

Trade and Development in a Fracturing World^{*}

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Abstract

In a fracturing world, how can low- and middle-income countries (LMICs) continue to leverage trade for economic development? Drawing on recent research at this intersection, this review argues that countries should look inward toward domestic reforms in key input markets. I review evidence on how trade in LMICs is shaped by frictions in labor, capital, material, land, and information markets, and highlight areas where the evidence base remains thin. I conclude with a discussion of vertical policies relevant for LMICs—particularly the role of services—and suggest areas where further research is needed to assess whether development can be service-led.

Keywords: international trade, economic development

JEL: F1, O1

1 Introduction

A significant backlash against global integration has emerged, and all dimensions of globalization—flows of goods and services, capital, people, and ideas—are fracturing. Trade negotiations have been stalled at the World Trade Organization for years. Heightened geopolitical tensions have amplified national security concerns over cross-border supply chains for sensitive technologies. The Covid-19 pandemic revealed vulnerabilities of global value chains that prioritized efficiency over resiliency. The urgency of climate change has spurred innovation but also has led governments to support domestic sectors through industrial policies. Developed countries are tightening visa policies for low- and high-skilled immigrants. And while flows of ideas are harder to measure, there is evidence that scientific collaborations between the U.S. and China, for example, are declining ([Van Noorden 2022](#)). [Gopinath et al. \(2025\)](#) have found that this new global policy environment has already reshaped trade and capital flows. Moreover, the policy

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outlook remains quite uncertain for low- and middle-income countries (LMICs), particularly regarding tariffs on their exports to the U.S. Will new climate border adjustment policies threaten market access? Should LMICs forge deeper bilateral trade relationships with other developed countries? Will growth in trade among LMICs provide new market access? How should LMICs think about policy responses in this new era of globalization?

To answer these questions, research in international trade has historically turned to workhorse neoclassical frameworks to analyze the impacts of trade. However, these frameworks have a key limitation when applied to developing countries: aside from trade costs, they typically assume no other distortions that drive wedges between prices and costs. Yet distortions—from factor market frictions to weak institutions—are a defining feature of LMICs. Theoretical work dating back to [Bhagwati and Ramaswami \(1963\)](#) showed that the presence of distortions can alter how trade affects resource allocation and welfare. This makes it difficult to directly apply insights from neoclassical trade models to the context of developing countries.

Fortunately, over the past fifteen years, there has been a surge in research studying how trade affects developing countries *differently* than developed countries. While there is a long intellectual history of trade and development—see the survey chapter by [Krueger \(1984\)](#)—modern research at this intersection is grounded in linking theoretical predictions to data, and has embraced the full toolkit of empirical methodologies: econometrics, randomized trials, calibration, and tailored surveys. It has also embraced a more expansionary notion of trade, ranging from multinational activity to intra-national trade within countries. As a result, there has been significant progress in our understanding of the role of trade specifically in developing countries.

This progress has culminated in several recent survey articles that synthesize this body of work. Each has taken a different approach to organizing the relevant literature. [Atkin and Khandelwal \(2020\)](#) and [Atkin et al. \(2025\)](#) organizing trade and development papers according to how trade interacts with three pervasive characteristics of LMICs: weak institutions, factor market distortions, and size-dependent distortions. [Atkin and Donaldson \(2022\)](#) categorize papers into those that highlight how trade affects reallocation due to existing distortions and those that demonstrate how trade may change the underlying distortions directly. [Verhoogen \(2023\)](#) organizes the literature according to how trade affects firm upgrading. [Garetto et al. \(2025\)](#) surveys work on FDI in developing countries. [Goldberg and Ruta \(2025\)](#) argue that the dynamic channels through which trade critical for economic development are under-emphasized in the literature.

This pathfinding review examines the impact of a subset of distortions that interact with trade and are (arguably) directly addressable through policy forms. I focus specifically on *domestic* factor market distortions, drawing from [Atkin and Khandelwal \(2020\)](#) and [Atkin et al. \(2025\)](#), but attempt to emphasize policy-relevant areas that remain ripe for further research. I also discuss recent work on industrial policies relevant for LMICs, particularly highlighting how closing particular research gaps can help inform ongoing debates about the role of services for driving economic development.

Before reviewing the literature, Section 2 provides an illustration of the challenges that LMICs

face in export markets by examining their response to the U.S.–China tariffs in 2018–19. That episode is instructive because those tariffs were primarily imposed by the U.S. and China on each other. The tariffs reduced each other’s market access, leaving bystander countries with potential opportunities to gain market share. Although the tariff “treatment” was the same for all countries, [Fajgelbaum et al. \(2024\)](#) find that the response varied significantly across the fifty largest exporters. Here, I extend those results by examining global export responses to the 2018–19 tariffs across 197 countries. I also extend the analysis to estimate long-run export responses through 2023. The results show that lower-income countries had weaker export responses to the tariffs than richer countries. These findings align with a central message from the trade and development literature—*domestic policy is trade policy*—and that reforms to domestic markets are essential for LMICs to capitalize fully on global trading opportunities.

The rest of the review is structured as follows. Section 2 examines bystanders’ responses to the 2018–19 US-China trade war by replicating and extending [Fajgelbaum et al. \(2024\)](#). Section 3 examines how trade is influenced by frictions across key factor markets, including labor, capital, materials, land, and information. I conclude with a discussion of an exciting but under-explored area documenting how trade can change the underlying distortions in factor markets. The issues discussed in Section 3 are broadly addressable through “horizontal” policies in that they do not target specific firms or sectors ([IMF 2024](#)). However, countries are increasingly using “vertical” policies that favor particular sectors to support their trade objectives ([Cherif and Hasanov 2019](#), [Juhasz et al. 2025](#)), and Section 4 examines recent research and discusses open questions particularly relevant for LMICs. Section 5 concludes.

2 Export Responses from US-China Tariffs, 2018–19

In 2018–19, the U.S. broke from nearly 70 years of free trade advocacy by raising tariffs. The U.S. targeted nearly a fifth of its imports, predominantly from China, with tariff hikes of about 20% over five tariff waves from July 2018 to September of 2019. China matched each wave with retaliations, ultimately raising tariffs by 13% on about 10% of its imports ([Fajgelbaum et al. 2019](#), [Fajgelbaum and Khandelwal 2022](#)). By 2024, China’s share of U.S. imports had declined to 13%, down from 22% in 2017. Similarly, the U.S. share of Chinese imports fell to 7% in 2024, compared to 10% in 2017. This episode serves as a compelling natural experiment in which all other countries were indirectly, but simultaneously, “treated” by the bilateral U.S.-China tariff escalation.¹ While the U.S. also raised tariffs on other countries in particular sectors, its trade war during that period was primarily directed toward China.

[Fajgelbaum et al. \(2024\)](#) develop a framework to estimate how bystander countries adjusted their exports in response to the U.S.-China tariff changes using publicly-available Comtrade data. Bystanders may increase or decrease their global exports depending on two key forces: a

¹While the U.S. also raised tariffs on other countries in specific sectors, the trade war during this period was primarily directed at China. In response, China not only retaliated against the U.S. but also reduced its import tariffs on the rest of the world ([Bown 2021](#)).

demand-side force—how substitutable their exports are with U.S. and Chinese varieties—and a supply-side force—whether reallocating exports toward the U.S. or China increases or decreases exports to the rest of the world.

The framework yields a convenient empirical specification in which export responses are estimated across three destinations: the U.S., China, and the rest of the world. The analysis matches bystanders' product-level exports to the four sets of product-specific tariff changes during the trade war: U.S. tariffs on China in product ω ($\Delta \ln T_{CH,\omega}^{US}$), China tariffs on the U.S. ($\Delta \ln T_{US,\omega}^{CH}$), U.S. tariffs on bystander country i ($\ln T_{i,\omega}^{US}$), and China tariffs on bystander i ($\Delta \ln T_{i,\omega}^{CH}$). The regression is:

$$\begin{aligned}\Delta \ln X_{i\omega}^n = & \beta_{1i\omega}^n \Delta \ln T_{CH,\omega}^{US} + \beta_{2i\omega}^n \Delta \ln T_{US,\omega}^{CH} + \beta_{3i\omega}^n \Delta \ln T_{i,\omega}^{US} + \beta_{4i\omega}^n \Delta \ln T_{i,\omega}^{CH} \\ & + \alpha_{ij}^n + \Omega^n SIZE_{i\omega} + \pi^n \Delta \ln X_{i\omega,t-1}^n + \epsilon_{i\omega}^n,\end{aligned}\quad (1)$$

where $\Delta X_{i\omega}^n$ is the change in export value of bystander country i to destination $n = \{US, CHN, RoW\}$ in HS6 product code ω . The specifications allow for treatment heterogeneity across origins (i), sectors (j) and the pre-war size of products (ω) by interacting each tariff change with country fixed effects, sector fixed effects, and the varieties' size in the pre-war period. The regression controls for origin-destination-sector fixed effects, the export variety's pre-war size and its lagged growth. It is run separately for the three destinations, and the total export response is then constructed from the estimated tariff responses β 's and aggregated using pre-war export share $\lambda_{i\omega}^n$:

$$\widehat{\Delta \ln X_i^{WD}} = \sum_{\omega} \sum_n \lambda_{i\omega}^n \left(\widehat{\beta_{1i\omega}^n} \Delta \ln T_{CH,\omega}^{US} + \widehat{\beta_{2i\omega}^n} \Delta \ln T_{US,\omega}^{CH} + \widehat{\beta_{3i\omega}^n} \Delta \ln T_{i,\omega}^{US} + \widehat{\beta_{4i\omega}^n} \Delta \ln T_{i,\omega}^{CH} \right), \quad (2)$$

[Fajgelbaum et al. \(2024\)](#) estimated (1) on the largest 50 exporters over 2018-19 and found that a few countries—notably Vietnam, Korea and Thailand—expanded their global exports in products that were heavily tariffed (relative to untaxed products). However, many countries experienced muted export responses. Moreover, cross-country responses were entirely due to a country factor, rather than due to sectoral or size factors, suggesting that pre-existing specialization cannot explain the heterogeneity in export responses. Here, I implement the same empirical specifications but with two changes. First, I extend the sample to 197 countries. Second, I extend the time horizon to 2023.

The top panel of Figure 1 reports the estimated export responses over 2018-19 in (2). The figure shows that lower-income countries had, on average, lower export responses to the tariffs compared to richer countries.: countries with GDPPC above \$15,000 had an average export growth of 0.9% compared to an average of -1.2% for countries below \$15,000 GDPPC. The variance in export responses across lower-income countries is also larger than across richer countries: the standard deviation across <\$15k GDPPC countries is 30.5% compared with 18.4% for above \$15k GDPPC countries.

The bottom panel examines longer-run responses to those 2018-19 tariffs. This simply

re-constructs $\Delta \ln X_{i\omega}^n$ to be the export response from 2018-2023 and re-estimates (1) and (2).² The lower panel of Figure 1 plots the results. There is a very similar pattern: poorer countries have tended to have lower export growth in tariffed products relative to untaxed products. So, despite being exposed to the same global tariff shock, rich and poor countries exhibited divergent export responses.

When re-calculating the decomposition exercise in Fajgelbaum et al. (2024) to determine which factor-country, sector or size-drives the variation in export responses, I continue to find that response heterogeneity is entirely due to country-specific factors. In other words, the reason that richer countries had larger positive export responses is not simply due to pre-existing sectoral specialization and or size.³ This suggests that the *domestic* structure of economies shapes responses, an insight that emerges from recent research in trade and development. For example, weak contracting environments can prevent firms from participating in global value chains, especially when products require a high degree of customization. Exporting is inherently costly and requires access to capital. In settings plagued by corruption, customs officials may extract rents by over-valuing used imported capital equipment, effectively raising tariff burdens on firms. Frictions in labor, land, and material markets further constrain firms' ability to scale or respond quickly to changes in foreign market demand.⁴

The subsequent section explores a range of specific frictions that have been shown to be important for trade in LMICs. A compelling message from this body of work is that domestic policy is trade policy. Domestic reforms can improve firm performance, allowing them to remain competitive in an increasingly fracturing global economy. The idea that complementary domestic reforms are necessary for realizing the full benefits of trade is, of course, hardly new. But, modern research on trade and development has brought a variety of data and methods to isolate particular distortions that affect trade and has sharpened our understanding of where further progress is needed. The next section assesses the current state of the literature and outlines its key limitations and opportunities for future research.

3 Markets Distortions and Trade

3.1 Labor Markets

The potential impacts of trade on labor markets receive considerable attention among policymakers. While textbook models offer benchmarks, the reality is that labor markets in LMICs

²There are, of course, several additional global trade shocks during this longer time horizon, most notably Covid-19 and the Russia-Ukraine conflict. The assumption is that these shocks are orthogonal to the product-level tariff variation from 2018-19.

³This decomposition re-estimates (1) shutting down heterogeneity across countries, sectors and size, respectively, and compares the counterfactual response to the case of full heterogeneity.

⁴Linder (1961) provides an alternative “demand-side” explanation for the muted response of lower-income countries to the tariffs: buyers in rich countries will purchase products from other rich countries because of preference for high quality. But, firms’ ability to produce high quality goods requires access to well-functioning factor markets.

diverge from the typical assumptions of no frictions, no informality, or unemployment.⁵ A large body of work has incorporated such frictions, substantially improving our understanding of how trade affects labor markets in developing countries.

Research has examined the mechanisms driving labor market impacts in LMICs. One set of explanations is unrelated to specific labor market frictions, instead focusing on changes in the nature of trade. Since the post-war period, global value chains have risen dramatically, with intermediate goods now comprising the majority of trade flows.⁶ Early work recognized that such changes could alter the distributional effects of trade. [Feenstra and Hanson \(1996\)](#) showed that when trade costs fall, the skill-abundant North offshores less skill-intensive tasks to the South; yet, from the perspective of the South, these tasks are relatively skill-intensive which raises demand for skilled labor and thus inequality in both regions—a pattern they documented for Mexico ([Feenstra and Hanson 1997](#)). A related explanation centers on product quality. If buyers in rich countries prefer higher-quality goods, firms in developing countries may need more skilled labor and capital to meet these demands.⁷ [Demir et al. \(2024\)](#) shows that export demand shocks from rich countries raise skill intensity among Turkish exporters and this raises demand for skill-intensive inputs from their *domestic* suppliers. A third channel is skill-biased technical change: trade lowers the relative price of capital goods, leading firms in developing countries to import more machinery which increases demand for skilled labor ([Acemoglu 2003](#)). These mechanisms do not depend on labor market failures but on how trade reshapes relative demand for skills in developing countries.

More relevant for this review is research on how labor market frictions mediate trade shocks, as summarized in Section 3.1 of [Atkin et al. \(2025\)](#). Three broad conclusions emerge. First, labor market frictions in LMICs are large, and understanding their sources, and how they limit labor mobility and sectoral adjustments, is critical for assessing the transmission of import trade shocks. Second, the informal sector often acts as a buffer for negative labor demand shocks in import-competing regions. Third, export opportunities tend to improve worker outcomes. But while these mechanisms are now better understood, the literature has yet to converge on concrete policy prescriptions to mitigate adverse impacts, and this is a critical gap to close.

Traditionally, the typical approach to examine the labor market impacts of trade was to examine sectoral supply and demand. In an influential paper, [Topalova \(2010\)](#) applied a “local labor markets” approach to thinking about the impacts of trade. Recognizing that the sectoral distribution across regions is far from uniform, a trade liberalization that shocks local labor demand can lead to differential impacts across regions in the absence of labor mobility. She found that regions in India relatively more exposed to imports saw a relatively slower reduction in poverty. [Kovak \(2013\)](#) formalized this insight and showed in Brazil that the negative impacts of trade in import-competitive regions were large and long lasting. That labor does not immediately

⁵More specifically, standard Stolper-Samuelson predictions that trade would reduce inequality in developing countries did not materialize; see [Goldberg and Pavcnik \(2007\)](#) for an extensive discussion.

⁶See [Yi \(2003\)](#), [Grossman and Rossi-Hansberg \(2008\)](#), and [Johnson and Noguera \(2012\)](#).

⁷[Schott \(2004\)](#), [Khandelwal \(2010\)](#) and [Manova and Zhang \(2012\)](#) show large variation in export quality across countries, and [Verhoogen \(2008\)](#) and [Kugler and Verhoogen \(2012\)](#) provide a link between product quality, the demand for higher quality inputs, and a widening skill-unskilled wage gap.

reallocate away from import-competing regions is perhaps not too surprising, but the specific factors model is typically viewed a short-run model, and so these findings from Brazil and India—two countries that are large and have diverse production structures—are surprising.

Subsequent research has explored mechanisms that lead to a slow reallocation of workers out of import-competing regions. An important contribution is [Dix-Carneiro \(2014\)](#) who estimates a dynamic structural model of trade. In his model, there are two adjustments to trade costs—young new workers can choose which sectors to enter (although not their educational choices, see [Findlay and Kierzkowski 1983](#) and [Atkin 2016](#)), and workers face a cost to switch sectors. The paper uses matched employer–employee data from Brazil that allows him to track workers’ employment over time. The benefit of the structural model is the quantification of these two costs, and indeed, the magnitudes that emerge are large: sectoral switching costs in Brazil are 1.4 to 2.7 times annual wages depending on the sector. [Artuc et al. \(2015\)](#) examine switching costs across 56 developed and developing countries, and similarly find that mobility costs in developing countries are 3.7 times annual wage, larger than the 2.6 times annual wage they estimate for developed countries. Moreover, [Dix-Carneiro and Kovak \(2017\)](#) demonstrate that these effects can be quite long-lasting because capital reallocates away and agglomeration forces decline in harder-hit regions.

If workers are slow to switch sectors how else might they respond to import-competing trade shocks? In many LMICs, the informal sector plays a key role in smoothing negative demand shocks. In Brazil, for example, the informal sector accounts for around half of all employment. Using matched employer–employee data linked to Census rounds, [Dix-Carneiro and Kovak \(2019\)](#) show that regions relatively more exposed to import competition experience relatively lower formal sector employment, more transitions to non-tradable and lower-paying services employment, muted migration responses, and have higher informal employment over the long run. More recently, [Dix-Carneiro et al. \(2025\)](#) estimate a structural model with informality and find that it acts a buffer during adverse shocks. But, since it is less productive than the formal sector, this response amplifies the real income losses relative to an economy without an informal sector. In contrast, a symmetric liberalization reallocates resources towards the more productive (and more distorted) formal sector, amplifying the gains. Similarly, when Botswana experienced a large decline in tariffs in the 1990s resulting from their membership to Southern Africa Customs Union, it also experienced an increase in informality and self-employment. Examining South Africa’s liberalization, [Erten et al. \(2019\)](#) find formal and informal employment both declined in more exposed regions and the adjustment likely occurred through increased unemployment.⁸ [Attanasio et al. \(2004\)](#) find that Colombia’s liberalization also increased the degree of informality. Overall, these findings suggest that when hit by import-competing shocks, workers find it difficult to switch to other formal sectors or to move across regions, with workers likely shifting to informal sector.

Two recent papers, again in the Brazilian context, have instead focused on monopsony as a distortion in labor markets. [Felix \(2025\)](#) finds that the trade liberalization increased the

⁸They conjecture that these responses may be specific to the South African context with its high structural unemployment and low levels of informality

concentration of local labor market payrolls by 7%—driven by exit and reduced employment in tradable non-exporting firms—without changing total employment. In effect, the large exporting firms become relatively more dominant employers. Workers can respond by changing jobs within a market or moving across markets, but she finds large deviations from perfect substitution. She estimates that Brazilians workers capture about 50 cents for every additional dollar they generate. For perspective, her estimate of the across-firm elasticity is about 7 times more inelastic than the U.S. estimates.

[Sharma \(2023\)](#) echoes this finding in her analysis of Brazil’s response to increased export market competition in the textile and apparel sector following the removal of U.S. quotas in 2005.⁹ She models workers’ labor supply decision as a three-tiered nested logit: a worker chooses a region, sector, and firm. Based on pre-MFA product mix, some Brazilian exporters are more negatively exposed to the shock than others, and she uses this variation to estimate workers substitution across firms, sectors and regions. She finds that female workers are hit harder: they are less likely to leave the firm (or sector or region), and, five years after the shock, earn less than men, who are more likely to reallocate. The estimated structural parameters imply that gender differences in labor supply elasticities generate an 18 percentage point gender wage gap, with 55% attributable to women’s stronger horizontal preferences for their employer, plausibly due to shorter commutes, safety concerns, or better work environments (for example, less harassment). The remaining 45% arises because textiles are a relatively better employment option for women, not due to comparative advantage, a point she validates by documenting stronger female-oriented amenities in the sector (e.g., maternity leave, childcare, flexible hours). One takeaway from both studies is the need for greater attention on search frictions, local transport, and firm reputation *within* markets.

The previous studies examine cases where countries lower import barriers without receiving symmetric reductions from their trade partners. In other settings, however, countries have experienced rapid expansions in export market opportunities, often through trade agreements, WTO accession, or partners’ liberalizations. China is the most prominent example: [Erten and Leight \(2021\)](#) use the local labor markets approach to analyze China’s accession to the WTO and its U.S. trade normalization. They find that regions more exposed to reductions in tariff uncertainty experienced greater exports and foreign investment, greater manufacturing employment, and lower agricultural employment. Similarly, when the U.S. normalized trade relations with Vietnam in 2001, [McCaig \(2011\)](#) and [McCaig and Pavcnik \(2018\)](#) find that more exposed regions experienced larger faster poverty declines, increased manufacturing employment, increased formal-sector employment, and greater migration inflows. [Benguria et al. \(2024\)](#) document that 2000s global commodity boom lowered skill premia in Brazil as agriculture expanded, with spatial linkages across regions playing an important role for distributing the terms of trade improvement across the economy. In Bangladesh, [Robertson et al. \(2020\)](#) find that end of the MFA in 2005 increased wages and reduced informality, outcomes driven, they argue, by internal migration. [Atkin](#)

⁹In 2005, the U.S., E.U. and Canada ended their decades-long quotas, known as the Multi-fiber Arrangement (MFA), on imports of textile and apparel from developing countries. China was the main beneficiary of this liberalization and experienced immediate and large export gains; see [Brambilla et al. \(2010\)](#).

(2016) shows Mexico's mid-1980s export expansion drew high school students quickly into manufacturing, although this lowered educational attainment in those more exposed commuting zones. These studies suggest that expanded export opportunities generate the flip side of import-led liberalizations: employment rises in export-oriented sectors and informality declines. One apparent difference appears to be the speed of adjustment: import-competing episodes feature sluggish reallocation out of affected regions, while workers seem to respond more quickly to opportunities in export-oriented sectors.¹⁰

What general principles for policy do these studies reveal about labor market frictions and trade in LMICs? One natural explanation is that it is difficult to re-train workers, particularly in developing countries with lower levels of educational attainment and lower-quality educational institutions. Migration barriers are also important. The development economics has found important roles for family and social networks, as well as traditional institutions such as caste, in shaping migration choices when formal insurance markets are limited. For example, in India, informal insurance networks built largely along caste lines (Banerjee and Newman 1998). Munshi and Rosenzweig (2016) demonstrate that consumption smoothing benefits of caste-based insurance influence rural mens' decision to migrate to higher earning jobs in the urban areas of India. Language barriers may also impede mobility in larger and more diverse developing countries. Results from Munshi and Rosenzweig (2006) suggest that these two constraints could interact: lower-caste men in India are more likely to enter schools where the medium of instruction is the local language, rather than English, which could impede future barriers to sectoral and geographic mobility. Costs of mobility in LMIC may also be high when due to poor infrastructure and low-quality housing in urban areas (Marx et al. 2013). Risk is another to barrier migration; for example, Bryan et al. (2014) experimentally show small subsidies can lead to large temporary migration in Bangladesh, as it reduces the riskiness of migration and induces individual learning about the returns to migration. Moreover, the Felix (2025) and Sharma (2023) emphasize frictions in labor markets beyond these traditional explanations, such as within-market commute times¹¹, collective bargaining agreements, workplace norms and culture, and crime. Labor markets are often subject to regulations that make it difficult for workers to flexibly reallocate (Besley and Burgess 2004). Several labor market frictions, in principle, are addressable through policy.

Several additional questions merit exploration to help policymakers maximize the benefits of trade while minimizing its adverse consequences.

- **Leverage insights from development economics.** An excellent review by Breza and Kaur (2025) emphasize additional frictions that have been identified in LMICs labor markets: wage rigidities, market power, and search-and-matching frictions. For example, they argue

¹⁰The overall effect of trade liberalization on inequality depend on various factors, including: Is the liberalization unilateral or symmetric? Is the import or export expansion occurring with richer or lower-income countries? Is activity in high skill intensive or low-skill intensive sectors expanding? These questions guide how trade affects relative wages across workers of different skill types. Trade will also affect consumer prices, which has received relatively less attention in the literature, but is important for understanding the impacts on the real wage across workers and households. For a concise discussion of the latter, see Atkin (2024).

¹¹Akbar et al. (2023) document 50% longer commutes in developing countries.

that missing markets for skill certifications could result in misallocation due to information frictions. Open areas for future work could be to explore how the insights from those studies can help understand the transmission of shocks from trade.

- **Role of new technologies and gig work.** Additionally, there are emerging questions about the changing nature of work resulting from new technologies. For example, can “gig” work, such as jobs through ride-hailing or food-delivery apps, provide better employment buffers from trade shocks than traditional informal work? Do foreign-run or domestically-run platforms generate thicker markets? What do transitions into and out of these types of jobs look like, and how do they compare with more traditional self-employment casual work?
- **Role of tradable services.** All the work above are predominantly focused on manufacturing trade and employment, but as discussed below, the increasing tradability of services allow more jobs to be performed home ([Dingel and Neiman 2020](#)). We still do not know much about the extent to which workers in LMICs take advantage of these platforms. Is there a role for policy to facilitate onboarding to these platforms?
- **Effective retraining programs.** While research on trade and labor markets typically conclude with a plea for analysis of re-training programs, this gap remains: what types of re-training programs and curriculum design serve as trade adjustment assistance?

3.2 Capital markets

Firms face large costs when trading across borders. One set of costs arises with searching and matching, such as travel to meet prospective clients, participation in trade fairs, and the general expenses around chasing leads. After securing an order, an exporter typically needs working capital to purchase inputs, and in some cases new machinery. Because international transactions tend to be larger in scale than domestic ones, input purchases may involve substantial upfront outlay. In addition, there is usually a large time delay between the time a product leaves the factory and when it reaches the buyer, making trade financing essential for maintaining operations. The exporter also faces risk of non-payment (or for buyers, risk of failed delivery). The magnitudes involved are large. [Das et al. \(2007\)](#) estimate that Colombia firms face export market entry costs between \$344,000 and \$430,000, depending on the sector and firm size; [Dickstein and Morales \(2018\)](#) estimate that Chilean chemical firms incur fixed costs of \$868,000, \$2.6 million, and \$1.6 million to export to Argentina, Japan, and the U.S., respectively. These magnitudes underscore the importance of well-functioning capital markets for facilitating trade.

This section, adapted from the Section 3.2 [Atkin et al. \(2025\)](#), discusses research on capital markets and trade. Here, I focus narrowly on a set of papers that have evaluated credit policies’ impacts on exports.

[Finlay \(2024\)](#) examines the general-equilibrium effects of a credit policy change in India. In 2007, India expanded its Priority Sector Lending (PSL) program by raising the threshold for

preferential lending from firms with less than ₹10 million in installed capital to firms with less than ₹50 million. Exploiting the discontinuity created by this reform, he compares the responses of domestic-oriented and exporting firms. Domestic firms do not respond to the policy change, but exporting firms take up new loans, expand input purchase, and sell more output. The impacts are concentrated amongst existing exporters, rather than on the export extensive margin. The results point to a misallocation in the credit market in which incumbent exporters, despite having higher capital levels, also have higher marginal products of capital.

[Defever et al. \(2026\)](#) study two export finance policies in Pakistan. The Export Finance Scheme (EFS) allows exporters to present a commercial bank with an export order and receive working capital loans at a subsidized interest rate, with the central bank refinance the loan to the bank. The Long-Term Finance Facility for Plants and Machinery (LTFFPM) offers subsidized loans for large exporters—firms with at least half of their sales overseas export turnover exceeding \$5 million—to finance long-term investments in machinery and equipment. Using a matching estimator, they find that both schemes raise the growth rate of exports by 7-11 percentage points, particularly for exporters using EFS for the first time. However, neither program appears to have expanded the set of exporters nor the set of products and destinations among existing exporters. After accounting for program costs, neither policy passes a cost-benefit test. For Nepal, [Defever et al. \(2020\)](#) evaluate its Cash Incentive Scheme for Exports (CISE), which rebates 2-4% of export value on transactions that meet a minimum domestic value-added requirement and exported beyond India. Their matching estimates find that the scheme encouraged exports to new countries (as intended), but participation was low and concentrated amongst exporters who were already, in fact, selling products beyond India. As in the Pakistan case, the particular export scheme has not produced the diversification results that policymakers had hoped.

[Paravisini et al. \(2014\)](#) study a *contraction* of credit during the Great Financial Crisis in Peru, and find that it reduces exports primarily along the intensive margin (incumbent exporters reducing their exports) rather than the extensive margin (exporters exiting). They interpret this as evidence that banks are financing variable costs of exports rather than fixed costs. This is consistent with [Manova \(2012\)](#) who, using bilateral industry exports, finds that the variation in credit constraints across countries affects the intensive margin of trade more than extensive margin.

A key challenge in quantifying the role of capital markets in trade is that credit-constrained firms often differ along unobservable dimensions. And, firms that self-select into government support schemes may already have plans to export, raising concerns about the additionality of subsidized credit. An exciting new paper by [Ali et al. \(2025\)](#) addresses both challenges through a randomized evaluation Tunisia's Tasdir+ program, which offers 50% matching grants (up to \$100,000) to offset fixed costs of exporting or establishing a foreign affiliate. Eligible expenditures include trade fair participation, market research, website development, certifications and trademark registrations, rents of foreign offices. Of the 487 firms in the sample, 281 firms were randomly offered the chance to participate; 187 of these firms submitted for reimbursements, a high take up. Results show large impacts on firm exports. In PPML specifications that combine

the intensive and extensive margins of export, the program raises exports by 27%, and 45% among continuing exporters. There is no evidence of crowding out domestic sales. Additionally, treatment effects are larger among firms with higher liability-to-asset ratios, a proxy for credit constraints. However, the program does not appear to have had meaningful effect on entry into export markets, nor on the number of destinations or products exported.

Although the papers reviewed here are not exhaustive, some lessons emerge. First, even though exporting firms are larger, more productive, and presumably have better access to credit than domestic firms, they respond to improved access to credit.¹² Second, the studies cited above show that improved credit access causes exporting firms to improve export performance through scaling existing activities, such as increasing sales of existing products to established destinations. Third, these credit policies do not appear to expand exports by bringing new firms into export markets or by spurring entry into new products or destinations. [Ali et al. \(2025\)](#) argue that their findings are inconsistent with standard heterogeneous-firm models (e.g., [Melitz 2003](#) or [Bernard et al. 2011](#)), which would predict that credit subsidies would shift elements of the extensive margin (new exporters, new countries, new products). Instead, the findings are consistent with [Arkolakis \(2010\)](#) who models exporters as facing increasing costs to reach new customers in their existing markets.¹³

In terms of paths forward, there are several open areas that are primed for more research:

- **Randomized interventions with government support.** Studies such as [Ali et al. \(2025\)](#) highlight the need for broader evidence through additional randomized evaluations of export credit policies. Given the scale and complexity of such interventions, these evaluations are likely to be conducted in close partnership with government agencies. Future research could also explore randomized trials of policies that also target the extensive margin, for example, by increasing the set of exporters or diversifying the set of export products or destinations.
- **Optimal credit policies.** The aforementioned studies all address credit constraints through different policy designs and target firms. India's PSL targeted relatively smaller firms. Tasdir+ asks firms to submit a market access proposal and rebates a portion of those expenditures. Pakistan's EFS provides subsidized working capital loans on export orders already obtained by firms, while the LTFFP subsidizes physical capital. Nepal's CISE offers a rebate on export values for exports to new destinations. Leaving aside the normative question of whether governments should be subsidizing exports, there remain many unknowns about the optimal design of such policies and optimal set of firms to target.

¹²This may reflect access to cheaper credit, rather than credit constraints. But, [Finlay \(2024\)](#) shows that Indian exporters have 28.6% higher marginal products of capital, on average, than non-exporters, and [Ali et al. \(2025\)](#) find larger treatment effects amongst credit-constrained firms.

¹³How, then, should we reconcile these findings with export-promotion studies in LMICs that report extensive-margin responses (e.g., [Volpe Martincus and Carballo 2008](#))? One possibility is that export promotion does more than credit facilitation, such as providing market research, setting up meetings with potential overseas clients, providing technical advice on logistics. Such activities that could be broadly seen as alleviating information frictions, which is discussed in Section 3.5.

- **Better understanding of credit market operators.** There are deeper questions as to why firms with potentially solid export or import business plans may face frictions in accessing credit. To answer these questions, one needs to investigate the reasons working capital loans and trade financing instruments are undersupplied or missing. This remains a largely unresolved question as there has been little research studying the plumbing of trade financing, such as industry structure of the players involved in trade financing, the role of credit bureaus, and the emergence of new trade financing technologies (e.g., tokenizing bill of ladings).
- **Trade shocks and capital markets.** While the papers referenced above focus on credit market policies, there is a literature that studies how trade shocks propagate in the presence of capital reallocation frictions, such as partial irreversibility and convex adjustment costs. For example, in the context of Peru, [Lanteri et al. \(2023\)](#) find that such frictions impede the exit of unproductive firms and cause large dispersions in marginal products, leading to larger aggregate productivity losses from import shocks than frictionless economies. More work understanding the microeconomic sources of these frictions seems warranted. For example, [Chatterjee et al. \(2025\)](#) find large consequences to exit barriers in India caused by a host of institutional and policy factors.

3.3 Material markets

Reduction in communication and trade costs have sliced production lines across space. Rather than sourcing material inputs in-house or within a single region, firms operating in global value chains now rely on inputs from numerous overseas suppliers. Just-in-time management processes further require these inputs to arrive only shortly before they are needed for production. Assured access to imported inputs is therefore critical for firms, and, drawing on Section 3.3 of [Atkin et al. \(2025\)](#), distortions in these markets have been shown to significantly affect firms' ability to trade.

The most direct evidence on the benefits of access to cheaper and higher-quality inputs comes from analyses of trade liberalizations in developing countries that lowered tariffs on intermediate inputs. These studies find that reductions in input tariffs decrease firms' marginal costs of production, increase the range of products exported, and improve total factor productivity.¹⁴ The observed within-firm improvements in TFP suggest that imported inputs embody ideas or knowledge that enhance firm performance.¹⁵

More recently, a growing set of papers using firm-to-firm transactions data has demonstrated the importance of material markets for understanding how trade shocks propagate through an economy. One strand of this literature emphasizes that the contracting environment meaningfully shapes procurement decisions. [Macchiavello and Morjaria \(2015\)](#) study Kenyan cut-flower exporters who have two marketing channels: selling into Dutch auction houses or selling directly

¹⁴For example, see [Amiti and Konings \(2007\)](#), [Topalova \(2010\)](#), [Goldberg et al. \(2010\)](#), [Halpern et al. \(2015\)](#), and [De Loecker et al. \(2016\)](#).

¹⁵For example, a firm that uses a foreign input may engage with its overseas supplier in ways that enhance its overall productivity through technical guidance, quality improvements, or process innovations. However, direct empirical evidence of this channel remains limited.

to foreign wholesale buyers. Auction prices are determined on the spot and fluctuate throughout the year, while formal contracts with wholesalers typically specify volumes and prices at the start of the season. Over the year, spot prices can diverge substantially from contracted prices, creating temptations to renege. However, customs records reveal remarkable stability in these contractual relationships, even during periods of large price deviations. Their results suggest that relational contracts can overcome weak formal contracting environments and are quite valuable, particularly long-term relationships, but that they also constrain the volume of trade. In subsequent work in a different context—the Rwandan coffee sector—[Macchiavello and Morjaria \(2021\)](#) document that mills widely procure coffee from farmers through relational contracts, and that more competition among mills weakens these relationships and results in higher procurement costs, lower cherry input quality, and reduced capacity utilization. In the context of Peru’s fish meal industry, [Hansman et al. \(2020\)](#) show that high-quality exporters mitigate contractual imperfections by vertically integrating with their upstream suppliers. More broadly, [Macchiavello \(2022\)](#) summarizes an emergent literature showing how a dynamic incentive compatibility constraints that underpin relational contracts can influence market structures, sourcing decisions, quality upgrading, and vertical integration.

A natural question that follows from these studies is whether distortions in material markets have aggregate implications. [Boehm and Oberfield \(2020\)](#) take a step in this direction by developing a general-equilibrium model of sourcing that incorporates relationship-specific inputs and imperfect contract enforcement. Using data from India’s Annual Survey of Industries, they show that firms located in states with more congested courts shift their input choices toward more standardized inputs, face higher production costs, and are more likely to vertically integrate. In other words, the contracting environment distorts the “recipes” firms use for production and influences from whom they purchase inputs (for example, by relying on family connections). Their model suggests that a weak contractual environment shapes the entire input–output structure of an economy and lowers aggregate productivity. In subsequent work, [Boehm et al. \(2024\)](#) develop a dynamic firm model showing that weak contract enforcement leads to relational contracts that are longer-lasting but less dynamic than those in economies with legal environments.

[Liu \(2019\)](#) examines market imperfections within a production network to explore how governments can optimally intervene. He embeds market frictions, such as credit constraints or contracting problems, into a canonical production network model that propagate through the network through higher prices. The paper shows that policy should target sectors with high distortion centrality, defined as the ratio of a sector’s influence (the aggregate effect of marginally expanding) to its Domar weight (its equilibrium size that the potential cost of subsidies). Sectors with the highest distortion centrality tend to be upstream because distortions propagate through demand: when downstream firms underutilize inputs due to distortions, their suppliers face reduced demand, which then cascades further up the supply chain. As a result, upstream sectors become “sinks” that accumulate distortions.

Several recent papers have explored the idea of market power in import transactions within

advanced countries.¹⁶ In the context of a developing country–Argentina–Atkin et al. (2024) exploit a period of discretionary import licensing to test for market power in international transactions. Their model yields a simple test that uses changes in import prices and quantities as licensing is introduced or removed to infer which side of the transaction holds market power. On average, they find that imposing licenses raises import prices, an outcome inconsistent with competitive models but consistent with foreign suppliers possessing some degree of market power. They further show that Argentine importers have greater market power when they are larger, but less when sourcing from richer countries. Using Colombian data, Alviarez et al. (2025) find that two-sided market power in trade with markups increasing in exporter concentration and decreasing in importer concentration, and develop a framework that can analyze how aggregate markups change with importer-exporter concentration.

Finally, a recent strand of literature that is highly relevant in today’s policy environment examines trade policy uncertainty. Uncertainty leads firms to delay investment decisions, and, as noted above, exporting and importing are large investments. Pierce and Schott (2016) show that the granting of permanent normal trade relations to China was an important factor behind the rapid rise of Chinese exports to the U.S. Handley and Limao (2017) develop a framework to quantify the effects of uncertainty, and estimate that about one-third of China’s exports to the U.S. between 2000 and 2005 is can be attributed to that reduction in policy uncertainty. Constantinescu et al. (2020) further argue that the impact of uncertainty on trade within global value chains is more nuanced: transactions within GVCs tend to be relationship-specific, which could make them less sensitive to uncertainty, but are also investment-intensive, which makes them more vulnerable to it. They estimate an overall net negative impact of trade policy uncertainty in 2018 on global trade. Nevertheless, even in an environment of uncertain global trade policy, policymakers should nevertheless remain focused on addressing domestic distortions in key factor markets.

Finally, a recent set of literature that is particularly relevant at the moment is the work on trade policy uncertainty. Policy uncertainty causes firms to hold off investment decisions, and as discussed above, import and exporting is one such investment. estimate that the granting permanent normal trade relations to China is an important factor explaining their rapid rise in exports to the U.S., with estimating that one-third of China’s exports to the U.S. between 2000-05 is attributable to the reduction in this trade policy uncertainty. Nevertheless, despite the uncertain policy environment, the distortions within material markets are sufficient alone for policymakers to be considering.

Open paths for future work on material markets, trade, and development include:

- **More sector studies and tailored data.** Progress in this area increasingly relies on two distinct types of data. Micro-level studies documenting how contracting environments

¹⁶For example, in Belgium, Dhyne et al. (2022) examine imperfect competition within firm-to-firm trade networks and finds sizable markup dispersions within firms across buyers. In related work, Dhyne et al. (2023) show that foreign demand shocks lead Belgian exporters to increase input usage almost one-for-one, but adjust labor costs less, suggesting a degree of monopsonistic competition in the labor market. Using customs records in the U.S., Alviarez et al. (2023) find that importers have large bargaining power vis-à-vis their foreign suppliers. In France, Morlacco (2020) finds that larger importers have significant market power that lead to lower import prices.

shape firm-to-firm relationships often focus on very specific settings where institutional knowledge, proprietary data, and tailored surveys complement standard administrative data. This approach offers the best hope for overcoming the numerous measurement and identification challenges in studying firm-to-firm trade. At the same time, cross-sector administration data can help identify systematic patterns in material sourcing.

- **Accessing firm-to-firm transactions data.** As discussed above, analytical frameworks that can speak to firm-to-firm transactions data are becoming more common. Obtaining such data in LMICs is, of course, easier said than done. However, many developing countries have value-added tax systems that could allow researchers to study firm-to-firm transactions within the formal economy. For example, while only a small number of firms import and export in LMICs, firm-to-firm data could reveal the true nature of participation—either directly or indirectly—in trade. Additionally, bill-of-lading data are increasingly available.
- **More credible effects of policy.** The literature remains surprisingly thin on the price effects of tariff and non-tariff barriers that provide guidance on how the recent trade policy changes will affect prices at and inside the border. [Atkin et al. \(2024\)](#) is an important step in this direction, and the current policy environment presents an opportunity to obtain more credible estimates of key price effects.

3.4 Land Markets

Land market distortions stemming from land titling issues or zoning restrictions are widespread in LMICs. Since importing and exporting firms tend to be large in size, land distortions may be binding for trade. Yet, compared with other input markets, the role of land market frictions has received relatively little attention.

One type of land policy that has become quite prevalent are industrial parks and special economic zones. These types of place-based policies typically go beyond securing physical work sites for firms. They are often accompanied by infrastructure investments, such as improved roads, ports, and the availability of electricity and water. Many zones attract foreign and domestic firms by lowering corporate taxes and/or allowing duty drawbacks. One estimate found nearly 5000 zones were created between 1995 and 2018 ([UNCTAD 2019](#)). However, there are surprisingly few rigorous analyses of whether or not zones pass a cost-benefit test in developing countries. Notable exceptions include studies of zones in China ([Wang 2013](#)) and India ([Galle et al. 2024](#)), both of which find positive effects on manufacturing.

There remains many open questions regarding land market distortions and zones for international trade in developing countries:

- **Optimal SEZ design.** Once a government decides to establish a zone, it faces a series of practical design choices. Should eligibility be restricted to particular sectors or technologies, or remain broad-based? Should upstream suppliers to targeted firms also be incentivized to co-locate? Should the zone be privately operated by a land developer, or structured as

a joint venture with the government? Should policymakers adopt a “lead tenant” model in which a flagship firm receives incentives in order to attract smaller firms? Should the zone be located near urban centers, where land is costly but commuting times are shorter, or further from cities, where land is cheaper but less accessible? Should the zone be complemented with broader industrial policies, such as supplier–MNC matching programs or workforce skills training? For example, the influential paper by [Alfaro-Urena et al. \(2022\)](#) finds large productivity gains among domestic Costa Rican suppliers linked to multinationals through Procomer’s Domestic Linkages program. [Guillouet et al. \(2024\)](#) show that experimentally reducing language barriers between foreign expat managers and domestic middle managers in Myanmar’s Thilawa SEZ improved communication between these layers of management. More research along these lines could offer immediate and practical guidance for policymakers.

- **Zones as coordination devices.** Zones often involve costly physical infrastructure and tax breaks, but are they necessary to spur economic activity? [Garg \(2025\)](#) offers a fresh perspective, arguing that zones can also address coordination failures that trap regions in low-development equilibria—an idea rooted in classic “big push” development theories ([Rosenstein-Rodan 1943](#)). She finds that India’s 4,000 industrial parks increase employment by 60% over 15 years, and estimates that roughly one-third of that increase can be attributed to a coordination effect. A natural next question is under what conditions governments can successfully trigger this coordinating mechanism, and whether the absence of such conditions explains why many zones often underperform relative to expectations.

3.5 Information and Knowledge Markets

Trade costs are higher in LMICs ([Anderson and van Wincoop 2004](#)). Over the past decade, growing interest has focused on the role of information and knowledge frictions in driving these high trade costs.

[Allen \(2014\)](#) set the stage for showing that information frictions can have quantitatively large impacts on trade. He embeds sequential search into a trade model with heterogeneous producers and applies it to intra-regional homogenous goods trade in the Philippines. In the model, producers can either sell locally or incur costly search to obtain price draws from another market. This breaks the standard no-arbitrage condition in a costless search model where prices are pinned down by differences in transport costs. Consistent with the model, he finds that observed transport costs cannot explain the variation in prices between origin-destination pairs, and observes regions that simultaneously import and export the same goods. His model suggests that information frictions can explain half of the observed price dispersion across regions.

[Startz \(2025\)](#) examines information frictions in a setting with differentiated goods. She studies Nigerian wholesale traders who retail goods, like as clothing and electronics, and sell to local buyers in Lagos. Drawing on impressive original data collection, she documents that Nigerian traders frequently travel to source products in person despite the ability to purchase online. These

trips could reflect concerns about delivery or quality issues, but traders will often meet with long-standing suppliers with whom they have done repeated business. This suggests that part of the decision to travel is motivated by traders wanting to keep up with new products and styles since online browsing is a poor substitute for discovering the latest trends. She builds a model to structurally quantify the relative importance for product discovery and contract enforcement using moments in the data that track traders' supply strategies: for example, how frequently traders travel, how often new products are sourced, and how often new suppliers are found. She finds that when ordering remotely, traders receive products roughly three months behind the frontier style and pay about 15% higher prices to ensure supplier compliance. Removing both information and contractual frictions would raise consumer welfare by 10%, with information frictions accounting for half of the gains.

[Atkin et al. \(2017\)](#) conduct a randomized trial to examine the impacts of removing search and matching frictions on exports. They study a cluster of small-scale Egyptian carpet manufacturers who had rarely produced for overseas markets. Working with a U.S.-based NGO and an Egypt-based intermediary, they marketed handmade carpets to potential clients in the U.S. and Germany. This involved facilitating the intermediary's attendance at trade shows, offering design advice, assisting with trade logistics, and so forth. Once the intermediary secured an export order, it approached a random set of producers in the cluster with the opportunity to manufacture the carpets. The authors pair the randomization with production-line data that collected prices, quantities, and quality metrics (e.g., how flat the handwoven rug lies). They find that treated firms not only have higher profits and quality than control firms but also about 15% higher TFP at the end of the study. The input and output quantities along with rug specification and quality metrics, along with having treatment and control firms produce the exact same rug in a lab setting, isolate the productivity gains. They draw upon log records of interactions to document evidence of information transfers from overseas buyers to the producers (via the intermediary), and find no evidence that any party charges for these consulting-type services. This suggests a learning-by-exporting mechanism that has been notoriously difficult to identify.

[Bloom et al. \(2020\)](#) study a different setting and intervention, but also end up finding a key role for reducing knowledge frictions on improving trade. Their context is a textile cluster outside of Mumbai. The original intervention from [Bloom et al. \(2013\)](#) had randomly provided firms with management consulting services and found large treatment effects—productivity increased by 17%. Nine years later, they re-surveyed these firms and found treated firms had 40% higher export volumes and were 20% more likely to have entered export markets. One treatment firm even began exporting to Walmart. What is interesting about this finding is that nothing in the management intervention was tailored towards exporting. Instead, the intervention targeted basic management processes like tracking and analyzing defects and improving inventory. The export gains likely reflect a combination of improved productivity, higher quality, and better general management.

[Hjort and Poulsen \(2019\)](#) use the staggered spatial and temporal arrival of submarine internet cables between 2006-14 across the cost of Africa to study internet's impact on firms. This

is a particularly clean setting to study the importance of the digital revolution. Linking this rollout to household and firm data across 12 African countries, they find increases in household employment, and in a subset of firm data, higher net firm entry, more exports, and more online communications with clients.

More recent work has studied the role of digital platforms explicitly in reducing search and matching frictions. [Carballo et al. \(2022\)](#) study exports by Peruvian firms that join a platform jointly developed by the IADB and private-sector partners, which by 2018 connected 45,000 firms across 140 countries. They find that Peruvian firms who joined the platform had 17% higher exports than non-members after attempting to try to account for endogenous selection, and the mechanisms appear to come from an improvement in visibility. [Cui and Gao \(2025\)](#) offer a different channel through which digital platforms can improve trade: information sharing. They analyze data from a large Chinese platform designed to facilitate exchanges among exporters. The posts on this platform are often related to practical questions like HS code classification and how to deal with trade policy changes. By merging platform participation data with customs records and using matching estimators to control for selection, they find that joining the platform raises exports by 11 percentage points over two years.

[Bai et al. \(2023\)](#), however, throw a bit of caution into the promise that online platforms are a panacea for reducing information frictions. They study exporters of children's T-shirts on AliExpress, exploiting a feature on the platform that allowed customers to observe seller ratings, product scope, and recent buyer transactions. By focusing on single product category, they can also collect direct measures of product quality and delivery speed by placing orders and having an external auditor evaluate them. A key finding is that sales volume correlates quite imperfectly with measured quality. The authors argue that consumers struggle to find the highest-quality sellers given the site's ranking algorithm. In other words, there is a demand reinforcement effect where some firms may move up the ranking despite not having the lowest quality-adjusted prices. They support this by randomly purchasing from selected sellers and show that these orders boost sellers' visibility and lead to higher subsequent sales. This motivates a model in which consumers sample only a subset of sellers and visibility rises with cumulative sales. In such a model, high-quality entrants will find it difficult to become visible, leading to misallocation on the platform. Quantitatively, the problem worsens as the number of participants grows, implying that blanket enrollment of firms onto large platforms may be less effective than hoped.

As discussed in Section 3.5 of [Atkin et al. \(2025\)](#), the evidence consistently finds information frictions are large in LMICs and reducing them can have sizable effects on trade. Future work should move beyond documenting their existence and focus instead of how they can be removed and whether policy intervention is necessary. Some open areas include:

- **Why do information frictions persist?** Relative to the other market distortions, information frictions appear to be somewhat easier to fix. After all, plenty of private-sector companies supply management and technical consulting, market research, design services, and logistics information. Nearly two-thirds of the world's population has access to the internet ([Ritchie](#)

et al. 2025), a share that is likely much higher among business owners (and potential importers and exporters). As such, one interpretation of Cui and Gao (2025) is that digital marketplaces work well to reduce information barriers, and there is no need for any policy intervention. However, they also find that only about 10% of Chinese exporters are registered on the platform, which suggests there may be costs to joining. Interestingly, there is considerable variation across cities which may point to localized access to broadband or in how firms learn about the benefits of platform. The findings from Bai et al. (2023) suggest that further market design is necessary, but this ought to come directly from the platform itself. Yet the persistence of information and knowledge frictions remains puzzling. Bloom et al. (2013) have argued that firms may simply be unaware of better management practices or may underestimate their returns. Alternatively, firms may strategically hoard information to prevent competitors from learning (Cefala et al. 2025). In any case, we lack a foundation for understanding why information frictions persist when there appear to be market-based solutions to reduce them.

- **Lowering information costs.** On the other hand, there may be real costs to acquiring information that could support policy intervention. Firms may be constrained in credit or worried about a first-mover disadvantage if the information diffuses to competitors (Hausmann and Rodrik 2003). Startz (2025) highlights that the role that visa policies can play to mitigate information frictions. More generally, Campante and Yanagizawa-Drott (2017) document large economic gains from lower air travel costs. Export promotion agencies can also fill this gap, and there is evidence that they do provide useful valuable trade information (Lederman et al. 2010). However, export promotion involves many different forms of help, and we still know very little about which types of interventions have the highest returns. Randomized interventions remain the most promising way to evaluate the efficacy of export promotion.
- **Improving cross-border information flows.** As the above papers indicate, there are large gains from cross-border information flows from advanced countries. Mostafa and Klepper (2018) trace the origins of Bangladesh's vibrant garment sector to technical partnership that Desh Garments established with Daewoo, a Korean firm, in 1978. The 126 Bangladeshi managers who trained abroad for six months subsequently spun off new firms and a vibrant export industry soon emerged. Artopoulos et al. (2013) examine four successful firms who pioneered emergent export industries in Argentina and argue that the tacit knowledge of foreign markets acquired by founders while abroad was instrumental. Sabel et al. (2012) describe the pioneering founder of Argentina's blueberry exports who realized the business opportunity of off-season fruit exports during a visit to Italy. For Colombia's cut flower exports, they note the early role of U.S.-based importers and Proexpo's (an export promotion agency) for providing information about U.S. customer demands. In the case of Uruguay's software sector, they note that the founders of the pioneering company, ARTech,

had previously consulted in Brazil and the U.S.¹⁷ Maintaining cross-border information and knowledge transfers into LMICs is vital, and policymakers should not disregard them simply because the payoffs are not immediate.

3.6 Trade's Impact on Market Distortions

As China debated its WTO accession, Premier Zhu Rongji viewed entry as a commitment to undertake domestic reforms. Systematic evidence from [Tang and Wei \(2009\)](#) supports this view that external commitments through trade agreements are particularly costly to reverse for developing countries. While the previous sections examine how trade interacts with various market distortions, it is entirely possible that trade could alter the level of distortions themselves. [Atkin and Donaldson \(2022\)](#) demonstrate that this channel can amplify the gains from trade in developing countries.

[Khandelwal et al. \(2013\)](#) provide an example of such amplification. As noted above, under the MFA, developing countries faced quotas on textile and apparel exports to the U.S. After negotiating quota levels, countries allocated export licenses to domestic producers. Some countries, like Hong Kong, auctioned licenses to the highest bidders. In China, however, the allocation system was opaque. Prior to liberalization, the majority of exports of quota-bound products came from state-owned enterprises. When the quotas were removed in 2005, exports surged, but this growth was entirely driven by firms who previously had not exported those products, and this extensive margin drove price declines. Had the licenses been allocated to the most efficient firms, the authors show that the liberalization should have increased exports through the intensive margin.¹⁸ This indicates that the licensing system misallocated quotas across firms, and the end of the MFA not only removed a trade barrier but also dismantled an inefficient domestic institution, thereby amplifying the gains from a trade liberalization.

A second example comes from [Tian \(2024\)](#). China's Hukou system restricted labor mobility, and migrants who did not officially change their hukuo status had reduced access to public services, such as schools and healthcare. She compiles a database of prefecture-level migration regulations from 1978-2016 and develops a scoring method to measure how friendly these regulations were towards migrant workers. She links this database to regional exposure to declines in tariff reductions following China's WTO accession, and finds that prefectures with greater export market access adopted more migrant friendly policies during this period. The findings demonstrate how trade itself can change underlying regulatory distortions to factor markets, in this case labor.

A third example comes from [Javervall and Khoban \(2025\)](#). Political connections can distort

¹⁷Of course, information alone is only a component of these success stories, and [Sabel et al. \(2012\)](#) emphasize the importance of overcoming the many coordination failures between private firms, industry organizations and the government that can arise in nascent sectors. They argue these coordination failures may be more important than the appropriability concerns of pioneering exporters emphasized by [Hausmann and Rodrik \(2003\)](#).

¹⁸This is because a license price acts as a specific trade cost (instead of an ad-valorem cost) and so the constraint on efficient firms is especially high.

resource allocation and known to be pervasive in developing countries. The authors show that the value political connections diminished when India liberalized its tariff regime. Using a close-election research design, they show that Indian firms with connections to winning politicians have higher sales, inputs, capital, and labor expenditures. However, after tariffs fell in the 1990s, particularly on imported inputs, the value of political connections declined. In effect, as Indian firms gained easier access to foreign inputs, their reliance on politicians to source these inputs diminished.

A set of studies documents how trade can improve the enforcement of existing regulations within developing countries. [Harrison and Scorse \(2010\)](#) find that anti-sweatshop activism in the 1990s, arising from greater multinational sourcing of labor-intensive products, improved working conditions in Indonesian factories. [Tanaka \(2020\)](#) shows that Myanmar's trade liberalization in the 2010s led to improvements in fire safety, health management, and worker voice. [Boudreau \(2024\)](#) conducts a randomized trial to evaluate worker safety committees in Bangladeshi garment factories who supply to MNCs, finding that they improve a range of health and safety practices. None of these three (partial-equilibrium) studies find evidence of negative employment effects. By contrast, [Alfaro-Urena et al. \(2022\)](#) examine responsible sourcing standards adopted by multinationals in Costa Rica and find reduced sales and employment among domestic suppliers, but higher wages for low-wage workers. Using a general-equilibrium framework, they show that fair-trade policies can have ambiguous aggregate effects but important distributional consequences: directly exposed low-wage workers benefit, while non-exposed low-wage workers experience negative effects through equilibrium wage and price adjustments.

The idea that trade agreements can generate a “race-to-the-top” appears in other contexts, as well. [Clausing et al. \(2025\)](#) examine how carbon border adjustment mechanism (CBAM) policies can trigger domestic regulatory changes. In 2026-27, the E.U. and U.K. will require that importers in six industries—iron and steel, aluminum, cement, fertilizer, hydrogen, and electricity (excluding the U.K.)—to purchase certificates at domestic price of carbon. Using a quantitative model of global aluminum and steel trade, the authors simulate the effects of CBAM. Contrary to concerns that CBAMs would disproportionately harm lower-income countries, they find that production in these sectors is not systematically more carbon-intensive in lower-income countries. Moreover, they show that there is a strong incentive for lower-income countries to adopt carbon regulations abroad in order to capture the tax revenue themselves rather than allowing it accrue in Europe.

Despite these studies, the idea that trade can alter domestic distortions in LMICs remains vastly understudied. Two immediate paths for research stand out:

- **Trade as a catalyst for institutional improvement.** If trade reduces distortions and strengthens domestic institutions, it can substantially amplify the gains from trade. This channel may help explain the gap between the large gains from trade estimated in natural experiments and the more modest gains predicted by standard quantitative models. For example, [Feyrer \(2021\)](#) exploits the eight-year closure of the Suez Canal from 1967 to 1975, which disproportionately affected developing countries, and estimates an elasticity

of income with respect to trade of around 0.25. [Feyrer \(2019\)](#) uses improvements in aircraft technology to estimate an elasticity of 0.50. Both estimates are substantially larger than those predicted by standard models. But, aside from the examples above, and as discussed in [Atkin et al. \(2025\)](#), most of the direct evidence on how trade changes institutions comes from historical contexts (see [Nunn and Trefler \(2014\)](#) for a review). The extent to which trade has altered institutions in developing countries today remains critically under-explored.

- **Cross-border regulatory collaborations.** In an era of rising fragmentation, it seems pertinent to emphasize *specific* ways through which globalization can improve institutional quality. One area is voluntary collaboration among regulatory bodies across countries. According to [Fuller \(2010\)](#), China's air crash rates were "stubbornly high" in the late 1990s. In 2002, its civil aviation agency established an exchange with the U.S. Federal Aviation Authority that provide technical assistance and allowed access to crash data. By the late 2000s, China's accident rates had fallen below the U.S. and Europe. Of course, other regulatory changes were implemented, but the prospect of Chinese carriers being denied U.S. landing rights and the cross-border collaboration drove institutional improvements. In 2012, the U.S. Federal Trade Commission and India's Competition Commission of India signed an memorandum of understanding to facilitate training, technical collaborations, and information sharing ([FTC and CCI 2012](#)). Assessing the impacts of such voluntary partnerships is challenging using standard economic tools, but detailed case studies can provide invaluable insights through which international exchange of ideas can shape institutional quality.
- **Deep trade agreements.** Modern trade agreements extend well beyond tariffs, embedding labor, environmental, and regulatory provisions into the agreements. For example, in the USMCA created a Rapid Response Mechanism allowing any "interested party" to petition the U.S. to investigate concerns over workers' rights at facilities in Mexico. Relatedly, the German Supply-Chain Act requires that large companies to establish "risk management system to identify, prevent or minimize the risks of human rights violations and damage to the environment." The U.S. Uyghur Forced Labor Prevention Act presumes that any product that wholly or partly produced in Xinjiang is subject to §307 of the 1930 Tariff Act, which restricts importation of goods produced by forced labor. How do firms comply with these rules? To what extent an they facilitate changes or enforcements of legal regulations within foreign countries? Or, are they primarily used a vehicle for trade protection? These questions remain unexplored.

4 Vertical Policies and Services

The types of policies that would address distortions in the previous section are predominantly "horizontal," in that they are not biased toward particular firms, sectors, or regions. In recent years, however, countries have increasingly turned toward policies more appropriately characterized as

“vertical” to support trade objectives (Juhasz et al. 2025). Rising geopolitical tensions have raised concerns that supply chains for military and other critical sectors may be compromised. At the same time, concerns over climate change, coupled with technological innovations, are spurring countries to accelerate the transition to a greener economy. The rise of industrial policies in one country may also reflect strategic responses to the adoption of such policies elsewhere. Some developing countries, facing pressures of de-industrialization, have implemented targeted policies to support manufacturing sectors (e.g., India’s Production Linked Incentives program).

As the policy environment has shifted, research has kept pace. There is, of course, a longstanding debate over whether countries should pursue industrial policies and under what conditions they are justified. This section will not enter into those normative questions, which have been extensively examined elsewhere (for a recent treatment, Juhasz et al. 2024). Instead, it will focus more narrowly on the role of services in the development process, as this debate is particularly relevant for LMICs.

A few points regarding manufacturing and services are well-established. First, apart from city-states and petro-states, no country has successfully transitioned to high-income status without first building a globally competitive manufacturing base. Second, manufacturing as a share of employment is falling globally. Third, countries today are de-industrializing earlier in the development process than the past. Fourth, there is agreement that services has been vastly understudied compared to manufacturing and many open research questions remain.

Establishing rigorous empirical evidence that development could be service-led will, in general, be difficult given the usual challenges around identification and measurement. Yet, Faber and Gaubert (2019) is a notable example that credibly shows a positive link from tradable services to development. Focusing on the tourism sector, which exceeds manufacturing exports in 40 percent of developing countries, the study uses Mexico as a setting to estimate the causal impact of tourism growth on local development. They cleverly use exogenous variation in tourism driven by natural and cultural characteristics of locations—e.g., measures of beach quality and the presence of ancient ruins as tourists attractions. In contrast to a “Dutch disease” type phenomenon, where resources get reallocated away from more productive sectors into tourism, they find a positive relationship between tourism and manufacturing activity. They argue that the gains to manufacturing come from tourism increasing local agglomeration forces. In a completely different setting—IT services in India—Avdiu et al. (2023) instrument for tradable services employment using foreign demand and find that for every 4 non-tradable jobs are created for every 10 tradable jobs. These two studies suggest that tradable services sector can have positive spillovers, but a better understanding the mechanism that generates these spillovers remains under-explored.¹⁹

Another approach is to break the debate over service-led development into smaller components. In a recent article, Goldberg and Reed (2023) argue that economic development is tightly linked to the adoption of increasing returns to scale technology. Indeed, proponents

¹⁹ Another channel could be that tradable services trigger human capital investments that have cross-sector benefits. For example, if working at a tourist hotel early in one’s career requires impeccable English and etiquette, does this experience generate productivity gains when workers move on to sectors?

that manufacturing remains critical for development will emphasize that manufacturing exhibit economies of scale. We have comparatively fewer studies examining returns to scale in services. A challenge is that services data are more difficult to obtain compared to manufacturing. However, in recent years, there have been methodological developments to estimate economies of scale using a variety of data. [Bartelme et al. \(2025\)](#) develop a framework where sector scale can be inferred based on the following insight: if there are returns to scale, larger sectors have lower prices; and, lower prices should lead to higher global demand. This allows them to use standard trade data (and existing estimates of trade elasticities) to estimate scale by building a demand-driven instrument. [Lashkaripour and Lugovskyy \(2023\)](#) develop a multi-sector Krugman model where “scale elasticities reflect the degree of love for variety whose social benefits are not internalized by firms’ entry decisions.” They apply this insight using firm-level data in Colombia to estimate sectoral scale elasticities through the substitution elasticities across domestic firms within a region. [Costinot et al. \(2019\)](#) use institutional details of one sector—pharmaceuticals—to test for home market effects. The data come from a market research company that tracks bilateral sales of pharmaceutical drugs, and countries’ disease burdens from the WTO. They demonstrate that a country’s demographics pins down its disease profile and thus the demand for particular drugs. Using this variation, they find a positive correlation between domestic demand and being net sellers of drugs which confirms a home-market effect. These studies offer different approaches to estimate scale using diverse different data requirements which may be especially useful in services applications.²⁰

Proponents of manufacturing-led development also emphasize within-firm (or within-individual) learning. This makes it possible for individuals with low-levels of education to access higher-paying jobs later in their careers. As [Rodrik and Sandhu \(2025\)](#) note, labor-intensive manufacturing typically does not require any specialized skills beyond manual dexterity, working in teams, and being punctual. Most estimates of within-firm productivity improves, or learning-by-doing, come from manufacturing sectors, such as carpets ([Atkin et al. 2017](#)), automobiles ([Levitt et al. 2013](#), [Adhvaryu et al. 2023](#)), aircraft ([Benkard 2000](#)), textiles ([Bloom et al. 2013](#)), and semiconductors ([Goldberg et al. 2024](#)). Studies that benchmark service delivery would be useful to confirm or rebut the conjecture that there is more learning within manufacturing sectors. [de la Parra and Shenoy \(2025\)](#) is a step in this direction. They collect multi-dimensional sources of retail productivity—customer counts data, inventory stocks and product mix—for establishments in Lusaka, Zambia. Of course, detailed surveys only provide measurement for a specific setting. But, they are important complements to administrative datasets which can rarely address productivity measurement challenges (see the discussion in [Atkin et al. 2019](#)). Moreover, generalizability can come through tailored surveys implemented across a variety of countries and services sectors.

[Fan et al. \(2023\)](#) is an interesting exception. This paper develops a structural framework to estimate productivity growth across sectors that include tradable and non-tradable services. In

²⁰ Interested readers should look at Appendix R of [Lashkaripour and Lugovskyy \(2023\)](#) for a formal comparison of these different methods to estimate scale.

order to estimate productivity, analysts must confront the challenge that quality variation can confound estimates of productivity. This is already difficult in manufacturing settings (De Loecker and Goldberg 2014). This is likely more challenging with tradable and non-tradable services where the delivered “product” is often bespoke. Fan et al. (2023) start by assuming that agriculture, manufacturing, and producer services (like IT or legal services) are tradable, but consumer services are non-tradable (e.g., restaurants, gyms). They further assume that demand for agriculture, manufacturing and services is non-homothetic, and confirm this by estimating Engel curves using Indian household consumption data. These two assumptions allow them to “invert” a location’s share of employment in consumer services to obtain its productivity levels.²¹ They find that productivity growth in consumer services has exceeded agriculture and manufacturing, leading to the provocative challenge that policymakers need not be concerned with “premature de-industrialization” (Rodrik 2016). However, their results show that since richer consumers spend disproportionately more on these services, the growth has favored richer households. Additionally, their exercise is an accounting one and does not assess the drivers of non-tradable services productivity growth.

Further progress on services is on the horizon. Administrative datasets that can track services flows are increasingly becoming available, particularly in countries that have value-added tax systems. Amodio et al. (2025) is a very nice example that uses VAT data to examine the linkages between manufacturing and services. The firm-to-firm transactions data allow them to trace the impact of surge in Chinese demand for beef across sectors in Uruguay. Their results show that the demand surge extends well beyond the agricultural sector and its direct suppliers. For every export dollar earned through beef sales, the services sector gains 10 cents through indirect linkages. Real estate services, construction, retail and professional services (e.g., legal) all expand from the export shock. Coupled with data on employment, they further can show positive impacts on services wages and sales per worker. Overall, their findings illustrate a tightly integrated network of agricultural, manufacturing and services firms all participating in the beef value chain, again suggesting that the “choice” of promoting particular sectors may not be necessary. Firm-to-firm transactions data are increasingly available in LMICs: for example, India, Rwanda, South Africa, Uganda, Ethiopia, Costa Rica. These are natural places to begin building the evidence base on linkages between agriculture, manufacturing, and services.

Additional paths for further research include:

- **Service-led development.** While the Fan et al. (2023) is progress towards the critical question of whether countries can develop through services, much more work is needed. After all, their conclusions run counter to the view that India’s development process has been below potential. How can we make further progress towards answering this all-important question? As noted above, one path is to break it into smaller components that are easier to answer. For example: How does the TFP process of services firms evolve over time and

²¹The technical breakthrough is to establish the conditions under which appropriately specified preferences (Price Independent Generalized Linear) can recover the income elasticity of an aggregate value added demand system from household data on final consumption purchases.

does it differ from manufacturing. For example, in the spirit of [Rodrik \(2012\)](#), do services exhibit unconditional productivity growth? What are fundamental supply and demand parameters within services sectors? Is production in services better characterized by constant or increasing returns to scale? What do the career trajectories of young workers who begin in services look like? How linked are tradable and non-tradable services to the agriculture and manufacturing parts of the economy?

- **Are all services the same?** Among the small set of papers that study services, a distinction is frequently made between tradable and non-tradable services but no further. It remains an open question as to whether or not the type of service matters for aspects of the development process: productivity growth, employment, and cross-sector spillovers. In a recent paper, [Bartelme et al. \(2024\)](#) argue that foreign demand shocks among particular manufacturing sectors—complex intermediates and capital goods—have larger real income effects than other sectors. Their analysis provides a theory-grounded rationale that a country’s location in the product mix matters for development ([Hausmann et al. 2007](#), [Hidalgo et al. 2007](#)). Do these findings generalize to services? What kinds of services matter more than others? How important is market size for different types services?
- **Trading non-tradable services.** The line between tradable and non-tradable activities is increasingly becoming blurred as technology and platforms have proliferated across the developing world. This has lead to the emergence of flexible “gig” jobs that, geographically speaking, are more tradable than in the past—for example, delivery workers now enable retailers to sell to consumers further away. As discussed above, it is possible that these jobs instills a certain degree professionalism that trigger the learning-by-doing found in manufacturing. For example, [Tang \(2024\)](#) demonstrates that restaurant delivery workers in China do exhibit social learning. Labor force surveys (or their modern-equivalence through platforms like LinkedIn) could be used to examine career ladders of workers with the goal assessing the relative impact of initial jobs in manufacturing, tradable and non-tradable services (whether this can even be disentangled from selection is, of course, is major challenge).
- **AGI and services.** New technologies are creating new types of tradable services jobs that may favor workers in developing countries. [Jalota and Ho \(2024\)](#) and [Ho et al. \(2025\)](#) examine labor supply elasticities in India to jobs that provide underlying data used in training AI models. The twist here is that these jobs can be performed at an office or from an individual’s household. Both studies experimentally vary job opportunities based on location (among other treatment arms) to examine take-up across gender. They find that women are quite responsive when offered the opportunity to work from home. The studies give promise that emergent jobs in AI, in this case exported to the developed world, could be beneficial (at least in the short-run) to women, particularly in societies where female labor force participation is low. Additionally, AI technologies that enable real-time language

translation could expand opportunities for workers in developing countries to enter tradable services jobs.

5 Conclusion

With the considerable uncertainty in the global trade environment, LMICs are concerned about trade's continued role in driving growth. Nevertheless, a central thesis of the work on trade and development has been that countries can reduce trade costs by looking inward. Domestic policy is a form of trade policy. Interventions in key factor markets can improve firm and worker performance, lead to deeper participation in the global economy, and can broaden the gains from trade within countries.

This article offers a taxonomy for organizing research on trade of LMICs. It also argues that further progress will come from continuing to draw insights across diverse fields—trade, development, macroeconomics, and industrial organizations—that have embraced a variety of methods—applied econometrics, descriptive analysis, case studies, and calibration. Diverse datasets, ranging from large-scale administrative datasets to small-scale curated datasets, will remain important for measuring impacts. Future research should continue to embrace these broad approaches to maintain policy relevance in a changing global economy.

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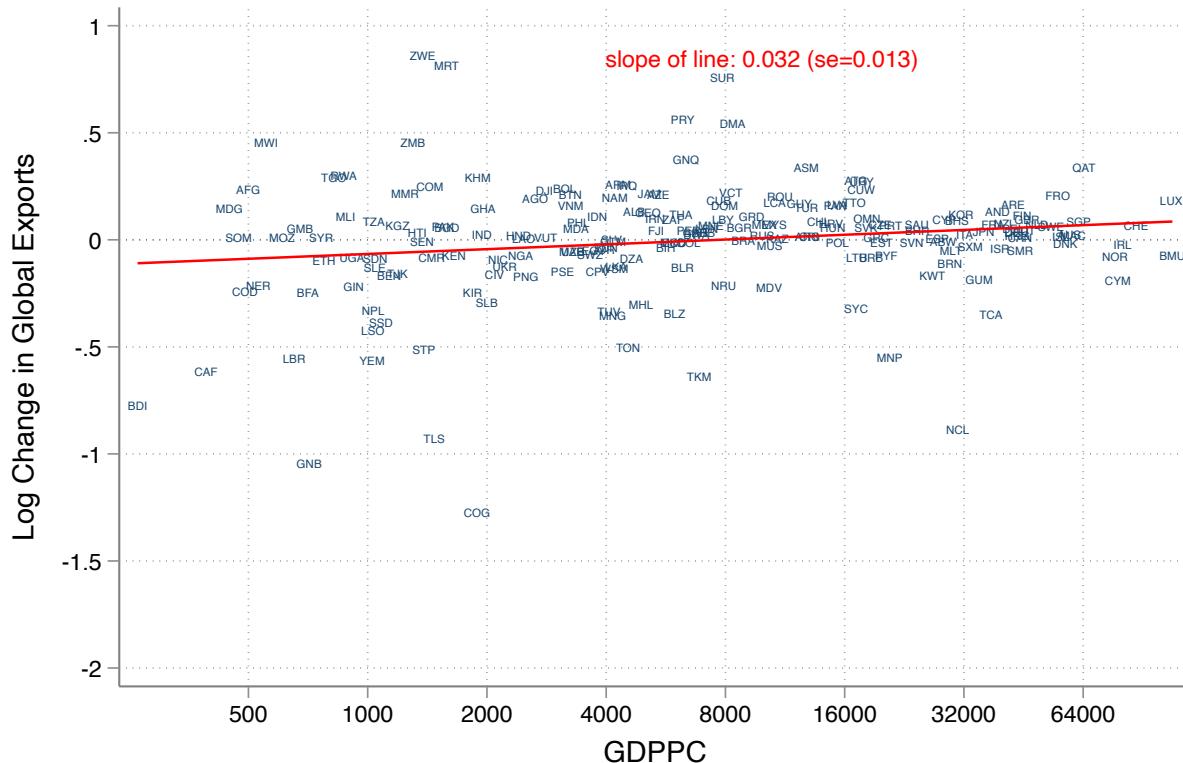
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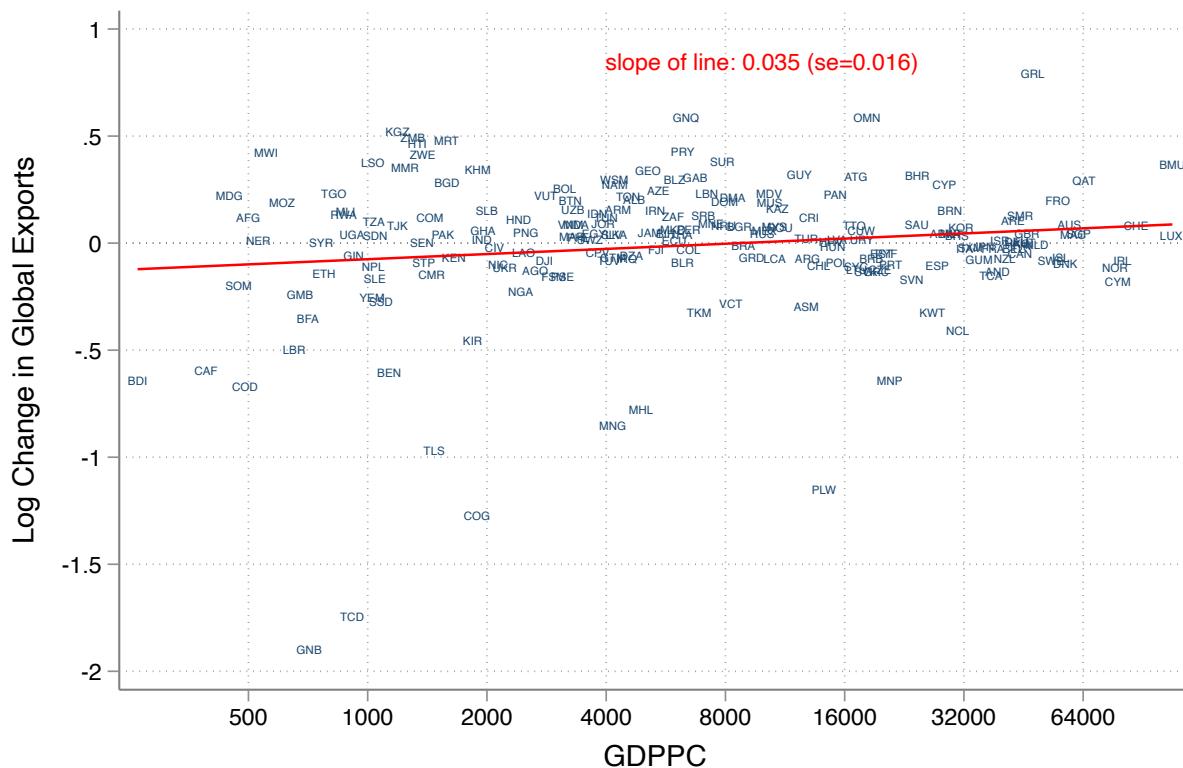
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FIGURE 1: EXPORT RESPONSES TO 2018-19 US-CHINA TARIFFS

Short-Run Responses (2018-19)



Long-Run Responses (2018-23)



Notes: Figure plots the export responses, defined in (2), to the 2018-19 U.S.-China tariffs. Figure A reports the short-run responses (2018-19) and Figure B reports the long-run responses (2018-2023). This approach is based on Fajgelbaum et al. (2024) and expanded to 197 countries.