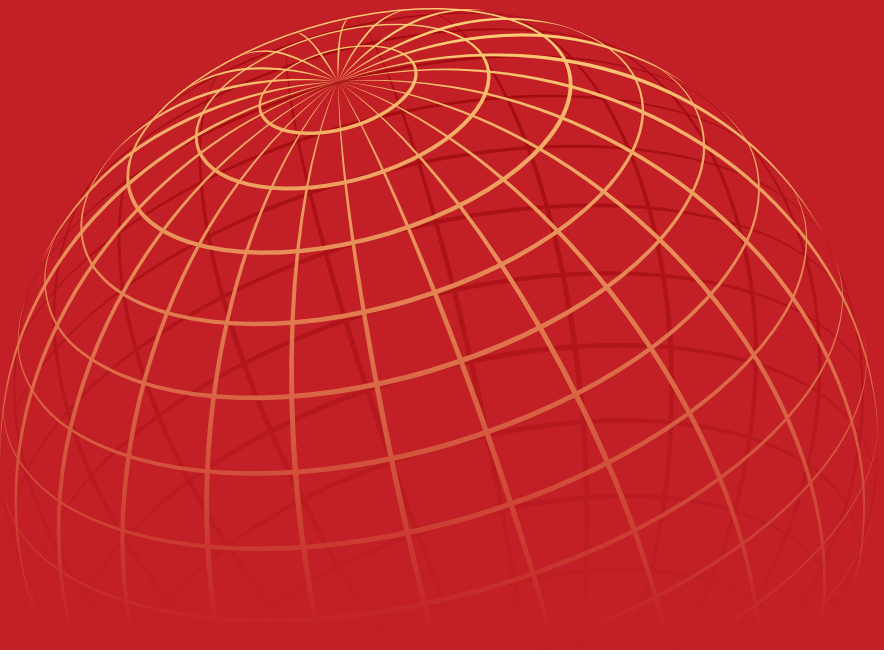


CHAPTER 3

HIGH TRADE COSTS

Causes and Remedies

As the global economy rebounds from the COVID-19-induced global recession, the accompanying strength in global trade offers an opportunity to jump-start the recovery in emerging market and developing economies (EMDEs). Lowering cross-border trade costs could help revive trade growth. Trade costs are high: on average, they double the cost of internationally traded goods in comparison to domestic goods. Tariffs account for only one-fourteenth of average trade costs; the bulk of trade costs are incurred in shipping and logistics, as well as cumbersome trade procedures and processes at and behind the border. Despite a decline since 1995, trade costs remain almost one-half higher in EMDEs than in advanced economies; about one-third of the gap may be accounted for by higher shipping and logistics costs and another one-third by trade policy. A comprehensive reform package to lower trade costs would include trade facilitation measures; deeper trade liberalization; efforts to streamline trade processes and clearance requirements; better transport infrastructure; more competition in domestic logistics, retail, and wholesale trade; and less corruption. Some of these measures could yield large dividends: among the worst-performing EMDEs, a hypothetical reform package to improve logistics performance, maritime connectivity, and border processes to those of the best-performing EMDEs is estimated to halve trade costs.

Introduction

Global trade collapsed by nearly 16 percent at the height of the COVID-19-induced global recession, in the second quarter of 2020, as pandemic-related policies disrupted shipping, international travel, and domestic economic activity. The subsequent rebound, however, was swift, especially for goods trade, and much faster than after the 2007-2009 global financial crisis. The recovery in global trade offers an opportunity for emerging market and developing economies (EMDEs) to jump-start their still-weak recovery from the pandemic. To seize this opportunity after a decade of slow trade growth, however, many countries may need to implement policies to lower the cost of trade.

Trade, powered by global value chain integration, has been an important engine of output and productivity growth over the past several decades. For example, a 1 percent increase in trade has been estimated to lift per capita income by 0.2 percent over the medium term (World Bank 2020a).[1] Global value chain participation, in particular, has been associated with reduced vulnerability of trade activity to domestic shocks although it has come with increased sensitivity to external shocks (Espitia et al. 2021).

Yet, over the past decade, global trade growth has slowed as global value chains matured, investment weakness weighed on goods trade, and trade tensions emerged between major economies over the past three years (World Bank 2015, 2017). As a result, trade is no longer growing faster than output: instead of being twice as fast as global output growth, as it was during 1970-2008, trade growth is now likely to continue broadly in step with real GDP growth, in line with its behavior during the 2010s (figure 3.1; World Bank 2015). Absent a major policy effort, weaker prospects for global output growth in the 2020s than in the 2010s are likely to be mirrored in weaker trade growth, too (World Bank 2021a).

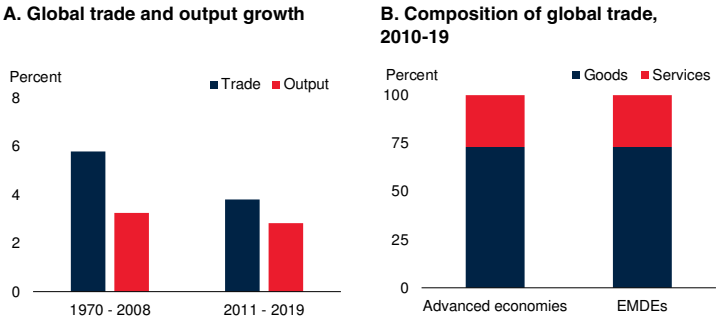
The recovery from the COVID-19-induced global recession offers an opportunity to revive trade growth as the global trade network is reshaped. The pandemic is likely to accelerate changes in supply-chains that had already begun, including by further regionalizing production networks and increasing digitalization. Multinational corporations operating in EMDEs have already increased the use of digital technologies and enhanced diversification of suppliers and production sites to increase their resilience to supply chain shocks (Saurav et al. 2020). As multinationals seek to diversify, EMDEs have a unique opportunity to

Note: This chapter was prepared by Franziska Ohnsorge, Lucia Quaglietti, and Cordula Rastogi.

[1] Trade has been associated with greater quality of products (Fieler, Eslava, and Xu 2018), technology transfers (Henry, Kneller, and Milner 2009), welfare gains from more varieties (Broda and Weinstein 2006), lower poverty (World Bank and WTO 2018), and distributional gains for lower-income households since they tend to spend more on tradable goods and services (Carroll and Hur 2020). At the same time, trade has been associated with a shift of income from labor to capital and, in some cases, environmental degradation (World Bank 2020a).

FIGURE 3.1 Global trade

Instead of being almost twice as fast as global output growth, as it was during 1970-2008, trade growth has expanded broadly in step with real GDP growth since 2011. Goods trade accounted for 75 percent of global trade during 2010-19.



Source: World Bank.
Note: EMDEs = emerging market and developing economies.
A. Bars indicate annual average growth. World output is real GDP growth and it is aggregated using real U.S. dollar GDP weights at 2010-19 average prices and exchange rates as reported in the *Global Economic Prospects* report. Trade growth is average of import and exports data.
B. Shares of global goods and services trade in global trade, average of 2010-19.

integrate into global supply chains, provided they can offer a conducive business environment.[2]

Lower trade costs can help create a business environment conducive to global supply chain participation. Trade costs currently double the price of internationally traded goods over domestic ones, a phenomenon sometimes dubbed "thick borders" (World Bank 2009). In EMDEs, trade costs are almost one-half higher than in advanced economies. High trade costs raise the price of exports and imports, hinder competitiveness, limit participation in global value chains, and erode consumer welfare by reducing the availability of goods and services for consumption. Lowering trade costs could help boost trade flows and enhance welfare (World Economic Forum and World Bank 2013).

Trade costs capture the costs faced by countries when trading goods across borders, in excess of the costs that the same goods face when traded domestically (box 3.1). Implicitly, trade costs cover the full range of costs associated with trading, including transportation and distribution costs, tariffs and nontariff barriers, costs of information and contract enforcement, legal and regulatory costs, as well as the cost of doing business across cultures, languages, and economic systems (Anderson and van Wincoop 2003).

This chapter will examine the following questions.

- What are trade prospects for the next decade?
- How large are trade costs?
- What are the correlates of trade costs?
- Which policies can help to lower trade costs?

Contribution to the literature. This chapter updates and confirms an earlier literature that estimates the magnitude of trade costs and its correlates (Arvis et al. 2016; Novy 2013). Like this literature, the analysis in this chapter confines itself largely to goods trade which accounts for about 75 percent of total world and EMDE trade (figure 3.1). Like the previous literature, this chapter uses goods trade costs estimates from the World Bank/UNESCAP database for 1995-2018, the latest year for which data are available.[3] The chapter adds a quantitative assessment of the costs of border and customs processes to factors considered elsewhere such as shipping, regulations, logistics, and governance and finds that such border and customs processes statistically significantly raise trade costs.[4] It builds upon the analytical findings to discuss policy options for lowering trade costs in support of the recovery from the COVID-19.

Main findings. This chapter offers the following findings.

First, the COVID-19-induced global recession of 2020 triggered a collapse in global trade, followed

[2] The supply chain response to the disruption caused by the 2011 earthquake in Japan may offer a guide to potential supply chain changes after the pandemic. After the 2011 earthquake, supply chain shifted away from the affected source but without any major near-shoring, reshoring or diversification (Freund et al. 2020).

[3] For 2018, trade costs data is available for 199 countries, including 150 EMDEs.

[4] For governance, see Hou, Wang, and Zhie (2021). For shipping and regulations, see Staboulis et al. (2020). For regional trade agreements, see Bergstrand, Larch, and Yotov (2015). For logistics, see Marti and Puertas (2019).

by a rapid rebound. Within six months, global goods trade had recovered to pre-pandemic levels and, by March 2021, global services trade was within 3 percent of pre-pandemic levels notwithstanding travel and tourism services still being just under 65 percent below. Looking ahead, absent a major policy effort, trade growth is likely to be weak over the next decade as output growth slows and as structural factors that supported the rapid trade expansion in the past have largely run their course. A reduction in trade costs may help accelerate trade growth.

Second, trade costs are high: on average, they are equivalent to a 100 percent tariff and, hence, they double the cost of internationally traded goods over domestic goods. Tariffs account for only one-fourteenth of average trade costs; the bulk are incurred in transport and logistics as well as cumbersome border and customs procedures. Despite a one-third decline since 1995, trade costs remain almost one-half higher in EMDEs than in advanced economies. About one-third of the explained difference in trade costs between EMDEs and advanced economies can be accounted for by higher shipping and logistics costs, and another one-third by trade policy (including trade policy uncertainty).

Third, services account for almost one-third of the value added of manufacturing exports. Services trade costs tend to be considerably higher than goods trade costs and, therefore, also spill over into higher goods trade costs. To a large extent, services trade costs have been attributed to regulatory restrictions.

Fourth, trade costs can be lowered effectively through comprehensive reforms packages that streamline trade processes and customs clearance requirements, enhance domestic trade-supporting infrastructure, increase competition in the domestic logistics, retail, and wholesale trade industries; lower tariffs; lower compliance costs with standards; and reduce corruption. Trade agreements that deepen integration beyond tariffs cuts can help lower nontariff barriers. Empirical analysis suggests that an EMDE in the quartile of EMDEs with the highest shipping and logistics costs and most unwieldy customs and border processes could halve its trade costs if it improved these conditions to match the quartile of EMDEs with the lowest costs of shipping and logistics and the least cumbersome border and customs processes.

Prospects for trade growth

Trade growth slowdown over the past decade. Global trade growth slowed over the past decade, from 5.8 percent per year during 1970-2008 to just 3.8 percent per year during 2011-19. If global trade had continued to expand according to its historical trend, it would have been more than one-quarter above its actual level in 2019 (figure 3.2). With the exception of Europe and Central Asia (ECA), the slowdown in trade growth was broad-based, extending across all EMDE regions. In Sub-Saharan Africa (SSA), trade growth has been particularly weak, at about half the EMDE average after the global financial crisis. At the sectoral level, the slowdown was concentrated in goods trade. Services trade continued to outpace world GDP before the pandemic, rising 1.5 percentage point per year faster on average during 2011-2019.

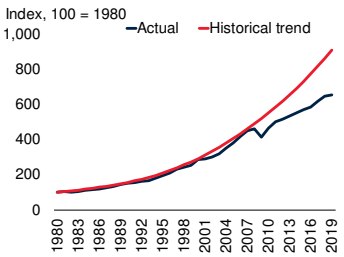
Declining responsiveness of trade to economic activity. The slowdown in trade growth reflected weak economic growth in the decade following the global financial crisis but also a weakening responsiveness of trade to global economic growth (the income elasticity of trade). Estimates from an error correction model for 1970-2019 suggest that the long-run trade elasticity has declined from 2.2 during 1990-2011 to around 1 during 2011-19.[5] In EMDEs, the ratio of import growth to income growth declined from 1.7 during 1990-2008 to 0.9 during 2011-19. The slowdown in the global income elasticity of trade in the decade before the pandemic hit reflected several factors (World Bank 2015).

[5] The model allows both the long-run elasticity of trade with respect to income (which captures trend, or structural, factors) and the short-run elasticity (which is relevant to short run or cyclical developments). For further details on the model specification see Constantinescu et al. (2014)

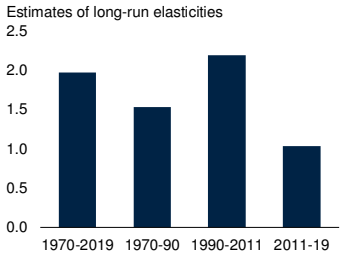
FIGURE 3.2 Evolution of global trade

Global trade growth has slowed since 2011, in part as a result of slowing output growth. In addition, the elasticity of trade to global economic activity has fallen over the past decade amid slowing global investment, maturing global value chains, and mounting trade tensions. Global trade collapsed during the pandemic but rebounded quickly, with the exception of travel and tourism services, which remain depressed.

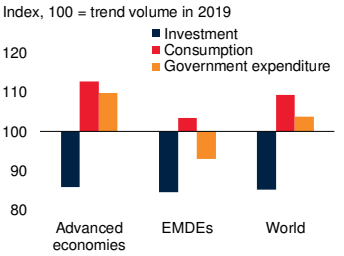
A. World trade, actual and trend



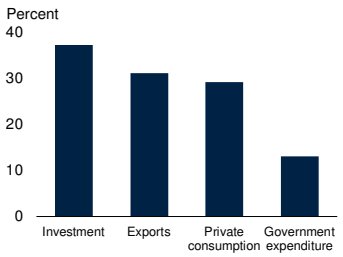
B. Trade elasticities



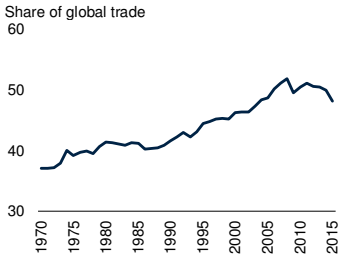
C. Aggregate demand components relative to historical trend, 2019



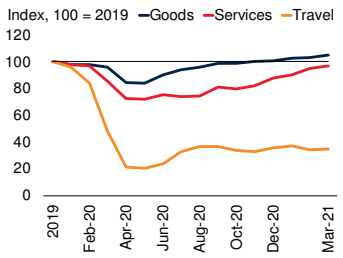
D. Import content of aggregate demand, 2014



E. Share of global-value-chain-related trade in global trade



F. World trade



Sources: Auboin and Borino (2017); Constantinescu et al. (2014); CPB Netherlands Bureau for Economic Policy Analysis; World Bank; World Trade Organization.

Note: EMDEs = emerging market and developing economies; GVC = global value chain.

A. World trade refers to average imports and exports volumes. The historical trend is computed over the 1980-2019 period, using a Hodrick-Prescott filter.

B. Estimates from an error correction model estimated over the period 1970-2019. The model allows both the long-run elasticity of trade with respect to income (which captures trend, or structural, factors) and the short-run elasticity (which is relevant to short run or cyclical developments). For further details on the model specification see Constantinescu et al. (2014).

C. Trend levels in 2019 are obtained on the basis of the historical average trend growth computed over the period 1995-2008 and rebased to 100. Bars below 100 show deviations of actual 2019 levels from trends.

D. Data for 2014 as estimated in Auboin and Borino 2017.

E. Share of GVC trade in global trade as defined in *World Development Report* 2020. Latest available data is 2015.

F. Goods trade is the average of import and exports volumes, services trade is the average of imports and exports values. Goods trade data in 2021 relative to average of 2019, services and travel trade data relative to corresponding month in 2019. Total goods trade volumes for 38 advanced economies and 43 EMDEs, as reported in the CPB World Trade Monitor. Services trade and travel data from WTO statistics. Sample for services trade and travel includes 13 advanced economies and 16 EMDEs. Last observation is March 2021.

- *Changes in the composition of global demand.* The composition of global demand has shifted away from advanced economies towards EMDEs and towards less trade-intensive components of aggregate demand. EMDEs, which typically have a lower trade-intensity than advanced economies, accounted for just under two-fifths of global output during 2011-19, compared with just over one-quarter during 1980-2008 (Cabrillac et al. 2016; World Bank 2015). Investment, which tends to be more trade-intensive than other components of demand, has been weak over the past decade, especially in EMDEs (Bussière et al. 2013; Kose et al. 2017). In China, a policy-guided shift away from investment-led growth and, in commodity exporters, prolonged weakness of commodity prices slowed investment activity (World Bank 2017, 2019).

- *Maturing global value chains.* Over the past decade, the expansion of global value chains slowed (Antras and Chor 2021; World Bank 2015, 2020a). The overall share of global value chain-related trade in total world trade grew significantly in the 1990s and early 2000s but has stagnated or even declined since 2011. This has in part reflected rising labor costs in key emerging markets, a greater appreciation by firms of supply risks in the wake of some natural disasters, as well as mounting trade tensions over the past five years (Cabrillac et al. 2016; World Bank 2020a).

- *Trade tensions.* A slowing pace of trade liberalization may also have contributed to a declining trade elasticity (World Bank 2015). Tariff rates levelled off in both advanced economies and EMDEs in the early 2000s. At the same time, the use of regulatory measures and nontariff barriers such as export subsidies, restrictions on licensing or foreign direct investment, and domestic clauses in public procurement increased (Niu et al. 2018).

Trade collapse in early 2020. The global recession of 2020 was the deepest since the Second World War and was accompanied by a collapse in global trade of nearly 16 percent in the second quarter of

2020—6 percentage points steeper than in the first quarter of 2009, at the height of the global recession triggered by the global financial crisis. Unusually for global recessions, the collapse in global services trade was even larger than the collapse in global goods trade.

Goods trade rebound in late 2020. The recovery, however, was swifter than in the global financial crisis, particularly for goods trade. Goods trade had returned to pre-COVID-19 levels within six months of the trough of the trade collapse, 12 months earlier than after the global financial crisis. The recovery in goods trade was fairly broad-based, with global imports of cars, capital goods, consumer goods, and industrial supplies all back at or above pre-pandemic levels by January 2021 (IMF 2021). Global value chains have remained broadly resilient to the pandemic as companies increasingly turned to digital technologies and diversified suppliers and production sites (Saurav et al. 2020). Nevertheless, recently, some strains in supply chains have emerged. The strong recovery in global manufacturing has raised demand for containerized exports from Asia, pushing up freight rates. The week-long blockage of the Suez Canal temporarily stretched maritime supply chains further (World Bank 2021b).

Unusually pronounced drop in services trade during the pandemic. The decline in services trade was considerably more pronounced and the recovery more subdued than in the global financial crisis, reflecting to some extent a collapse in global tourism as countries closed their borders to stem the spread of the pandemic. In March 2021, global services trade was still 3 percent below pre-pandemic levels, whereas at a similar point after the global financial crisis, services trade had already recovered. While most components of services trade, including telecommunications and financial services, have fully recovered to pre-pandemic levels, travel services remain just under 65 percent below. The recovery in services trade was concentrated in East Asia and the Pacific (EAP) where China's services trade had already returned to pre-pandemic levels by December 2020. Service trade plays an increasingly important role in the global economy: Since 2000, global travel and tourism revenues have nearly tripled, with the sector now accounting for 10 percent of global GDP and about 30 percent of global services trade, and providing one out of ten jobs worldwide (World Bank 2020b).

Weak prospects for global trade growth. Global trade is forecast to grow by 8.3 percent in 2021, reflecting the strength of global growth, but also the diminishing trade intensity of the global recovery. The structural factors that supported the rapid trade expansion in the two decades preceding the global financial crisis seem to have largely run their course, with the recent weakness in the relationship between global trade growth and global output growth likely to constitute a "new normal." Since global output growth itself is expected to slow going forward compared to the past decade, world trade growth would decline accordingly (World Bank 2021a). Over the 2020s, trade growth may slow by another 0.9 percentage point from the 2010s, broadly in line with global potential output growth, unless major policy efforts significantly increase the growth of trade (World Bank 2021a). The weakness may be more pronounced in goods trade, where new technologies may allow more localized and more centralized production (Coulibaly and Foda 2020; Zhan et al. 2020). In contrast, in services trade, rapidly growing data services promise a return to rapid expansion once the pandemic is brought under control (World Bank 2021c).

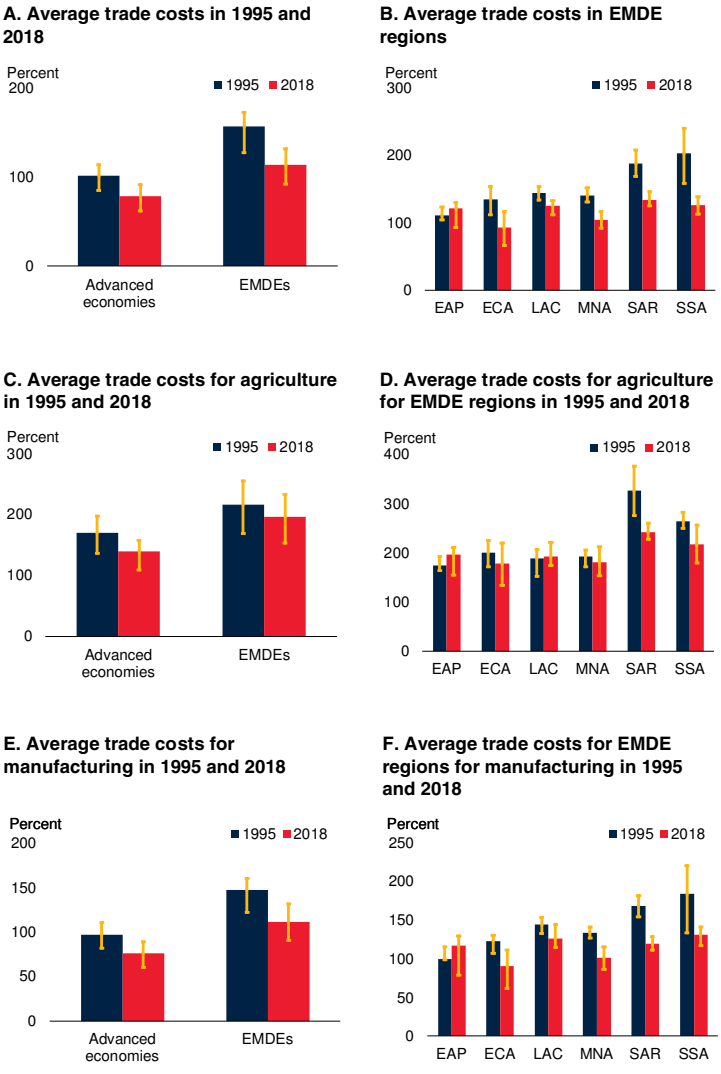
Patterns in trade costs

High, although declining, trade costs. Average trade costs are high, particularly in EMDEs where they double the price of goods traded domestically, and are far in excess of the average tariff of 7 percent.[6] Trade costs in EMDEs are almost one-half higher than those in advanced economies (figure 3.3). This is despite a sharp decline over the past two and a half decades (Bergstrand, Larch, and Yotov 2015). In 2018, average trade costs were about one-quarter lower

[6] This estimate of trade costs is of the same order of magnitude as other studies—such as Arvis et al. (2016) or Anderson and van Wincoop (2004) but is larger than others based on individual retail price data such as one for the United States and Canada (Gopinath et al. 2011).

FIGURE 3.3 Trade costs

Trade costs are roughly equivalent to a 100 percent tariff—far above actual average tariff rates. Despite a decline over the past two decades, trade costs remain high, especially for agricultural products and in EMDEs. Trade costs for agricultural goods are highest in South Asia and Sub-Saharan Africa, while trade costs in the manufacturing sector are the highest in Latin America and the Caribbean and Sub-Saharan Africa.



Sources: Comtrade (database); ESCAP-World Bank Trade Costs Database; World Bank; World Trade Organization.

Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa. Bilateral trade costs (as defined in the ESCAP database) measure the costs of a good traded internationally in excess of the same good traded domestically and are expressed as ad valorem (tariff) equivalent. Bilateral trade costs are aggregated into individual country measures using 2018 bilateral country exports shares from the Comtrade database. Regional and sectorial aggregates are averages of individual country measures. Bars show unweighted averages, whiskers show interquartile range. Sample in 1995 includes 33 advanced economies and 46 EMDEs, 5 in EAP, 7 in ECA, 4 in MNA, 15 in LAC, 2 in SAR, and 13 in SSA. Sample in 2018 includes 21 advanced economies and 58 EMDEs, 11 in EAP, 14 in ECA, 7 in MNA, 13 in LAC, 3 in SAR, and 10 in SSA.

in advanced economies and almost two-fifths lower in EMDEs than in 1995. Average trade costs fell in all sub-regions except East Asia and Pacific, with the fastest decline occurring in Sub-Saharan Africa (SSA). As discussed in the next section, both the decline in trade costs and the high trade costs in EMDEs reflect a wide range of factors.

Trade costs across EMDE regions. Among EMDE regions, average trade costs range from tariff equivalents of 93 percent in Europe and Central Asia (ECA) to 134 percent in South Asia (SAR), with wide heterogeneity within regions. This heterogeneity is particularly pronounced in East Asia and Pacific (EAP). Within Europe and Central Asia (ECA), countries that are members of the European Union or geographically close to it have two-thirds the average trade costs of other countries that are less integrated into EU global value chains.

Trade costs for agricultural goods. Trade costs for agricultural goods are about four-fifths higher than for manufacturing goods. Agricultural trade costs are particularly high in SAR and manufacturing trade costs are particularly high in SSA and Latin America and the Caribbean (LAC). Agricultural trade costs declined less than trade costs in manufacturing over the period 1995 to 2018, in part because of slower progress in tariff reductions and narrower coverage of trade agreements.

Trade costs for services. Goods and services trade are complementary. Tradable services are key links between stages of value chains and "enablers" of trade in goods, in particular communications, finance, business and logistics services. As a result, services account for almost one-third of the value added of manufacturing exports (OECD 2018). Comparable cross-country data on services trade costs and on policies affecting trade in services are however scant. The few attempts to quantify trade costs in services in the literature rely on observed trade and value-added flows-akin to the methodology embedded in the World Bank/UNESCAP database for goods trade (Miroudot, Sauvage, and Shepherd 2010) or rely on an inventory of services trade restrictions (Benz 2017). Both types of studies suggest that trade

costs for services are considerably higher than trade costs for goods and, in contrast to goods trade costs, have not fallen since the 1990s.

Correlates of trade costs

Methodology and data. A panel gravity equation with time fixed effects is used to quantify the correlates of trade costs (box 3.1). The regression uses bilateral data for 2007-2018 for 23 advanced economies and 63 EMDEs for which data on trade costs as well as its determinants is available from 2007. The sample is heavily constrained by data availability. For example, the *Doing Business* indicator for ease of trading is not available before 2006. Bilateral, sector-specific goods trade costs are regressed on geographical and cultural barriers (distance, common border or adjacency, and common language); trade policy (sector-specific bilateral tariffs, membership of a regional trade agreement and a proxy of trade policy uncertainty); logistics and connectivity (Logistics Performance Index LPI and the Liner Shipping Connectivity Index LSHI); and regulatory barriers (*Doing Business* score index for the time and costs it takes exporters to comply with documentary and border regulations).[7] The model is estimated in two versions: for all sectors of the economy and for manufacturing separately, and both specifications explain over half of the variation of trade costs in the sample (table 3.1).

Tariffs. Tariffs are associated with higher trade costs, both overall and for manufacturing more narrowly. While statistically significant, they have contributed less than other components to the reduction in trade costs over time or the difference between trade costs in EMDEs and advanced economies. After steep reductions in the 1990s and early 2000s, manufacturing tariffs now average 6 percent in EMDEs—somewhat less than the average tariff of 7 percent across all sectors—and around 2 percent in advanced economies (figure 3.4). Agricultural tariffs remain two (EMDEs) and more than three (advanced economies) times higher than manufacturing tariffs.

Regional trade agreements. Membership of a regional trade agreement lowers bilateral trade costs statistically significantly by just under one-fifth.[8] All advanced economies are part of at least one regional trade agreement. The EU alone participates in 46 regional trade agreements, and other advanced economies are members of 75 regional trade agreements. Among EMDEs, membership of regional trade agreements is less common, although all but a handful of EMDEs are members of at least one agreement. Such agreements are most common in ECA, where parts of Central and Southern Europe are EU members and parts of Eastern Europe and Central Asia are members of the Free Trade Area between Members of the Commonwealth of Independent States, and in LAC where most countries are part of MERCOSUR and trade agreements with the United States, such as the U.S.-Mexico-Canada Agreement (USMCA) or the Dominican Republic-Central America Free Trade Agreement (CAFTA-DR).

Shipping and logistics costs. Transit delays have been identified as more important deterrents to trade flows than geography (Freund and Rocha 2011). Poor shipping connectivity, inadequate logistics infrastructure and services as well as underlying regulations are associated with significantly higher trade costs. The one-week blockage of the Suez Canal, through which 12 percent of global trade merchandize traffic passes,

[7] The World Bank's *Logistics Performance Index* (LPI) is based on a survey of global freight operators and express carriers about customs, logistics and transport infrastructure, international shipments, logistics competence, tracking and tracing, and timeliness. Logistic managers are asked questions related to the country of operation, including about the quality and transport infrastructure, the ability of the country to track and trace consignments, and the number of forms needed to be submitted to obtain clearance of imports and exports. The UNCTAD's Liner Shipping Connectivity Index is based on each country's number of ships, their container-carrying capacity, maximum vessel size, the number of services, and the number of companies that deploy container ships in a country's ports.

[8] This is somewhat lower than found by Bergstrand, Larch, and Yotov (2015) who estimate that an economic integration agreement lowers trade costs by 30 percent in a smaller and earlier sample (41 mostly advanced economies during 1996-2000). Qualitatively, it is consistent with Brenton, Portugal-Perez, and Regolo (2014) who find that trade agreements help to lower the price differential between domestic and traded foods.

BOX 3.1 Understanding the determinants of trade costs

Shipping and logistics, borders and customs processes, tariffs, and membership of regional trade agreements are statistically significant factors that influence trade costs.

Introduction

Elevated trade costs remain a significant impediment to cross-border trade. On average, trade costs double the cost of an internationally traded good over a similar domestic good. In EMDEs, trade costs are almost one-half higher than in advanced economies despite a decline since 1995.

This box considers the determinants of trade costs empirically by examining the following questions.

- How are trade costs measured in the literature?
- What are the main determinants of trade costs, empirically?

The results suggest that geographical distance and high bilateral tariff rates are positively associated with trade costs, including in the manufacturing sector. In contrast, common borders (adjacency), common language, and membership of a common regional trade agreement tend to reduce trade costs. Policies aimed at facilitating trade including maritime connectivity and stronger logistics performance are also associated with lower bilateral trade costs, as well as indicators related to the ease of doing trade.

Measures of trade costs

Conceptually, trade costs are the excess cost of an internationally traded good compared with a similar good traded domestically. By construction, trade costs can therefore move without any change in external costs of trading, simply as a result of changes in domestic trading costs. To measure trade costs, two main approaches have been developed in the literature: direct and indirect approaches.

Direct approaches rely on observable data that serve as a proxy for individual components. For instance, measures of costs faced at the border are often based on counting the average number of days that is needed for a good to cross the border, while transport costs are often inferred from the cost of ocean and air shipping (Hummels et al. 2007). Policy barriers such as tariffs and nontariff measures are directly available from a range of statistical sources. Direct approaches suffer from a series of limitations, including the fact the underlaying variables are only partially observable and can hardly be converted to plausible tariffs ad-valorem equivalents, which makes it difficult to compare them but also to aggregate them into a summary measure of trade costs (Anderson and van Wincoop 2004). Therefore, trade cost estimates taken from such measures tend to be only partial.

Indirect approaches aim to circumvent these difficulties. These infer trade impediments top-down, from measures of trade flows and aggregate value added.[a] Under this approach, trade costs correspond to the difference between the trade flows that would be expected in a hypothetical "frictionless" world and what is observed in the data and are computed relative to domestic trade costs. Measures built through the indirect approach can be tracked over time and include all observed and unobserved factors that explain why trading with another country is more costly than trading domestically. Novy (2013) develop a micro-founded measure of aggregate bilateral trade costs by a theoretical gravity equation for the trade cost parameters that capture the barriers to international trade. The resulting solution expresses the trade cost parameters as a function of observable trade data, providing a micro-founded measure of bilateral trade costs. The measure is easy to implement empirically for a number of countries with readily available data. One drawback is that the contribution of the individual cost factors cannot be easily disentangled by simple inspection of the measure. A way proposed in the literature to overcome this is to combine indirect and direct measurements into a single regression (Arvis et al. 2013).

Determinants of trade costs

To estimate the contribution of different determinants of trade costs, a gravity model is estimated for a panel of 23 advanced economies and 63 EMDEs with annual data for both trade costs and all determinants of trade costs over 2007-2018.

Data

The estimation relies on bilateral trade costs from the UNESCAP-WB Trade Costs Database. Following Novy (2013), Arvis et al. (2013) derive measures of annual trade costs for the period 1995-2018. For any given country pair

a. Domestic trade flows are proxied by gross domestic output on a gross shipment basis or, if this is unavailable, gross value added.

BOX 3.1 Understanding the determinants of trade costs (*continued*)

i and j, trade costs are obtained as geometric averages of costs faced by country i when exporting to j and vice versa. They are computed according to the formula below:

$$(X_{ii}X_{jj})/(X_{ij}X_{ji})^{1/2(\sigma-1)}$$

where X_{ij} represents trade between countries i and j (goods produced and sold in i and goods produced and sold in j) and σ refers to the elasticity of substitution. This measure captures international trade costs relative to domestic trade costs. Intuitively, trade costs are higher when countries trade more with themselves than they do bilaterally, i.e., as the ratio $(X_{ii}X_{jj})/(X_{ij}X_{ji})$ increases. Intra-national (i.e., domestic) trade is proxied by the difference of gross output and total exports.

Trade costs thus computed, implicitly account for a wide range of frictions associated with international trade, including transport costs, tariffs and nontariff measures but also costs associated with differences in languages, currencies and import or export procedures. Trade costs are expressed as ad valorem (tariff) equivalent of the value of traded goods and can be computed as an aggregate referring to all sectors of the economy, but also specifically for the manufacturing and agriculture sectors.

Estimation

Gravity equations are widely used as a workhorse to analyze the determinants of bilateral trade flows. Chen and Novy (2011) and Arvis et al. (2013) employ a gravity specification also in the analysis of the determinants of bilateral trade costs in a cross-sectional set. In line also with Moïsé, Orliac, and Minor (2011), this study estimates determinants of trade costs in a panel specification

The regression equation takes the following form:

$$TC_{ijt} = \beta_1\, RTA_{ijt} + \beta_2\, tariff_{ijt} + \beta_3\, LSHI_{ijt} + \beta_4\, LPI_{ijt}$$
$$+ \beta_5\, Ease\ of\ Trading_{ijt}$$
$$+ \beta_6\, Trade\ Policy\ Uncertainty_{ijt}$$
$$+ \beta_7\, Gravity_{ij} + \eta_t + \varepsilon_{ijt} \qquad (1)$$

where for any given country pair ij, bilateral trade costs TC observed at time t are regressed on a wide range of candidate drivers. These include standard gravity indicators such as distance, a common language and a common border (adjacency), but also trade policies such as bilateral tariff rates and belonging to a regional trade agreement. A proxy for trade policy uncertainty is also included. In line with Osnago, Piermartini, and Rocha (2018), trade policy uncertainty is defined as the gap between binding tariff commitments and applied tariffs. To ascertain the role of policies aimed at facilitating trade, indexes of logistic performance (LPI) and maritime connectivity (LSHI) and an indicator of doing business related to compliance of documentary and border checks is included.

Specifically, the World Bank's *Logistics Performance Index* (LPI) is based on a survey of global freight operators and express carriers about customs, logistics and transport infrastructure, international shipments, logistics competence, tracking and tracing, and timeliness. UNCTAD's Liner Shipping Connectivity Index is derived from the number of ships, their container-carrying capacity, maximum vessel size, number of services, and number of companies that deploy container ships in a country's ports. The World Bank's *Doing Business* ease of trading across borders index is based on surveys of experts on regulations regarding customs documentation and time and costs of customs, clearance. The choice of variables in the panel is informed by Arvis et al. (2013), but also by findings from the stylized facts presented in the main text.[b] Full details of data and sources are presented in table 3.1.

Since trade costs data are obtained as bilateral geometric averages, trade facilitation indicators available at individual country level are transformed into bilateral measures by taking the geometric average of each country pair direction. Therefore, the unit of analysis is each individual country pair. Time fixed effects η_t are included in the estimation to control for country characteristics that might vary over time. As the measures of trade costs net out multilateral resistance components, in line with Novy (2013), the estimation does not include additional fixed effects.[c] Instead, to control for possible correlation of errors terms, clustered standard errors by country pairs are used.

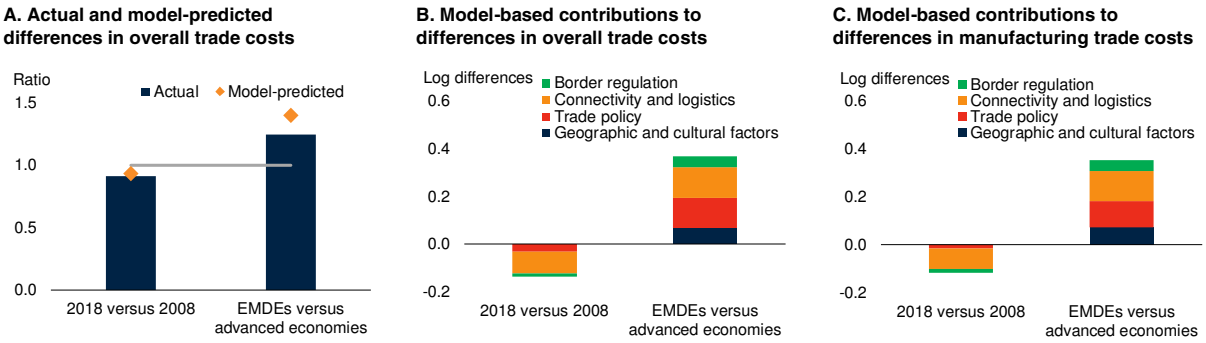
b. Nontariff barriers or exchange rate volatility would ideally have been included in the regression estimation. However, these are difficult to measure and the available cross-country, over time-panel measures were too crude to yield statistically significant results. Ideally, the regression would also be applied to services; however, the database does not offer trade cost for services.

c. Outward multilateral resistance captures the fact that trade flows between i and j depend on trade costs across all potential markets for i's exports, while inward multilateral resistance captures the fact that bilateral trade depends on trade costs across all potential import markets. Therefore, the two indices summarize third-country effects that might affect bilateral trade flows between i and j. Novy (2013) shows that simple algebra makes it possible to eliminate the multilateral resistance terms from the gravity equations, and in so doing he derives an expression for trade costs.

BOX 3.1 Understanding the determinants of trade costs (*continued*)

FIGURE B3.1.1 Estimated contributions to trade costs

The panel estimation accounts for much of the difference in average trade costs between EMDEs and advanced economies and the difference between 2008 and 2018. About one-third of the predicted difference between average trade costs in EMDEs and advanced economies and two-thirds of the predicted difference between 2008 and 2018 is attributed to costs associated with shipping and logistics.



Sources: Comtrade (database); World Bank.

Note: EMDEs = emerging market and developing economies; RTA = regional trade agreement; LSCI = liner shipping connectivity index; LPI = logistics performance index.

Predicted ratios of overall trade costs between the two groups indicated on the x-axis (A) or the contributions (B, C) to differences in logarithms of trade costs. Computed using coefficient estimates for each variable and the following realizations for each indicator included in the regression: trade-weighted averages for all countries in the sample in 2018 minus trade-weighted average for all countries in the sample for 2008 for the comparison over time and trade-weighted averages for EMDEs minus trade-weighted average for advanced economies in 2018. Trade policy includes tariffs and membership in regional trade agreements; geographic and cultural factors includes distance, common border, and common language; border regulation includes the ease of trading; and connectivity and logistics include liner shipping connectivity index and logistics performance index. Gray horizontal line (A) indicates 1, that is, no difference in trade costs between the two groups indicated on the x-axis.

Two models are estimated: a general model for the determinants of trade costs in all sectors of the economy, and a sectoral model for the determinants of trade costs in the manufacturing sector. The two models follow the specification presented in equation 1, but trade costs and tariff rates are sector specific. Table 3.2 shows results from the estimations.

Results

All variables have the expected signs and magnitudes and are in line with the literature. Geographical distance and high bilateral tariff rates are positively associated with trade costs. In contrast, adjacency, common language and membership of a common regional trade agreement tend to reduce trade costs. Policies aimed at facilitating trade including maritime connectivity and stronger logistics performance are also associated with lower bilateral trade costs, both overall and in the manufacturing sector. Indicators related to the ease of doing trade are also statistically significant, with countries characterized by more cumbersome border processes facing higher trade costs on average. Trade uncertainty is also positively associated with trade costs, including in the manufacturing sector.

The panel estimation explains most of the difference in trade costs between the average EMDE and the average advanced economy, and attributes about one-third of this gap to higher shipping and logistics costs in EMDEs and another one-third to trade policy (including trade policy uncertainty). The regression also explains most of the decline in average trade costs between 2008 and 2018 and attributes two-thirds of it to falling shipping and logistics costs.

Robustness

The estimations are robust to different specifications, lag structure, and estimators. An alternative estimation performed with the PPML estimator which is often employed in the literature on gravity models (Santos Silva and Tenreyro 2006) to control for heteroskedasticity produces similar results to the ones presented in table 3.2.

BOX 3.1 Understanding the determinants of trade costs (*continued*)

Adding further variables including the bilateral real exchange rate, GDP per capita income and a dummy characterizing landlocked country pairs does not alter the regression results, as the variables turn out to be statistically insignificant. Adding country fixed effects does not alter the stability of the model, with both the gravity and trade policy variables retaining the expected sign and statistically significant effects. Concerns about multicollinearity (including regarding the 0.5 correlations between the LPI with the LSHI and the *Ease of Trade* indicators) are mitigated by the results of a Variable Inflation Factor test, a standard diagnostic test conducted to detect the presence of multicollinearity among the regressors. They are also mitigated by the statistical insignificance of the difference between average bilateral tariffs in country pairs in a regional trade agreement and those outside it.

A few caveats apply to the analysis. One limitation relates to the interpretation of the effect of policies on trade costs. Changes in trade costs between two countries can be due to actions taken by one government or the other, or both together. The fact that the variables featuring in the regression (including the measure of trade costs) are computed as country pairs geometric averages doesn't allow us to disentangle the source of policy actions. In addition, due to lack of sufficiently long time-series data, the approach taken here does not take into account the possibility that the regression coefficients have changed over time, as has been found in other studies for the effect of distance (Yotov 2012) or trade agreements (de Sousa 2012).

Conclusion

The estimation results suggest that policies can have a statistically significant and economically sizable impact on trade costs. Better shipping connectivity, better logistics performance, less burdensome border and customs procedures, and less trade policy uncertainty are associated with statistically significantly lower trade costs. More challenging shipping and logistics account for about one-third, and trade policy for another one-third, of the predicted gap between trade costs in EMDEs and advanced economies. Improved shipping and logistics also account for about two-thirds of the predicted decline in trade costs since 2008.

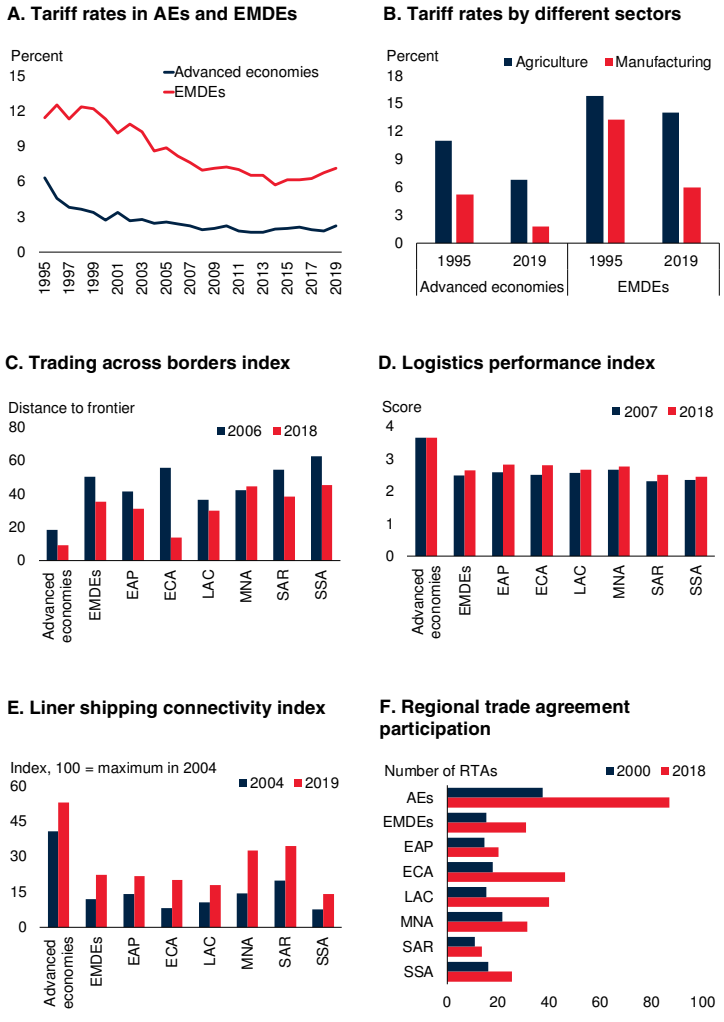
after a container ship accident in March 2021 was a reminder of the critical role of shipping in global trade (World Bank 2021b). For advanced economies, poor logistics have been more important sources of trade costs than geographic distance (Marti and Puertas 2019; Staboulis et al. 2020). Global shipping connectivity and logistics remain considerably poorer in EMDEs than in advanced economies (figure 3.4) and trade costs remain higher in countries with poorer shipping connectivity and logistics (figure 3.5). The regression results suggest that a shift from the bottom quartile on these two indicators' scores to the highest quartile—equivalent to a comparison between Sierra Leone and Poland—is associated with about one-tenth to one-third lower trade costs (box 3.1).

Regulatory cost. Trade costs are significantly higher when compliance with trade and customs procedures and processes is more difficult (Staboulis et al. 2020).[9] Burdensome regulations have been associated with significantly lower trade—almost as much as the average tariff, for each additional signature to be collected for exports—especially for highly differentiated goods where price comparisons are more challenging (Hillberry and Zhang 2015; Sadikov 2007). The regression results suggest that a switch from the quartile furthest from the frontier in the *Doing Business* ease of trading to the closest quartile—equivalent to a comparison between Sierra Leone and Thailand—is associated with one-eight lower trade costs.

[9] This is consistent with studies that find that documentation requirements are an important deterrent for trade flows in OECD countries (Staboulis et al. 2020). For agricultural goods, regulations that cause border delays are particularly damaging to trade (Djankov, Freund, and Pham 2010). The Logistics Performance Index also captures in part regulatory compliance burdens.

FIGURE 3.4 Trade policy, border processes, and logistics

Tariffs declined sharply over the 1990s and early 2000s, in part because of regional and multilateral trade agreements, but began to tick upward again in 2017, especially in EMDEs. They are higher in EMDEs than in advanced economies and in agriculture than in manufacturing. Border processes and logistics tend to be easier, and shipping connectivity better, in advanced economies than in EMDEs.



Sources: Gurevich and Herman (2018); World Bank; World Trade Organization.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa; RTAs = regional trade agreements.
A.B. Regional aggregates are computed as unweighted averages of country weighted tariff rates.
C. Doing Business index for "trading across borders" indicator on a range from 0 = lowest performance to 100 = best performance. Sample includes 82 EMDEs and 16 advanced economies for 2006 and 2018. Bars show distance to frontier in 2006 and 2018.
D. Logistics performance index (LPI) is a summary indicator of logistics sector performance, combining data on six core performance components into a single aggregate measure. The indicator is available for a sample of 160 countries. Sample includes 36 advanced economies and 123 EMDEs.
E. Liner shipping connectivity index (LSCI) is an average of five components and captures how well countries are connected to global shipping networks. The index value 100 refers to the country with the highest average index in 2004. Sample includes 30 advanced economies and 119 EMDEs.
F. Regional trade agreements are reciprocal trade agreements between two or more partners and include both free trade agreements and custom unions. The EU Treaty and the USMCA agreement are included. Regional aggregates are computed as averages of individual country participation in RTAs.

Regulatory costs in EMDE regions. Regulatory requirements for trading across borders have been streamlined significantly over the past decade, especially in ECA, SAR, and SSA. In ECA and SSA, the improvement appears to be linked to automation and digitalization of trade processes in a number of countries, which has reduced the time of compliance assessments at the location of customs clearance. In SAR, the improvement appears to be related to the upgrading of port infrastructure in India, coupled with the introduction of a new system of electronic submission of imports documents. In EAP, better governance and less burdensome customs procedures have been associated with somewhat lower trade costs.

Trade uncertainty. Uncertainty about, and high variability of, transit conditions, customs and border processes, tariffs, and other policies can impose significant costs. Uncertainty about trade policy may have lowered U.S. investment by more than 1 percent in 2018 (Caldara et al. 2020). Uncertainty also imposes significant costs by threatening on-time delivery. In Africa, for example, a single-day transit delay for an exporter is estimated to be equivalent to a 2 percent tariff in all importing partner countries (Freund and Rocha 2011). One dimension of trade uncertainty is the room for tariffs to be raised without violating WTO rules, that is, the difference between applied tariffs and bound tariffs, the "tariff water" (Osnago, Piermartini, and Rocha 2015). The regression results here suggest that a 10-percentage point narrower gap between the actual applied tariff and the maximum (bound) tariff is associated with one-seventh lower trade costs.

Differences between EMDEs and advanced economies. In 2018, trade costs for the average EMDE in the sample included in the regression were almost one-quarter higher than for the average advanced economy in the sample. The panel estimation can explain most of this gap and, in turn, attributes about one-third of it to poorer logistics and shipping connectivity in EMDEs, one-third to trade policy (including trade policy uncertainty), one-eighth to more cumbersome customs regulations and border processes, and just

under one-fifth to the greater remoteness (geographically and culturally) of EMDEs.

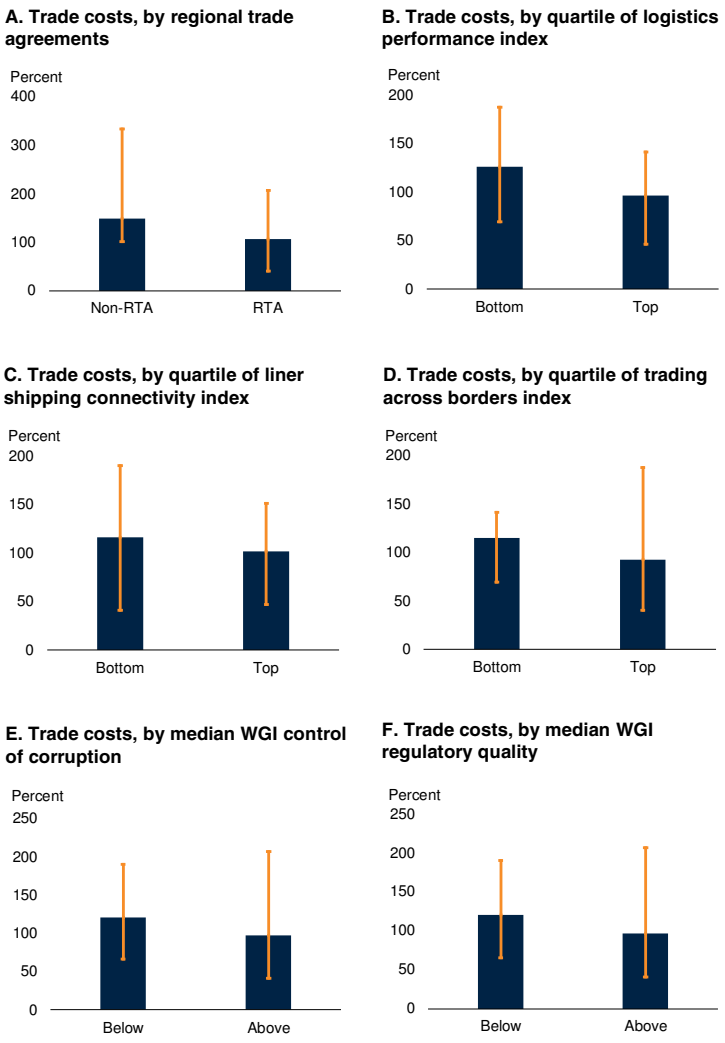
Decline in goods trade costs over time. Between 2007 and 2018, trade costs have fallen by one-eighth, on average, in the countries in the sample, somewhat more than predicted by the regression. The regression attributes almost two-thirds of this decline to improved shipping connectivity and logistics, one-quarter to trade policy (tariff cuts, membership of regional trade agreements, and uncertainty related to trade policy) and one-tenth to easier customs and border processes.

Other factors. Other factors, beyond what can be captured in the empirical exercise used here, likely also contribute to cross-country difference in trade costs and their changes over time. Such factors include nontariff barriers, market structures, but also country-specific institutional and policy characteristics including information availability and automation of procedures and trade-supporting infrastructure beyond that included in the logistics surveys.

- *Nontariff barriers*—such as sanitary and phytosanitary standards, preshipment inspections, licensing requirements or quotas—have risen over time. In 2015, about 2,850 product lines were subject to at least one nontariff barrier, about double the 1,456 product lines in 1997 (Niu et al. 2018). The average nontariff barrier is equivalent to an 11.5 percent tariff (Kee and Nicita 2016). Nontariff barriers affect a higher share of imports—but a lower share of exports—in advanced economies than in EMDEs. Almost all agricultural imports face nontariff barriers, compared with about 40 percent on average across all sectors (World Bank and UNCTAD 2018). Low-income countries are particularly affected by nontariff barriers because of their more frequent use of nontariff barriers in the agricultural sector and the lower capacity of firms to comply with such requirements.
- *Export restrictions on sensitive sectors* have increased in the pandemic. Policy makers have adopted a wide range of measures to restrict exports and encourage imports of food and medical equipment, over concerns about food

FIGURE 3.5 Trade costs in EMDEs, by country characteristics

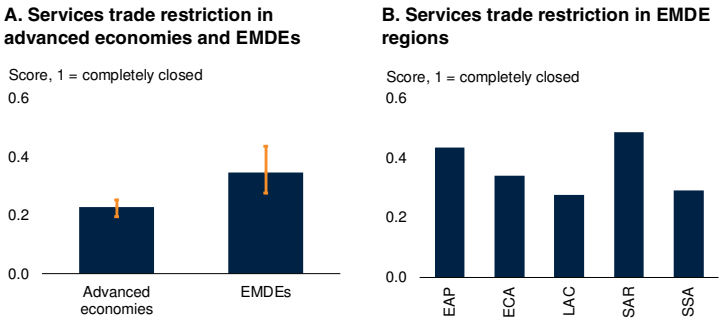
Trade costs are somewhat higher in EMDEs outside of regional trade agreements, with the poorest logistics performance, the least maritime connectivity, and the most challenging customs and border processes.



Sources: Comtrade (database); Gurevich and Herman (2018); ESCAP-World Bank Trade Costs Database; World Bank; World Trade Organization.
Note: EMDEs = emerging market and developing economies; RTA = regional trade agreements; LSCI = Liner Shipping Connectivity Index; LPI = Logistics Performance Index. Whiskers show minimum and maximum range. Orange wiskers indicate minimum and maximum range. Sample includes 59 EMDEs.
A. Average trade costs (unweighted) of countries based on their membership in regional trade agreements (RTAs) as defined in Gurevich and Herman (2018).
B. Average trade costs (unweighted) for countries ranked in the bottom and top quartile of the Logistics Performance Index.
C. Bars show the average trade costs (unweighted) for countries in the bottom and top quartiles of the liner shipping index
D. Average trade costs (unweighted) for countries ranked in the bottom and upper quartiles of the Doing Business "trading across borders" indicator.
E.F. Average trade costs (unweighted) for countries above and below median of the "Control of Corruption" and "Regulatory quality" of the World Governance Indicators (WGI). Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

FIGURE 3.6 Services trade restriction policies

Services trade in EMDEs face more restrictions than those in advanced economies. Across regions, the most restrictive policies to services trade are applied in South Asia and in East Asia and Pacific.



Sources: Organisation for Economic Co-operation and Development; World Bank.

Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific, ECA = Europe and Central Asia, LAC = Latin America and the Caribbean, SAR = South Asia, SSA = Sub-Saharan Africa.

Services trade restrictions index (STRI) helps identify which policy measures restrict trade. The STRI indices take the value from 0 to 1, where 0 is completely open and 1 is completely closed. They are calculated on the basis of information in the STRI database which reports regulation currently in force. Bars show denote the unweighted average and orange whiskers indicate the interquartile range. Sample includes 31 advanced economies and 17 EMDEs.

security and medical emergencies. In the first nine months of 2020 alone, 135 economies announced more than 600 such measures, of which 44 percent without a removal date (Evenett et al. 2020).

- *Better institutional quality and economic infrastructure*—including energy provision, transport and communication infrastructure and services, and greater transparency in policy decisions—have also been associated with lower trade costs (Cali and Te Velde 2011; Hou, Wang, and Xue 2021). In a large sample of countries in the early 2000s, the availability of trade-related information, the simplification and harmonization of documents, the streamlining of procedures and the use of automated processes were associated with more than 10 percent lower trade costs (Moïsé and Sorescu 2013). The impact of corruption has been more ambivalent: it may raise trade costs when corrupt officials extort bribes or it may lower trade costs when corrupt officials allow tariff evasion (Dutt and Traca 2010).
- *Noncompetitive market structures* can drive up trade costs. A lack of competition and the existence of monopolies, including in transport industries, may raise high trade costs. In some countries in Sub-Saharan Africa, for example, the cost of moving goods domestically is up to five times higher than in the United States (Atkin and Donaldson 2015; Donaldson, Jinhage, and Verhoogen 2017). This difference has in part been attributed to a lack of competition (Teravaninthorn and Raballand 2008). Elsewhere, excessive competition can drive down the quality of transport services quality, with high road mortality, deteriorated roads, and poor vehicle quality.
- *Regulatory restrictions on services trade* can add to trade costs, even for goods trade. To a large extent, trade costs in the services sector reflect regulations which create entry barriers, such as licensing quotas. The OECD Service Trade Restrictions Index (STRI) measures *de jure* regulatory restrictions on services trade of different types in 44 countries for 2014-19 (figure 3.6). Like for goods trade, services trade remains more restricted in EMDEs than in advanced economies, especially with respect to the entry of foreign firms. Across regions, the most restrictive policies are applied by SAR and EAP, whereas countries in LAC tend to be more open.

Policies to lower trade costs

Menu of policy options. The literature suggests that high trade costs remain a considerable roadblock to trade. A menu of options is available to reduce trade costs at the border, between borders, and behind the border, as part of a broader package to return EMDEs to a green, resilient and inclusive development path (GRID; World Bank 2021d; OECD and WTO 2015). Some of these policies are under the sole control of country authorities (such as improving border and customs regulations and processes or facilitating shipping and logistics) while other policy changes require agreements with other country authorities (such as regional trade agreements). While some policies can be implemented quickly, others, such as increasing competition, can take years to pursue.

- Measures that lower trade costs at the border include trade facilitation (customs and border procedures) but also tariffs, and trade agreements.
- Measures that lower trade costs between borders include global road, port, air, communications and energy infrastructure and services networks.
- Measures that reduce trade costs behind the border include trade-related regulations and institutions; logistics and broader market governance; domestic transport infrastructure; market structure of domestic trucking and port operations; as well as nontariff barriers (e.g., standards and accreditation procedures for standards) and quotas.

Beyond policies to facilitate trade, complementary policies might also be needed to assure that the benefits are sustainable and widely shared.

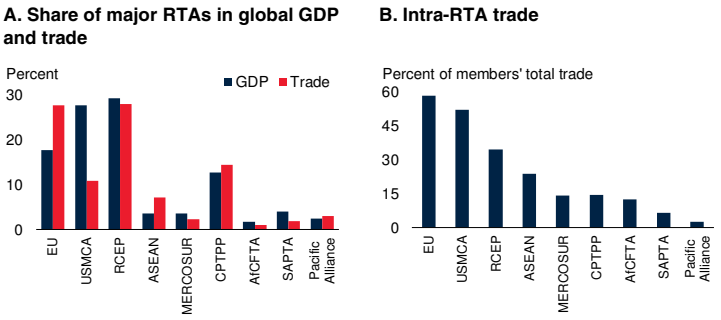
At-the-border measures

Tariffs. Falling tariffs, often embedded in broader trade agreements, have contributed to rapid trade growth over the past three decades. However, tariffs have risen over the past five years as trade tensions mounted, raising concerns about a protectionist turn among some major economies (World Bank 2021a).

Trade agreements. The decline in trade costs over the past three decades has been supported by the introduction of regional trade agreements. In particular, the number of regional trade agreements more than quintupled between the early 1990s and the mid-2010s and these agreements have, over time, shifted focus from tariff cuts to lowering nontariff barriers (World Bank 2016). The largest trade agreement by the number of members, the African Continental Free Trade Area, for example, has been estimated to raise real incomes in its member countries mostly by lowering nontariff barriers to trade, rather than tariffs, and by implementing trade facilitation measures (World Bank 2020c). The two regional trade agreements in North America (USMCA) and Europe (European Union) alone cover more than 40 percent of global GDP (figure 3.7). Trade agreements have fostered domestic reforms in EMDEs and have generated their own momentum for greater liberalization and expansion (Baccini and Urpelainen 2014a, 2014b; Baldwin and Jaimovich 2010).

FIGURE 3.7 Regional trade agreements

Countries engaged in regional trade agreements account for a large part of global GDP and, for some agreements, member countries' trade.



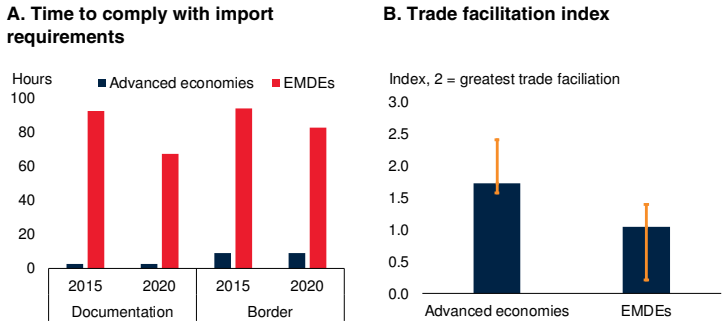
Sources: Comtrade (database); World Bank; World Trade Organization.
Note: RTAs are reciprocal trade agreements between two or more partners and include both free trade agreements and customs unions.
A.B. AfCFTA = African Continental Free Trade Area; ASEAN = Association of South East; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; EU = European Union; MERCOSUR = Southern Common Market; RCEP = Regional Comprehensive Economic Partnership; SAPTA = South Asian Preferential Trading Arrangement; USMCA = United States–Mexico–Canada Agreement.

Border processes. In addition to the direct costs of tariffs, a multitude of indirect costs are imposed by administrative border and customs procedures (Moïsé and Le Bris 2013). In the average EMDE, it takes 56-67 hours to comply with border documentation for exports and imports and another 64-83 hours to comply with border processes more broadly—significantly longer than in the average advanced economy (figure 3.8). In the average EMDE, these compliance costs are two to four times those in the average advanced economy.

Trade facilitation. The WTO Agreement on Trade Facilitation (WTO TFA), which was adopted in 2014 and has been ratified by more than 90 percent of WTO members, provides a framework to streamline inefficient control and clearance procedures of border authorities, unnecessary border formalities, and opaque administrative cost. Seventy percent of commitments included in the agreement have been implemented to date. For example, in West

FIGURE 3.8 Customs and border procedures

Customs and borders procedures are considerably more burdensome in EMDEs than in advanced economies but have declined over time in both country groups.



Sources: Organisation for Economic Co-operation and Development; World Bank.

Note: EMDEs = emerging market and developing economies.

A. Unweighted average for 39 advanced economies and 147 EMDEs.

B. Unweighted average for 36 advanced economies and 122 EMDEs. Trade facilitation index is an unweighted average of 11 subindices, all scored on a scale of 0-2. The indices score countries on information availability, trade consultations, advance rulings, appeals procedures for administrative decisions by border agencies, fees and charges on imports and exports, simplicity of trade document requirements, automation of border procedures and documentation, simplicity of border procedures, cooperation between domestic agencies, cooperation with neighboring agencies, and governance and impartiality. The data is collected from publicly available sources, country submissions, and private sector feedback. Orange wiskers indicate minimum and maximum range.

Africa, an initiative is underway to cut trade costs by electronically sharing customs transit data (World Bank 2021e). Guatemala and Honduras have reduced the time for traders to cross the border from 10 hours to 7 minutes by integrating their trade procedures and replacing duplicative processes with a single online instrument (de Moran 2018). Progress has been uneven, however, with less than 40 percent of commitments implemented in low-income countries.

Between-the-border measures

Global connectivity and market structure. High-quality and well-maintained transport infrastructure—at ports, airports, on land and in the hinterland—and efficient global shipping services lower logistics costs. Where bribes and transport monopolies are common, they also drive up trade costs. For example, in a pilot study of four African countries, responses from more than two-thirds of survey respondents suggest that bribery to accelerate transport services was common (Christie, Smith, and Conroy 2013). Efforts to control corruption and to encourage competition can help lower transport costs. Policies that strengthen regional integration can also be beneficial, particularly in the case of small countries and these that are geographically isolated from trade hubs. Coupled with regional institutions that help thin borders, regional infrastructures can enable countries to exploit the benefits of regional and global trade networks (Deichmann and Gill 2008).

Lower search cost. That said, even in a competitive, well-governed environment, efforts to improve the match between trucking service providers and shippers can help reduce trade costs by reducing wait times and empty backhauls. Such efforts can, in particular, leverage information and communication infrastructure and services for timely information about shipping capacity and schedules that allows exporters and shippers with available capacity to be matched more efficiently. In addition, deeper regional trade agreements can also lower transport-related trade costs (Brenton, Portugal-Perez, and Regolo 2014).

Behind-the-border measures

Regulations and standards. Although not separately included in the empirical exercise above for lack of data, behind-the-border policies such as regulations, standards, inspection requirements, and labelling requirements, can impose considerable costs (Moïsé and Le Bris 2013). In Central America, sanitary and phytosanitary requirements, such as inspection requirements or labeling standards for meats and grains, have been estimated to raise import prices by about 30 percent on average (OECD and WTO 2015). Harmonization of standards can significantly increase trade, but (smaller) gains can also be achieved by mutual recognition of standards or conformity assessments (Chen and Mattoo 2008; World Bank 2016).

Taxation. Beyond standards, a shift in taxation away from trade-based taxation to income-based or consumption-based taxation can further lower barriers to trading. In middle- and high-income EMDEs, such a shift has not been associated with lasting revenue losses, but such losses have

materialized in low-income countries (Baunsgaard and Keen 2010).

Global value chain participation. High transport costs, in part, reflect unbalanced trade flows since shipping at full capacity in both directions of a route is less costly than empty backhauls (Ishikawa and Tarui 2018). At any one time, two-fifths of ships have been estimated to carry no cargo (Brancaccio, Kalouptsidi, and Papageorgiou 2020). Over the longer term, and in a favorable business environment more broadly, increased global value chain participation can expand the volume of both exports and imports and thus help lower shipping costs.

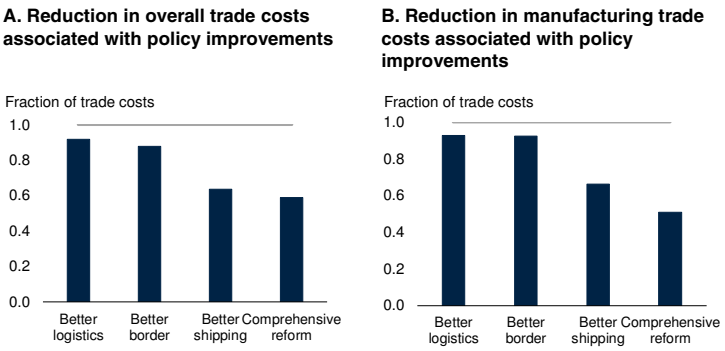
Comprehensive reform packages

Country examples of reforms. Some of the most successful reform programs have covered a wide range of policies. In Cambodia, a combination of customs and border improvements, regulatory reform, and streamlined import and export procedures helped the country to leap 46 rankings on the Logistics Performance Indicators between 2010 and 2014 (World Bank 2018). In Africa's Great Lakes region, improved trade and commercial infrastructure in the border areas and simplified border crossing procedures have been credited with greater accountability of officials, declining rates of harassment at key borders (from 78 percent to 45 percent of survey respondents in South Kivu), extended border opening hours, increased trade flows, and a doubling of border crossings (World Bank 2021e).

Impact on trade cost of a hypothetical reform package. The empirical results above can be applied to a hypothetical comprehensive reform scenario. In particular, one can focus on those country pairs that average in the bottom quartile of the logistics performance index, the liner shipping connectivity index, and the *Doing Business* index for ease of trading. Three-quarters of these EMDEs are located in Sub-Saharan Africa. The coefficient estimated from the panel estimation suggest that an improvement in the average logistics performance, shipping connectivity, and border processes among these country pairs to the top quartile of the distribution of country pairs would halve their trade cost (figure 3.9).

FIGURE 3.9 Impact of policy improvements on trade costs

Better logistics, shipping connectivity, and border and customs processes could help lower trade costs by one-half in the quartile of EMDEs that score worst on these indicators.



Source: World Bank.
Note: EMDEs = emerging market and developing economies.
A.B. Bars show the fraction of trade costs that would remain after policy improvements. Policy improvements assume that the average EMDE in the quartile of EMDEs with the poorest score for liner shipping connectivity index (LSCI), logistics performance index (LPI) or Doing Business "trading across borders" improves to match the score of the average EMDE in the quartile of EMDEs with the best score for liner shipping connectivity index (LSCI), logistics performance index (LPI) or Doing Business "trading across borders". The comprehensive package assumes that all three scores are improved simultaneously. Data refer to 2018. Gray line indicates 1 for unchanged trade costs in 2018 among the sample of EMDEs scoring in the poorest quartile on these indicators.

Priority area for lowering trade costs: Medical equipment. At the current juncture, to ensure that the current global recovery broadens to EMDEs, one area in particular requires priority action to lower trade costs: medical equipment. Global vaccine production is concentrated in a small number of countries and these rely heavily on supply chains that span the globe. During 2017-19, vaccine producing nations sourced 88 percent of their key vaccine ingredients from other vaccine producing trading partners (Evenett et al. 2021). Export bans and other restrictions, such as those newly introduced on medical equipment in 2020-2021 in 80 countries and of which more than half are still in place, threaten to disrupt vaccine production globally (Global Trade Alert 2020; WTO 2020). To bring the pandemic under control, removing obstacles to trade in medical equipment is a priority.

Reforms to lower services trade costs. As manufacturers access services to produce and export goods, policies aimed at lowering trade

costs in the services sector can help lower costs of trading goods. Opening services markets to more competition remains important for reducing trade costs, including in road and rail transport services and shipping. Liberal bilateral air services agreements can help lower trade costs for many goods that form part of global value chains or high value-added agricultural goods.

Reforms for improved agricultural trade. Due to their perishable nature, measures that accelerate the movement of agricultural traded goods are particularly important (USAID 2019). The WTO TFA includes several provisions aimed at making agricultural trade faster and more predictable, such as simplified and more efficient requirements regarding risk-based document verifications, physical inspections, and laboratory testing. In a Single Window, a single authority can reduce the amount of redundant and duplicated paperwork by processing all documents and coordinating with other relevant agencies to (UNESCAP 2011). Improved storage facilities can reduce spoilage and losses in perishable agricultural goods (UNESCAP 2017; Webber and Labaste 2010). Tracking and monitoring technologies can help accelerate paperwork and monitor environmental conditions (Beghin and Schweizer 2020). Such measures to lower agricultural trade costs can also help address prevent or reduce food insecurity.

Reforms to mitigate environmental and distributional impacts. A comprehensive package would also take into account the potential environmental degradation and distributional consequences that have been associated with trade.

- *Distributional impacts.* The failure of some firms participating in global value chains to pass costs reductions on to consumers and the declining share of labor income in countries integrated in global value chains have contributed to the perception of unequally shared gains from trade (World Bank 2020a). Conversely, growing services trade, global supply chains and digitalization have offered new economic opportunities to women (World Bank and WTO 2020). Going forward, labor market policies that can help share gains from global value chain participation more broadly include policies to facilitate labor mobility with active labor market programs and wage insurance schemes (World Bank 2020b).
- *Environmental impacts.* In some countries, entry into global value chains in manufacturing has been accompanied by greater carbon dioxide emissions and global value chains have contributed to greater waste and increased shipping (World Bank 2020a). Shipping accounts for 7 percent of global carbon dioxide emissions and 15 percent of global sulfur dioxide and nitrogen oxides (World Bank 2020a). Being heavily concentrated in the electronics sector, global value chains have also contributed to e-waste which accounts for more than 70 percent of toxic waste in U.S. landfills (World Bank 2020a). Policies, such as eco-friendly industrial parks and community-based tourism, can encourage environmentally friendlier business practices (World Bank 2020b). Measures that price environmental degradation can help improve resource allocation while reducing CO_2 emissions (World Bank 2020b).

Leveraging digital technologies. Digital technologies may eventually lower trade costs behind the border, at the border, and between borders, including by improving transparency and price discovery as well as the information flow between exporters, shippers, and country authorities.[10] This may particularly support global supply chains. Robotics can help accelerate port procedures. Artificial intelligence can help lower logistics costs by optimizing route planning, storage and inventory, as well as improving tracking and monitoring; 3D printing can help shorten supply chains and localize supply chains, thus reducing the environmental footprint of trade; blockchain technology can help reduce time spent in customs, especially for time-sensitive goods, facilitate cross-border payments by increasing transparency and credibility, and enhance information sharing within supply chains (Fan, Weitz, and Lam 2019;

[10] Conversely, greater digitization in cross-border trade will create its own challenges, including to enforce value added tax payments if digitization makes ever smaller payment transactions profitable (World Bank 2021c).

WTO 2018). Such technologies may disproportionately benefit small and medium-sized enterprises that currently face larger trade costs than large enterprises.

Conclusion

Despite a decline over the past two decades, trade costs are high. In EMDEs, they amount to the equivalent of a 100 percent tariff, i.e., they double the price of a traded good over a similar domestic good. Trade costs are on average about four-fifths high on agricultural goods as on manufacturing goods and almost one-half higher in EMDEs than in advanced economies.

Trade costs have a wide range of sources. The bulk of these costs are caused by transport and domestic market conditions as well as regulatory and administrative practices; tariffs account for only about one-fourteenth of trade costs. In fact, about one-third of the difference in trade costs between EMDEs and advanced economies reflects the effects of impediments to logistics and shipping, and another one-third trade policy, incuding trade policy uncertainty.

Comprehensive packages of reforms have often been successful in reducing trade costs. Such a package can include trade facilitation measures as well as agreements for deeper trade integration and coordinated efforts to streamline trade procedures and processes at and behind the border, improved domestic infrastructure, increased competitiveness in shipping and logistics, reduced corruption, simplified trade-related procedures and regulations, and easier compliance with standards. Many of these reforms, especially those relating to the business climate and governance, would stimulate private, trade-intensive investment and output growth more broadly.

TABLE 3.1 Data employed in the panel regression

Data	Definition	Source
Trade costs	Logarithm of the geometric average of country i's and j's bilateral trade costs	UNESCAP-WB Trade Costs Database
Tariff rates	Logarithm of the geometric average of country i's and j's bilateral tariff rates	UNESCAP-WB Trade Costs Database
Regional trade agreement (RTA)	Dummy variable equal to unity if countries i and j share a common RTA	CEPII
Common border	Dummy variable equal to unity if countries i and j share a common land border (adjacency).	CEPII
Common language	Dummy variable equal to unity if countries i and j share a common language	CEPII
Distance	Logarithm	CEPII
Logistic Performance Index	Logarithm of the geometric average of country i's and j's scores	World Bank
Liner Shipping Connectivity Index	Logarithm of the geometric average of country i's and j's scores	World Bank
Ease of doing business. Trading across borders score	Logarithm of the geometric average of country i's and j's score indicators	WB Doing Business Database
Proxy of trade policy uncertainty	Logarithm of the geometric average of the country i's and j's gap between bounded and applied tariff rates	World Development Indicators Database

Source: World Bank.

TABLE 3.2 Panel regression results

	All sectors	Manufacturing sector
Liner Shipping Connectivity Index	-0.2329*** (0.007)	-0.2281** (0.007)
Logistics Performance Index	-0.3708*** (0.334)	-0.3849*** (0.036)
Ease of trading	-0.1993*** (0.014)	-0.1983*** (0.166)
Tariffs	0.2897*** (0.042)	
Manufacturing tariffs		0.3495*** (0.053)
Regional trade agreement membership	-0.0485*** (0.056)	-0.0535*** (0.007)
Trade policy uncertainty	0.0783 (0.048)	0.0748 (0.005)
Distance	0.2533*** (0.069)	0.2630*** (0.007)
Common border	-0.4197*** (0.034)	-0.4222*** (0.036)
Common language	-0.1660*** (0.013)	-0.1745*** (0.014)
Sample	50,370	49,754
R^2	0.53656	0.5646

Source: World Bank.
Note: * p<0.05, ** p<0.01, ***p<0.001, robust standard errors are shown in parenthesis. The table shows estimated coefficients from a gravity panel regression estimated for 86 countries using annual data for 2007-2018 where the dependent variable is the log of bilateral trade costs. The regression includes time fixed effects. Standard errors are clustered by country pairs.

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