb, 2020). Industry 4.0 technologies include industrial robots, additive manufacturing, and the industrial Internet of Things, and are considered 'game-changing technologies' given their potential impact on manufacturing processes and operations (Eurofound, 2018).

Antràs (2020) notes that the effect of automation on offshoring may be conceptualized as an increase in domestic fixed costs that allows for marginal cost reductions. This simple consideration clarifies that the choice to automate domestic production operates separately from the increases in foreign costs. Hence, a firm may or may not automate when offshoring becomes prohibitively expensive, depending on the fixed costs of investing in automation and the expected reduction in marginal costs relative to foreign costs.

When domestic marginal cost decreases are large enough, the automating firm will find it profitable to reshore. Indeed, some studies have identified a positive association between robots and reshoring. At the industry level, Krenz et al. (2021) find that one additional robot per 1000 workers corresponds to a 3.5% rise in reshoring activities in manufacturing, and argue that automation induces productivity improvements that incentivize reshoring. In line with capital-labor substitution dynamics, they find that low-skilled wages decline while high-skilled workers' wages increase due to complementarity with automation, leading to greater inequality and a higher skill premium. At the sub-regional level, Faber (2020) finds evidence that robots replace workers in production activities, reducing domestic production costs and decreasing the demand for imports from Mexico to the US, therefore offshoring. Survey-based studies confirm that firms consider adopting Industry 4.0 technologies as incentives to reshore. Stentoft et al. (2015)'s review of the drivers of offshoring/outsourcing and reshoring in Denmark finds that automation ranks third among the reshoring drivers, after quality issues and long lead time. Automation-driven reshoring is more likely when companies aim to boost their productivity and flexibility or enhance product quality, brand recognition, and post-sales processes (Ancarani et al., 2019; Dachs et al., 2019).

In contrast, other studies have highlighted the complementarity between automation and offshoring. Indeed, automation, particularly robotization, brings productivity gains that can expand the scale of production and increase the international sourcing of components that are harder to automate (Antràs, 2020), especially in countries

closer to the technology frontier (Lamperti et al., 2023). Artuc et al. (2023) find that robot adoption correlates with increased imports, especially from developing countries. Stapleton and Webb (2020) find different implications of robot adoption on offshoring depending on whether adoption occurs before or after offshoring. When the firm is already abroad, automation decreases offshoring; for not-yet-offshored firms, there is complementarity between automation and offshoring.

Furthermore, Industry 4.0 technologies are a diverse set with differentiated characteristics that bear different implications for reshoring (Antràs, 2020). While robots can replace labor-intensive tasks and potentially shorten GVCs in some industries, the Industrial Internet of Things and advancements in ICT can deepen GVC participation by facilitating interactions among economic actors and reducing information and transaction costs (Lamperti et al., 2025).

3.4 Geopolitical uncertainty

The current economic and political environment is marked by frequent disruptions, creating significant uncertainty for international activities and global value chain structures (Baldwin & Freeman, 2022). After the stress test imposed on GVCs by the COVID-19 pandemic, Brexit, and US–China trade tensions, the global implications of the Russia–Ukraine war and conflicts in the Middle East have prompted observers to describe this as a "new Cold War" era (Gopinath et al., 2024). Disruptions stem from both supply- and demand-side shocks caused by natural disasters, policy shifts, political instability, macroeconomic crises, and exchange rate volatility.

These factors directly increase all costs that are sensitive to (geopolitical) distance—primarily tariffs, communication and transportation costs, but also the risk of knowledge spillovers and intellectual property leakages. Moreover, they cause substantial uncertainty, making a careful assessment of the foreign production costs more difficult (Autor et al., 2024; Benguria et al., 2022). Indeed, these combined shocks have exposed the fragility of systems reliant on global interdependence: while all production models involve risks, dependence on foreign inputs inherently makes domestic activities more vulnerable to international disruptions (Antràs, 2020; Baldwin & Freeman, 2022; Gary, 2020; Javorcik, 2020). After all, input diversification among several foreign suppliers is precisely what has made the fragmentation of production successful for many years, in that it reduces dependence on any single country (D'Aguanno et al., 2021; Thakur-Weigold & Miroudot, 2024).

The literature has highlighted that the unpredictable global environment, as well as the instability in exchange rates, can affect trade flows and reduce the benefits from offshoring in the long run, driving companies to change their location decisions and consider reshoring (Ellram et al., 2013; Tate et al., 2014; Wiesmann et al., 2017). Rising offshoring costs and increasing uncertainty about the benefits make offshoring riskier as economic conditions deteriorate. Accordingly, earlier studies have argued that reshoring occurs more frequently during recessions, conflicts, and potential supply shocks (Delis et al., 2019; di Stefano et al., 2022). Several recent contributions have analyzed the implications of geopolitical fragmentation on trade (Aiyar et al., 2023; Altman & Bastian, 2024; Attinasi et al., 2023; Bosone et al., 2024) and FDI (Ahn et al., 2023; Boeckelmann et al., 2024a, 2024b; Casella et al., 2024; Gopinath

et al., 2024). Specifically, many studies have confronted the evidence of nearshoring with that of "friendshoring", highlighting that international trade and capital flows are much more sensitive to geopolitical blocks than to geographical distance (Bosone et al., 2024; Bontadini et al., 2025; Conteduca et al., 2025).

The impact of shocks on relocation depends on whether firms perceive them as temporary or permanent. Firms are more likely to alter their strategies in response to perceived permanent shocks (Marvasi, 2023). Temporary shocks need to be exceptionally large to have lasting effects, and strong GVC integration may even turn out to increase resilience in these cases by allowing for input diversification (D'Aguanno et al., 2021; di Stefano et al., 2022; Giglioli et al., 2021).

3.5 Policies

Policy measures can play a crucial role in shaping de-globalization and fostering reshoring. Globally, several nations have implemented policies to support reshoring, including direct mechanisms like subsidies and tax allowances, and indirect measures like trade policy provisions such as import tariffs, quotas, and renegotiation of WTO subsidies agreements (EU Policy Department, 2021). Rotunno and Ruta (2024) note a significant rise in manufacturing subsidies since 2009.

Tariffs, such as those implemented during the 2018–2019 US–China trade wars under the Trump administration, have reduced offshoring and intra-firm trade (Antràs & Helpman, 2004; Díez, 2014; Freund et al., 2024; Grossman et al., 2024; Kerney, 2020). The US Reshoring Initiative data, reviewed by Bolter and Robey (2020), identify tariffs as a significant factor encouraging reshoring. However, firms may still offshore to low-wage nations unaffected by tariffs (Grossman et al., 2024; Wang et al., 2023). Recent research also shows that, even if direct imports from China may be reduced, supply chains remain closely intertwined with it, and imports maintain a large share of products originally produced in China (Conteduca et al., 2025; Freund et al., 2024).

In the United States, reshoring gained momentum under President Obama's 2012 "Blueprint for an America Built to Last," which included tax incentives, trade enforcement, and infrastructure investments (White House, 2012) while programs like the "Manufacturing Extension Partnership" and "Make it in America Initiative" helped firms evaluate production costs. The Trump administration emphasized cost-cutting through the 2017 tax reform, reducing corporate tax from 35 to 21% and lowering taxes on repatriated overseas profits, complemented by relaxed environmental regulations and protectionist tariffs targeting imports, notably from China (Freund et al., 2024; Kinkel et al., 2020; Piatanesi & Arauzo-Carod, 2019). The 2022 Inflation Reduction Act (IRA) prioritized reshoring by incentivizing domestic manufacturing for sustainability and supply chain autonomy (Grossman et al., 2024). The IRA provides tax credits and subsidies for clean energy technologies, requiring domestic or "friendly" country sourcing. It also aims to strengthen supply chain resilience in critical industries, including semiconductors, medical equipment, and renewable energy, aligning with the CHIPS Act to enhance US strategic independence.

In 2012, Japan implemented monetary, fiscal, and structural reforms, including trade agreements, to bolster industrial competitiveness. These policies supported the reshoring of 57 firms back to Japan (EU Policy Department, 2021).

Across Europe, reshoring policies have been varied. The UK has encouraged reshoring through initiatives like the Advanced Manufacturing Supply Chain program, which funds skills training, R&D, and capital investment to strengthen local supplier networks, particularly in the automotive sector. The Reshoring UK initiative has connected manufacturers with suppliers and offered strategic advice for reshoring plans (De Backer et al., 2016; EU Policy Department, 2021). France's Ministry for Industrial Renewal offered support to companies in 2013, including tools to assess reshoring costs, though these were discontinued by 2019. The Netherlands launched a €600 million fund to support reshoring-related job creation (Eurofound, 2019). In Italy, reshoring has grown in sectors like clothing and footwear, leveraging the "Made in Italy" brand. While national incentives were limited, regional initiatives such as Piemonte's "contratto di insediamento" and the "Location and Development Agreements" in Emilia-Romagna offered support (Eurofound, 2019; Piatanesi & Arauzo-Carod, 2019). Recently, Italy introduced a 50% corporate tax rebate for reshoring, with penalties for firms that subsequently offshore operations again.[5]

At the EU level, the 2021 Open Strategic Autonomy (OSA) initiative seeks to bolster domestic capacity in strategic sectors like semiconductors and rare earth elements, addressing vulnerabilities highlighted by global crises. Policies such as the EU Chips Act aim to reduce reliance on external suppliers for critical industries. Meanwhile, the European Green Deal and Digital Strategy set ambitious goals for carbon neutrality and digital transformation, with reshoring and local production central to sustaining EU-based innovation in high-tech and sustainable industries (European Commission, 2021). Rising populism and protectionist policies (Autor et al., 2024; Colantone & Stanig, 2019), coupled with geopolitical tensions, are likely to further accelerate reshoring and protectionist measures in the coming years.

4 The stickiness of global value chains

The arguments developed in the previous sections should have clarified that the increase in production costs and uncertainty, as well as the developments in automation, are making offshoring less appealing to firms. However, as already suggested, they do not necessarily imply reshoring (Antràs, 2020).

As extensively discussed in the literature, global sourcing and offshoring involve high fixed costs to enter foreign markets. To start sourcing from a foreign supplier or establish a subsidiary abroad, a firm needs to gather market and supplier information, learn about the procedures to set up a business in a foreign country, invest in physical assets and equipment, as well as in "relational" capital and security to ensure the enforcement of contracts (e.g., Antràs & Chor, 2013; Antras & Costinot, 2011; Antràs & Helpman, 2004; Benfratello et al., 2024; Burchardi et al., 2018; Martin et al., 2023; Rauch, 2001; Rauch & Trinidade, 2002). These costs are higher

[5] Il Sole 24 ore, "Mimit: via met'a tasse a imprese che tornano in Italia" October 16th, 2023.

for more distant countries and for products requiring a higher degree of information and customization (Antràs & Chor, 2013; Martin et al., 2023; Rauch, 1999, 2001). Furthermore, these costs are largely sunk, in that country-specific information, relationship-specific assets and relational capital are not easily redeployed in different contexts (Antràs & Chor, 2013; Antràs, 2020; Martin et al., 2023). This is particularly the case for products requiring strong customization, which often leads to persistent buyer-seller relationships and rigid trade networks (Antràs & Chor, 2013; Hummels et al., 2014).

The relevance of sunk costs implies that the same factor price increases may affect re-location choices differently ex-ante and ex-post. First, the firm chooses between investing in sunk costs to enjoy lower variable costs in a new location, and domestic production where no new sunk costs are needed but variable costs may be higher. Ex-post, after the firm has established international production facilities (through offshoring), the fixed costs are sunk. In contrast, reshoring is likely to involve considerable new fixed costs, for example, to establish new factories capable of performing the production tasks that were previously offshored.

If the sunk cost component is sizeable and the increase in variable costs is not too high, the firm will prefer the status quo. In other words, relocating production back home (reshoring) "will require a much higher erosion of foreign competitiveness ex-post than ex-ante" (Antràs, 2020, p. 23). This explains the sticky nature observed in global value chain configurations (Antràs, 2020; Arte & Larimo, 2019; Dixit, 1989; Martin et al., 2023).

Furthermore, uncertainty exacerbates value chain stickiness, making cost predictions more difficult. Martin et al. (2023) find that episodes of uncertainty reduce investments in new firm-to-firm relationships, especially in value chains with high levels of product customization and long-lasting ties. Hence, the combination of strong uncertainty and large sunk costs may bear the paradoxical implication that increases in offshoring costs reinforce existing transnational ties. In contrast, in less sticky value chains where commodities are traded on spot markets, uncertainty shocks disrupt existing relationships and reshoring may appear a more suitable option.

Another way to look at these results is to recognize that the weight of sunk costs on location decisions is heavier for shorter time horizons, hence fixed relocation costs will appear acceptable to the firm if the shocks to production costs are perceived as persistent, as they can be amortized over a longer time horizon (Antràs, 2020; di Stefano et al., 2022). Uncertainty implies that the persistence of the shock effects is hard to predict, and the possibility that location decisions will be reconsidered is high. Hence, when internationalization choices are partially irreversible, uncertainty will increase the option value of waiting until more information is available (Conconi et al., 2016). In line with this interpretation, di Stefano et al. (2022) find that COVID-19, perceived as a temporary shock, did not spur large waves of reshoring.

4.1 The role of firm heterogeneity

Due to the important role of fixed costs, scale matters for the decision to offshore in the first place (Antràs, 2020; Antràs & Helpman, 2004; Helpman et al., 2004). To be profitable, foreign production entails a larger scale than domestic production, hence

it implies a selection of firms internationalizing. In turn, scale advantages facilitate the offshoring of further phases and the amortization of the related fixed costs. Such a self-nurturing mechanism is magnified by technical constraints in the sequencing of input sourcing (Antràs & De Gortari, 2020; Antras et al., 2017). The large economies of scale make firms reluctant to dismantle the value chains when facing severe but temporary shocks.

Furthermore, the reshoring of single phases is complicated when complex global value chain networks face irreversibilities driven by technical constraints. In line with the arguments by Bontadini et al. (2025), the evaluation of the benefits arising from reshoring crucially depends on the final demand that the value chain can activate, which is not necessarily domestic. In short, the opportunity cost of reshoring is higher for larger, more internationally exposed firms.

Similar considerations apply to the decision to automate domestically. Since automation involves significant domestic fixed costs that enable marginal cost advantages, it generally leads to a higher optimal scale of production for firms that choose to automate. Like offshore operations, this creates a feedback loop: automating raises the optimal scale of production, this enhances productivity, and greater productivity increases the ability to further offshore (or stand offshoring costs) and automate. Lamperti et al. (2023) observe that the productivity gains from automation are primarily realized by industries operating closer to the technological frontier.

Productivity is indeed another related source of heterogeneity in the decision to internationalize, source from abroad, and relocate (Melitz, 2003). Productivity can be taken as a proxy for production rents, hence for firms' capability to react to shocks in production costs (Card et al., 2018). Therefore, the impact of offshoring costs can vary among firms with different productivity levels. These costs are notably more significant for small and medium enterprises (SMEs) due to their limited experience in coordination and communication procedures, and in managing the complexity of operating internationally (Canello, 2022; Larsen et al., 2013). Small firms face challenges due to inadequate methods and capabilities to evaluate the offshoring decision and difficulties implementing monitoring procedures. This increases their vulnerability to opportunistic behavior from foreign suppliers, resulting in higher coordination costs and extended delivery times. The most productive firms are better equipped to operate in foreign countries. Faced with cost increases, most productive firms are better able to bear the increased production costs, adjust the production to substitute more expensive inputs and stay abroad, as well as to face the fixed relocation costs to move to third, possibly "friendlier", countries (Antràs, 2020; Antràs & Helpman, 2004; Miroudot et al., 2009; Helpman et al., 2004)

The international business literature has long acknowledged that international experience is a source of organizational learning and equips companies with organizational and managerial capabilities that enable them to coordinate and manage complex organization structures, evaluate costs, and generate value (Barkema et al., 1997; Penrose, 1959). This argument can be extended to the complexity of offshoring operations. Firms with prior offshoring experience are more likely to have accumulated organizational knowledge, making them comparatively better at estimating the costs of offshoring as well as at anticipating and mitigating the potentially negative impact of "hidden" costs (Larsen et al., 2013).

5 Reshoring to survive?

5.1 Limited economic incentives to reshore

The discussion about heterogeneity bears implications for the complementarity between reshoring and investing in automation, which is a key objective of many policy initiatives promoted in advanced economies.

As the model in Antràs (2020) clarifies, investing in automation entails high fixed costs domestically, ideally to enjoy lower marginal costs in the long run. Relative to relocating to a different country, reshoring via automation may require lower information, communication, and search costs, and may eliminate the "hidden costs" and mitigate uncertainty when operating in foreign markets. Yet, it may require radically reconfiguring production technology to shift from labor-intensive to capital-intensive technology. This implies that the firm will reshore *and* automate whenever the new automation technologies bring efficiency gains that are so large that they outweigh the benefit of remaining offshore.

This condition may be hard to meet even by substantial global shocks if the fixed costs and the domestic prices of factors other than automation, e.g., labor and energy, remain high relative to foreign countries. In particular, in areas where offshoring and import competition have led to decades of stagnation in domestic manufacturing, the availability of skilled production workers may be limited and may not justify the higher wages (Autor et al., 2013; Colantone & Stanig, 2019). Moreover, due to the role of fixed costs, automation will generally imply a large production scale. When firms have access to investment capacity, specialized competencies, strong managerial capability, and skilled labor, investing in automation becomes a more viable option.

However, when the scale becomes very large, firms may prioritize marginal cost savings over fixed costs. In this context, Stapleton and Webb (2020)'s finding that firms adopting automation tend to be larger-scaled explains why the demand for offshored inputs might increase with automation. It also suggests that reshoring through automation may not always be more cost-effective than remaining offshore. As a result, relocating production to a third different, potentially geopolitically closer, country may emerge as a more viable alternative to reshoring.

Integrating the framework in Antràs (2020) with considerations about the advantages of global production fragmentation (Baldwin & Freeman, 2020) also allows speculating about the relative profitability of nearshoring and reshoring. As Baldwin and Freeman note, "Putting all your eggs in one basket does not diversify risk—even if the basket is at home" (Baldwin & Freeman, 2020). Alternatives like regionalization and nearshoring, along with diversification, may offer more practical approaches to strengthening supply chains and firm resilience (Javorcik, 2020). Nearshoring involves relocating previously offshored production to countries closer to the home market (e.g., Mexico for North America or Eastern Europe for the EU). This strategy not only brings production nearer to the final market but also offers many of the advantages associated with reshoring, such as increased flexibility, shorter geographical distances, reduced transportation costs, easier management and coordination, and a quicker response to changes in demand (Piatanesi & Arauzo-Carod, 2019).

Moreover, nearshoring can offer location-specific benefits, such as lower labor costs in nearby regions.

The above arguments about scale and productivity imply that larger and more productive firms faced with increasing offshoring costs may opt to relocate previously offshored production to geographically and geopolitically closer countries as long as the fixed costs of relocating production are not too high. As a matter of fact, the evidence about nearshoring, especially "friendshoring", is at present stronger than the evidence about reshoring (e.g., Ahn et al., 2023; Altman & Bastian, 2024; Bosone et al., 2024).

These arguments suggest that the economic incentives to reshore may be limited even for highly productive firms, unless factors that support domestic profitability, such as "made-in" concerns and the need to protect intellectual property, become significantly more important. The incentives to repatriate production are, hence, mainly policy-driven. Through measures like subsidies, tax rebates, and infrastructure support, industrial policies can enhance the profitability of domestic production relative to offshore alternatives, particularly by promoting digitalization and the transition to automation.

5.2 "Survival" reshoring

Antràs (2020)'s observation that the opportunity costs from reshoring are more sizeable for large-scale firms implies that smaller, less productive, and less internationally exposed firms are more likely to repatriate manufacturing activities. Drawing on limited resource buffers, these firms are less resilient to shocks and may not have the resources to invest in automation. Even small shocks may turn their profits negative, and offshoring cost increases may threaten their survival. Smaller firms may also find it relatively convenient to repatriate production if the size of the "hidden costs" of offshoring is large due to limited managerial capability or organizational structure (Ancarani et al., 2015; Barbieri et al., 2018).

Reshoring is particularly appealing when the related fixed costs are low. This may be the case if only part of the firms' production line has been offshored, such that home production has been scaled down but not completely discontinued. In other words, the fixed costs of reshoring will be lower for firms that are less strongly integrated within global value chains.

Also, the fixed costs will be comparatively low in less "sticky" value chains, where product customization and information content are limited—high stickiness may on the contrary lock smaller firms into their existing value chain configurations, deteriorating their profitability (Martin et al., 2023).

The above implies that the firms most likely to find reshoring profitable are the smallest and least productive among offshorers, suggesting that reshoring may effectively be a strategy to survive. In line with this interpretation, D'Ambrosio et al. (2024) find that smaller and less internationally exposed firms with greater financial difficulties are the ones that are most likely to reshore. Benstead et al. (2017) find evidence that the number of SMEs reshoring has increased over time, which suggests unwillingness or inability to financially support further difficulties faced in offshoring-related activities (Benstead et al., 2017; Kinkel, 2012).

Increasing globalization costs may also bear survival and compositional implications. Incumbent firms facing rising production costs may lack the resources to invest in automation and struggle to adopt new automated production technologies due to limited capabilities to efficiently deploy and integrate these technologies within their organizational structures (Aaronson et al., 2018; Amit & Schoemaker, 1993). Without the resources to invest in automation, firms are unable to leverage technology to create the option of producing domestically in a more efficient manner, rendering this strategy essentially implausible for many.

In contrast, new market entrants starting up with higher levels of automation may be better suited to reap the benefits from a changing global structure of incentives. The industry-level results of the decline in offshoring due to automation by Artuc et al. (2023) may be attributed to changes in the industry composition rather than reshoring. Indeed, Stapleton and Webb (2020) find that firms adopting robots decrease their imports from low-wage countries but also that, much more often, firms automate without ever offshoring.

This analysis highlights how firms may respond differently to global challenges based on their structure and capabilities. Interestingly, among the available strategies, reshoring appears less attractive for larger, highly productive firms. Unless these firms can minimize the fixed costs of repatriating production through automation, they are often better equipped to reconfigure supply chains in response to shocks. For them, the potential downsides of reshoring often outweigh the benefits.

Smaller, less productive firms, on the other hand, are more vulnerable to supply chain rigidity and profitability pressures. For these companies, reshoring without significant changes to production technology may offer a way to manage rising offshoring costs and uncertainties while avoiding high search and information costs associated with alternative strategies. However, the efficiency gains from reshoring are likely limited. Consequently, alongside the "virtuous," policy-driven reshoring by highly productive firms investing in automation, a distinct form of "survival reshoring" may emerge, primarily aimed at mitigating losses rather than achieving significant gains.

6 Conclusions and future research

In this paper, we relied on Antràs (2020) model to explain why we do not observe more reshoring, despite the geopolitical fractures, protectionist stances, rising costs, and available incentives. Despite remarkable increases in automation, uncertainty, and offshoring costs, production reshoring did not emerge as an obvious implication. The extent to which increasing costs of offshoring imply reshoring depends on the costs of reconfiguring the production technology, the stickiness of the value chain, and the scale and productivity of firms, relative to the gains to be expected from the "made-in" effect on quality and demand, alongside intellectual property protection. The balance between these factors need not bend in favor of home production and may be greater for nearshoring than reshoring.

The importance of scale and productivity in location decisions confirms that a cumulative process is at work where stronger, more competitive firms are more likely

to stand the global challenges. We also highlighted that, along with the "virtuous" reshoring that policymakers are seeking to attract with their policies, there may be a contrasting form of "survival" reshoring, driven by firms struggling to cope with the costs of globalization. Policies designed to support the development of domestic capacity and accelerate the green and digital transition could fall short of their objectives if they end up attracting "zombie" firms.

An important policy implication is that reshoring policies should incorporate rigorous screening processes to identify high-potential firms. In the absence of basic absorptive capacity, incentives for technology adoption will fail to sustain domestic productivity (Lamperti et al., 2023).

The implications of these arguments are particularly important for the transition to green technologies, which is central to many strategic autonomy strategies. Antràs (2020) model does not directly address the costs of transitioning to green technologies, but given the inherent uncertainty in their returns and the strong role of externalities, we may expect that they entail even greater fixed costs, and lower marginal cost gains than investments in automation (Acemoglu et al., 2016). Hence, the economic incentives to reshore by investing in green technologies are even lower than for automation. This confirms the crucial role of policy-driven support to decrease costs and increase access to green technologies, along with digitalization and automation, so that reshoring can become more appealing for all firms beyond the 'happy few' (Mayer & Ottaviano, 2008).

To enhance supply chain resilience, alternative strategies to reshoring are possible and include a range of approaches that focus on diversification, substitutability and flexibility. These strategies can help mitigate risks without necessarily bringing production back home. Increased input diversification (geographical diversification of supply) and enhanced substitutability in input sourcing (making it easier to switch suppliers across countries) may be particularly effective in strengthening resilience to shocks (International Monetary Fund, 2022; Javorcik, 2020; Miroudot, 2020; UNCTAD, 2020). When concerns about production concentration and supply chain dependence arise, international diversification may prove more effective than reshoring. This approach, however, involves trade-offs, as companies may sacrifice some economies of scale by incorporating more locations and suppliers into the value chain, but the resulting diversification creates a supply chain configuration that is less vulnerable to disruptions.

Input substitutability also plays a critical role in enabling firms to respond quickly to shocks. It refers to the ease with which producers can replace inputs from one country's supplier with those from another country. Substitutability can take two forms: increasing the flexibility of production technologies to accommodate slightly different inputs of the same type from various suppliers, or standardizing intermediate inputs globally. For example, General Motors is a good example of standardization through its recent collaboration with chipmakers to streamline and reduce the variety of unique semiconductor chips it uses for these intermediates (International Monetary Fund, 2022). This allows businesses to switch between suppliers more easily, particularly when inputs are standardized. However, for complex or highly customized inputs, finding alternative suppliers can be costly, and replicating spe-

cialized activities may increase overall costs (International Monetary Fund, 2022; Marvasi, 2023).

Finally, evidence suggests that, during the COVID-19 pandemic, many firms shifted from a "just-in-time" to a "just-in-case" approach by increasing inventory stocks and standardizing certain components to enhance flexibility. This shift enables companies to share inputs globally and shift production more easily between sites (McKinsey Global Institute, 2020; Miroudot, 2020). Although evidence of widespread shortening of supply chains is rare, increasing inventories of critical components has become one of the most commonly implemented strategies since 2020 (Masters & Edgecliffe-Johnson, 2021; McKinsey, 2021).

The above discussion highlights that de-globalization is a complex, multi-dimensional phenomenon that can take new shapes but cannot easily be reversed. The heterogeneous incentives to nearshore and reshore imply potentially very heterogeneous impacts of these strategies on firm performance and, more broadly, on the economies of both the home and the host countries.

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Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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