

A Trade Competitiveness Diagnostic for Armenia

Reconfiguring Trade to Overcome Geographical Limitations



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Acronyms

AMD	Armenian dram	ISO	International Organization for Standardization
Armstat	Statistical Committee of the Republic of Armenia	IT	information technology
BaTIS	Balanced Trade in Services	ITC	International Trade Centre
BACI	Base pour l'Analyse du Commerce International (data base for international trade analysis)	LPI	Logistics Performance Index
B2B	business-to-business	MFN	most favored nation
CES	constant elasticity of substitution	MRIO	multi-region input-output
CGE	computable general equilibrium	M&A	mergers and acquisitions
CEPA	Comprehensive and Enhanced Partnership Agreement	NQTM	new quantitative trade model
CEPII	Center for International Prospective Research and Data	OECD	Organization for Economic Co-Operation and Development
CIF	cost, insurance, and freight	PTA	preferential trade agreement
CIS	Commonwealth of Independent States	R&D	research and development
COVID-19	coronavirus disease 2019	RCA	revealed comparative advantage
EAEU	Eurasian Economic Union	SARM	National Body for Standards and Metrology
EIF	Enterprise Incubator Foundation	SMEs	small and medium enterprises
EU	European Union	SPS	sanitary and phytosanitary
FDI	foreign direct investment	TCD	Trade Competitiveness Diagnostic
FEA	foreign economic activity	TFA	Trade Facilitation Agreement
FOB	free on board	TFI	Trade Facilitation Indicator
FTA	free trade agreement	TRAINS	Trade Analysis Information System
GCC	Gulf Cooperation Council	UATE	Union of Advanced Technology Enterprises
GDP	gross domestic product	UN	United Nations
GSP+	Generalized Scheme of Preferences Plus	UNCTAD	United Nations Conference on Trade and Development
GVC	global value chain	UNDP	United Nations Development Program
ICT	information and communication technology	US\$	United States dollar
IFC	International Finance Corporation	WRAP	Worldwide Responsible Accredited Production
		WTO	World Trade Organization

Executive Summary

This Trade Competitiveness Diagnostic (TCD) provides a comprehensive assessment of Armenia's trade landscape and its competitiveness in the global market. The TCD aims to identify obstacles to Armenia's trade and competitiveness as well as opportunities to overcome them and strengthen its position in the global economy. The diagnostic includes an in-depth analysis of various dimensions including Armenia's trade competitiveness, the recent effects of trade policies, and a deep dive into the country's information and communication technology (ICT) sector. Through rigorous evaluation, the TCD highlights priority areas that require attention and strategic interventions to improve Armenia's trade competitiveness and integration in the global economy.

Armenia saw a rapid increase in exports of goods and services over the last decade and is now on par with other countries of similar income. The share of Armenia's total exports of goods and services to gross domestic product (GDP)—a proxy for trade openness—was 27 percent in 2011, below the average for countries with similar per capita income. This indicator then showed an upward trend over the last decade, reaching a peak of 42 percent in 2019 according to the World Development Indicators. In recent years, the share has been consistent with the average for countries of similar per capita income. Armenia's trade flows jumped in the aftermath of Russia's invasion of Ukraine. Exports of goods to Russia more than doubled from US\$452 million between March and September 2021 to US\$1.2 billion between March and September 2022. This increase was driven by re-exports of machinery and transport vehicles, among others. Exports to Russia remain high, rising to US\$2.1 billion between March and September 2023

This rapid export growth has been driven by a few products/sectors. Armenia has ranked among the top 30 countries with the fastest export growth since 2000. Its goods and services exports values were 10 and 12 times larger, respectively, in 2019 compared to 2000. Goods exports were driven primarily by a few commodities, particularly copper ores exports. Services exports surged in the early 2000s and remained high through the 2010s, driven by ICT services exports. Exports of ICT-related services have risen significantly over the past few years, adding to the strong performance of travel and transport.

Notably, merchandise exports have been driven by unprocessed commodities, and sophistication levels remain low. The average share of copper ores in total

exports almost doubled over the past decade, from 16 percent during 2009–11 to 25 percent during 2019–21. Furthermore, over 80 percent of merchandise exports are primary products, suggesting higher dependence on commodities. The heavy dependence on commodity exports makes Armenia vulnerable to external factors such as changes in global demand.

At the same time, the TCD found an increasingly high degree of concentration in destination markets for both goods and services. The European Union (EU) remains an important destination, although its export share has declined from 43 percent in 2011 to 23 percent in 2021. The decline in EU exports has left Armenia more dependent on trade with the Russian Federation and China: as the share of Armenia's exports to the EU declined, the share of exports to Russia increased from 14 percent in 2011 to 23 percent in 2021. At the same time, imports from Russia and China represented almost half of Armenia's total imports in 2021, while imports from the rest of the world have been declining over the years. A similar trend can be seen in services exports, with the bulk of ICT-related exports only destined for North America and the EU.

Armenia faces several trade constraints arising from its geographical situation and closed borders with neighboring countries. Landlocked between four countries, Armenia lacks direct access to major seaports, limiting its ability to engage in global trade. The closed borders with Azerbaijan and Türkiye limit the flow of goods and services to and from Armenia, further hindering trade integration. These barriers not only halt trade but also affect the magnitude and efficiency of the flows of both trade and transit freight between Armenia and its neighbors, and the rest of the world. In addition, a relatively small domestic market constrains the expansion and growth of domestic industries, making it difficult for Armenian firms to compete with larger international firms.

In addition, Armenia's trade has also been affected by accession to the Eurasian Economic Union (EAEU) customs union, which has resulted in a gradual increase in tariffs and reliance on EAEU trade partners. As part of the EAEU, Armenia adopted a common external most favored nation (MFN) tariff and is therefore bound by the EAEU and cannot change tariffs unilaterally outside of the union. As a result, tariffs are significantly higher across all broad economic categories compared to peers which makes it difficult for Armenia to access affordable and quality imported inputs and capital goods to compete with larger international players, thus hindering the development

of backward linkages. The loss of preferences from the EU's Generalized Scheme of Preferences Plus (GSP+) exacerbates the issues.

Foreign direct investment inflows have been on a marked decline over the past decade, prior to surging in 2021 and 2022. Between 2010–22, the average FDI inflows for Armenia were US\$384 million, compared to an average of US\$1.3 billion for Georgia during the same period. However, Armenia has experienced a recent increase in FDI inflows, which rose from US\$366 million in 2021 to US\$998 million in 2022. Russia remains the largest holder of FDI stocks in Armenia, although its share has declined since 2014 while the shares of the EU, North America, Middle East, and other regions have increased. Investment projects in Armenia are primarily focused on mining, services (particularly financial, IT, and trade), utilities, and manufacturing sectors such as computers/electronics and transportation equipment.

According to a survey conducted by the International Finance Corporation (IFC) in 2023, the most significant challenges for investment activities in Armenia are related to human capital, bureaucracy, legal issues, and infrastructure. The survey also highlighted the lack of large-scale projects to attract institutional investors, limited exit routes and strategies due to an underdeveloped stock market, and a shortage of highly qualified human capital as factors affecting investment activities in the country.

Armenia continues to lag on trade facilitation. Despite being a World Trade Organization (WTO) member since 2003 and ratifying the TFA in 2017, Armenia's implementation of its obligations remains incomplete, with a compliance level of 94.5 percent. While the compliance levels have been high compared to peer countries, the provisions of the TFA can be implemented at different maturity levels, leading to differences in trade facilitation, speed of trade flows, and related costs. The OECD trade facilitation indicators reveal that Armenia lags in areas such as engagement with the trade community, documentation processes, automation, and cross-border cooperation. This ineffective implementation, like higher tariffs, escalates the costs associated with trade.

Armenia has scope to increase value added through global value chain (GVC) participation. Armenia currently exports commodities for processing and onward exports by other countries. The country has shown a high degree of integration in forward GVC participation, in contrast to

peer countries such as Albania, Bosnia and Herzegovina, and Estonia that are skewed toward backward GVC linkages. With backward linkages, an economy imports intermediates to produce its exports. Drawing from global experiences of successful exporters, Armenia needs to concentrate more on backward linkages if it wants to move up the value chain. By engaging in the earlier stages of production, Armenia can add more value to its exports and capture a larger share of the value created in the production process. In addition, Armenia can potentially reap more benefits from GVC participation if it successfully embeds the booming services sector into manufacturing.

The emergence of ICT services and other commercial services exports more generally over the last few years is an opportunity for Armenia to partly overcome its trade constraints. Services exports surged in the 2000s and remained high through the 2010s on the back of a robust commercial services exports performance. The ICT services sector has been driving recent growth and contributed to one-fifth of total commercial services exports in 2021. In addition, gravity model estimates shows that Armenia has a stronger comparative advantage in post and telecommunications services than all of its peers. Further nurturing the services sector—particularly the dynamic ICT sector as well as other services such as financial services and business processes outsourcing—can increase value addition and competitiveness throughout the economy.

Armenia's ICT industry is already on an upward trajectory, with established diaspora networks committed to creating business opportunities. The sector has capacity to grow further thanks to the increased availability of funding sources, including venture, angel, and other forms of startup financing. Diaspora networks have continued to create business opportunities and to bring foreign investments and significant knowledge transfers in the sector. The ICT sector has already been shifting toward higher value-added ICT services exports, for which global demand has grown in the post-coronavirus disease 2019 (COVID-19) global economy.

Moreover, the industry faces less connectivity-related issues and fewer trade policy-related restrictions compared to other sectors. Unlike goods trade, which can be heavily impacted by logistical and infrastructural challenges, the trade of Information and Communication Technology (ICT) services is generally less hindered by issues related to connectivity. This is because ICT services are often delivered digitally, bypassing the traditional

barriers that affect the physical movement of goods, such as transportation delays, customs clearance, and the need for physical infrastructure. Armenia has also signed various international agreements to promote investments in the ICT sector. These agreements include the Partnership Agreement with the EU on services, the Trade and Investment Framework Agreement with the United States, the EAEU, the Commonwealth of Independent States (CIS) Multilateral Convention on the Protection of Investor Rights, in addition to its WTO commitments in Trade in Services.

Multiple structural challenges, such as a skills mismatch, threaten to derail progress in increasing the competitiveness of the ICT sector. Although the education system offers a strong foundation in mathematics and physics, Armenia has struggled to upskill and reskill its labor force. Consultations with the private sector revealed a mismatch between graduate capabilities and business needs. This mismatch has posed challenges in scaling up, as firms struggle to find skilled developers and engineers as well as product and sales managers. Although the current ICT strategy for Armenia, developed more than 10 years ago, had clear goals and courses of action to resolve these challenges and to position the Armenian ICT industry at the global level, its ineffective implementation due to state capacity issues threatens to hamper future competitiveness.

Although significant progress has been made toward improving the regulatory framework in Armenia, some gaps continue to impede foreign investments in the sector. The laws and regulations remain unclear regarding electronic documents and signatures and need to be reviewed. No laws have been enacted regarding the validity of electronic signatures, which creates challenges for foreign investors since electronic signatures are crucial, particularly for remote contacts which are often made at the international level.

The current legal framework in Armenia presents challenges in the realm of cross-border data transfer and accountability, particularly due to the lack of specific legislation governing the protection of personal data. Although the Personal Data Protection Law of 2015 protects the rights to personal data protection, it falls short in clarifying its reach, especially concerning the data collection and transfer activities of foreign companies involving the personal data of Armenian citizens within the country's borders. There is an urgent need for Armenia to revisit and refine this Law to address these issues, which

have significant implications, notably in the sphere of foreign investment. The existing uncertainty in the legal provisions may deter foreign companies from engaging in business operations in Armenia, given the potential risks associated with the legalities of data collection and transference.

The absence of legislation on personal data protection, particularly regarding the transfer of data across borders, poses challenges for cross-border data transfer accountability and the legal basis for data collection. While Armenia protects the rights to personal data protection under the Personal Data Protection Law of 2015, the Law is not clear on its jurisdictional scope, as it does not specify which rules apply to a foreign company's collection and transfer of Armenian citizens' personal data collected within Armenia. Armenia urgently needs to review this Law, as it has significant consequences particularly for attracting foreign investments. Foreign companies may be hesitant to operate in Armenia if there is uncertainty surrounding the legal framework for the collection and transfer of personal data.

Lastly, little coordination takes place between the government and firms regarding data sharing in Armenia. The institutional ecosystem for data in Armenia comprises several agencies, with different reporting lines and mandates. Consultations revealed that the Ministry of High-Tech Industry leads its own projects on data collection with little coordination with the Statistical Committee of the Republic of Armenia (Armstat), which is the statistical agency responsible for collecting, monitoring, and sharing data in Armenia. Moreover, Armstat data sharing is through PDF and old excel files, which makes data processing and use challenging. In addition, while various e-government websites have been developed over the last few years, they do not have consistent metadata structures and standards that enable data flows. This makes it difficult for the government and stakeholders to monitor developments in the sector effectively and make timely interventions.

The analysis presented in this report reveals three strategic priorities for enhancing Armenia's trade competitiveness.

1. **Effectively implementing the WTO TFA to improve trade facilitation** – by effectively implementing the WTO TFA, Armenia can unlock various potential gains. These gains include increased exports and imports: simulations have shown that fully implementing the

TFA could lead to a 14.8 percent increase in exports and a 10.9 percent increase in imports. This increased trade could bring expanded economic activity, higher production, and potential growth for the country. At the macroeconomic level, effective implementation of the TFA could lead to a 2.9 percent increase in real GDP. Wages are also estimated to increase by 2.7 percent, further contributing to improved economic conditions. This could be achieved by:

- a. Strengthening the governance framework to coordinate whole-of-government trade facilitation reforms—this involves institutionalizing a National Committee on Trade Facilitation or similar body to coordinate various cross-border regulatory agencies and guarantee active involvements and dialogue with private sector stakeholders.
 - b. Formulating and approving a National Trade Facilitation Development Plan to consolidate initiatives, ensure synergies of projects, mobilize necessary resources and external support, and enable dialogue and secure commitment by all relevant stakeholders.
 - c. Further enhancing the Trade Single Window solution to better facilitate the flow of information between exporting firms and state administration bodies and to simplify cross-border procedures.
 - d. Standardizing and digitizing services provided, implementing streamlined FEA service centers that offer high-quality and modern client-centric services.
 - e. Improving coordination of compliance and border management at the national and bilateral levels (for instance, through an Integrated Targeting and Operation Center and implementation of an Authorized Economic Operator (AEO) Program) and bilateral levels (exploring joint management of land border posts and mutual recognition of AEOs).
 - f. Redesigning border procedures based on modern technologies (such as non-intrusive inspection equipment, plate readers and tracking and tracing devices, biometric solutions, and surveillance cameras) to implement seamless smart borders.
2. **Promoting export diversification, upgrading, and integration in GVCs** – Armenia has growth potential in sectors such as agriculture, apparels, and digital services. Increasing value added in sectors such as agriculture and apparels through value chain participation, and promoting investments in these sectors will lead to increased exports. Additionally,

participating in digital services is an opportunity for Armenia to overcome its connectivity constraints. Necessary reforms include:

- a. Attracting a new wave of FDI in ICT and manufacturing—FDI attraction efforts should be focused on a narrow set of target sectors and value chains with the highest potential to generate exports and linkages.
 - b. Supporting domestic firms' integration in GVCs in the apparels sector through supplier linkage programs—tools to facilitate international firms and local suppliers include supplier databases, digital marketplaces, and business-to-business (B2B) platforms.
 - c. Connecting domestic small and medium enterprises (SMEs) in agriculture with leading food exporting firms to promote domestic backward linkages in the agriculture sector. This can be done through targeted public sector support and measures. The success of these initiatives depends on producers meeting market standards and supplying sufficient volumes of produce.
 - d. Supporting the adoption of international standards and addressing constraints in conformity assessment, which includes adopting best practices to facilitate certification of products.
 - e. Actively engaging in trade promotion activities to increase market access with members of the EAEU as well as other countries with which Armenia has bilateral free trade agreements (FTAs). Such activities could include organizing trade missions, participating in trade fairs and exhibitions, and facilitating B2B contacts to connect Armenian exporters with potential buyers in other member states.
3. **Enhancing ICT sector competitiveness** – the recommendations identified in World Bank (2020) on Armenia's high-tech potential are still valid. In addition, policy interventions should focus on:
- a. Upskilling and fostering innovation – This can be achieved by formalizing and integrating educational programs to meet the sector's changing skill requirements, creating a platform to disseminate information and opportunities in ICT services trade for talent attraction and retentions, and fostering local research and local development, as well as innovation initiatives that lead to the creation of locally developed applications and products.

- b. Promoting new investments – the government should streamline its marketing strategies under an agency to coordinate the ICT sector's promotional activities and enhance the role of Armenian consulates and embassies in advocating for connections between foreign investors and local ICT companies and startups
- c. Strengthening state capacity and effective implementation – this involves training government officials, crafting specialized programs, and fostering international partnerships and knowledge exchange. Additionally, revising Armenia's ICT strategy to match global trends and consulting with the private sector is crucial to ensure the strategy is relevant and effective.
- d. Facilitating the integration of new skilled IT professionals from Russia by helping them find accommodation and navigate administrative processes and by facilitating networking opportunities
- e. Closing existing gaps in the regulatory framework – this involves evaluating and strengthening the legal and institutional framework for e-services, revising the 2015 Personal Data Protection Law and its provisions, and implementing a government-wide strategy for systematic data handling and storage, ensuring adequate safeguards

Introduction



Armenia's trade is constrained by numerous factors, including the country's geographical situation, closed borders with neighboring countries, and small domestic market. Armenia is a landlocked country that has border closures with two of its four neighbors. Its borders with Azerbaijan and Türkiye have been closed for 30 years, and Armenia currently conducts very little to no trade with those two countries. Thus, Georgia and Iran provide the only trade land routes, which constrains Armenia's external performance and export growth. In addition, a relatively small domestic market limits the expansion and growth of domestic industries.

Despite these constraints, Armenia recorded a rapid increase in exports of goods and services over the last two decades. Armenia ranks among the top 30 countries with the fastest export growth since 2000 (Figure 1). Its total goods and services exports grew at annual average rates of 10 percent in volume terms (constant US dollars) between 2000 and 2019. As a result, Armenia's goods exports and its services export values were 10 and 12 times larger, respectively, in 2019 compared to 2000.

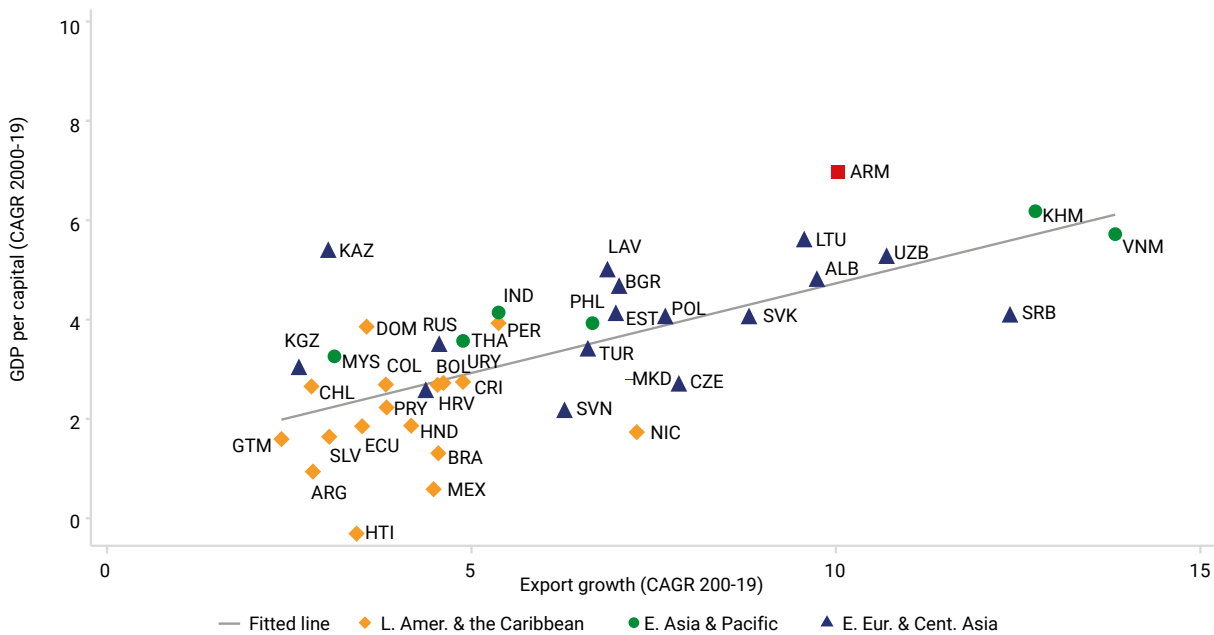
However, the high export growth rates experienced by Armenia over the last two decades may not be sustainable

given the high degree of concentration on particular exports and trading partners. Armenia's trade patterns and export structure have remained relatively narrow, primarily centered around few commodity exports. The heavy reliance on a limited number of commodities makes the country vulnerable to external shocks and fluctuations in global commodity prices. Equally, Armenia's dependence on a small number of trading partners for both goods and services has further constrained its ability to diversify and expand its markets.

Trade openness can play an important role for Armenia. Armenia needs to prioritize export diversification, which can only happen through trade openness given its small domestic market. Diversifying trade and exploiting new opportunities presented by the expansion of trade in services and participation in global value chains (GVCs) can enhance Armenia's competitiveness on the global stage. At the same time, given the country's geographical challenges, expanding trade relationships with a broader range of countries will reduce Armenia's vulnerability to economic shocks originating from a single market or region.

To unleash the potential of trade and GVCs as engines for growth, this Trade Competitiveness Diagnostic

Figure 1: Export growth vs. gross domestic product (GDP) per capita growth, 2000–19



Source: World Bank staff calculations based on World Development Indicators and Fernandes, Neivas, and Winkler 2022.
Note: CAGR = compound annual growth rate.

(TCD) aims to identify obstacles to Armenia's trade competitiveness and engagement in GVCs and the means to overcome them. It looks at how Armenia's goods trade has evolved over the past two decades and the opportunities available for Armenia to diversify its export basket, given its geographical limitations. It identifies factors limiting Armenia's trade prospects and explores actionable policy options for enhancing goods trade. Recognizing the importance of the ICT sector, the analysis looks at key structural challenges affecting the sector and deliberates on ways Armenia can enhance its competitiveness in exporting ICT services.

This TCD builds on existing evidence on the main issues facing Armenia. The evolution of Armenia's export performance, recent global and geopolitical developments, and export potential have been documented, showing the need to boost the tradable sector by focusing on products with higher complexity (Akepanidaworn et al. 2022). The importance of the ICT sector in Armenia's export basket and its potential to drive growth in the future have been documented in World Bank (2013) on competition and connectivity and World Bank (2020) on Armenia's technology potential.

The TCD helps to fill remaining knowledge gaps with new analysis. This TCD is the first detailed analysis to provide a better understanding of patterns observed in the literature such as (1) obstacles to Armenia's trade competitiveness, (2) new opportunities for diversifying Armenia's export basket, (3) policy priorities for enhancing Armenia's trade competitiveness, and (4) Armenia's ICT services sector performance and key challenges. New analysis was also conducted using gravity and general equilibrium analyses to provide new perspectives on issues that have received limited attention in the existing literature. The TCD first quantified Armenia's sectoral comparative advantage and new opportunities using a structural gravity model. It used the same model to quantify the magnitude of Armenia's export potential. The TCD also used a "new quantitative trade model" (NQTM) to simulate a scenario in which Armenia fully implements its World Trade Organization (WTO) Trade Facilitation Agreement (TFA) commitments relative to the baseline captured in the most recent Organization for Economic Co-Operation and Development (OECD) Trade Facilitation Indicators (TFIs) (2019). As part of this work, stakeholder consultations were held by the TCD team in Armenia to better understand the challenges faced by the private sector and what is needed to address those challenges.

Throughout the TCD, Armenia is benchmarked against its peers. These peers are drawn from the Armenia Systematic Country Diagnostic (forthcoming) and include Albania, Bosnia & Herzegovina, Estonia, Georgia, Moldova, and Tunisia. Benchmarking against these countries is used to explore areas with potential for export growth or potential for improvement.

The Centre d'Études Prospectives et d'Informations Internationales (CEPII) Base pour l'Analyse du Commerce International (BACI, database for international trade analysis—see Gaulier and Zignago 2010) is used as the main source of data for analysis. Differences in reporting between official data by Armstat and BACI are expected, as BACI reconciles trade flows between countries by implementing a harmonization procedure with two main adjustments: (1) cost, insurance, and freight (CIF) costs are estimated and removed from import values to compute free on board (FOB) import values and (2) the reliability of each country as a reporter of trade data is assessed. If a reporter tends to provide data that are very different from the data of its partners, it is considered to be unreliable and is assigned a lower weight in the determination of the reconciled trade flow value. Other data sources include the Eora multi-region input-output (MRIO) tables, United Nations Conference on Trade and Development (UNCTAD), United Nations (UN) Comtrade, OECD-WTO BaTIS database, World Development Indicators (WDI), Central Bank of Armenia, Statistical Committee of the Republic of Armenia (Armstat), and national legislation.



01

Snapshot of goods trade: a trade outcomes analysis

1.1 Rapid but commodity-driven export growth

Armenia's exports of goods and services increased significantly within just 10 years and are now on par with other countries of similar income. The share of Armenia's total exports of goods and services to gross domestic product (GDP), a proxy for trade openness, was 23 percent between 2009–11, below the average for countries with similar per capita income (Figure 2, panel a). Ten years later, the share is now at 36 percent to GDP, consistent with the average for countries with similar per capita income but still lower than the share of some peers such as Estonia, Georgia, and Tunisia (Figure 2, panel b). Between 2011–19, services exports grew by 8 percent annually on average, playing an important role in Armenia's rapid export growth, but goods exports have remained dominant.

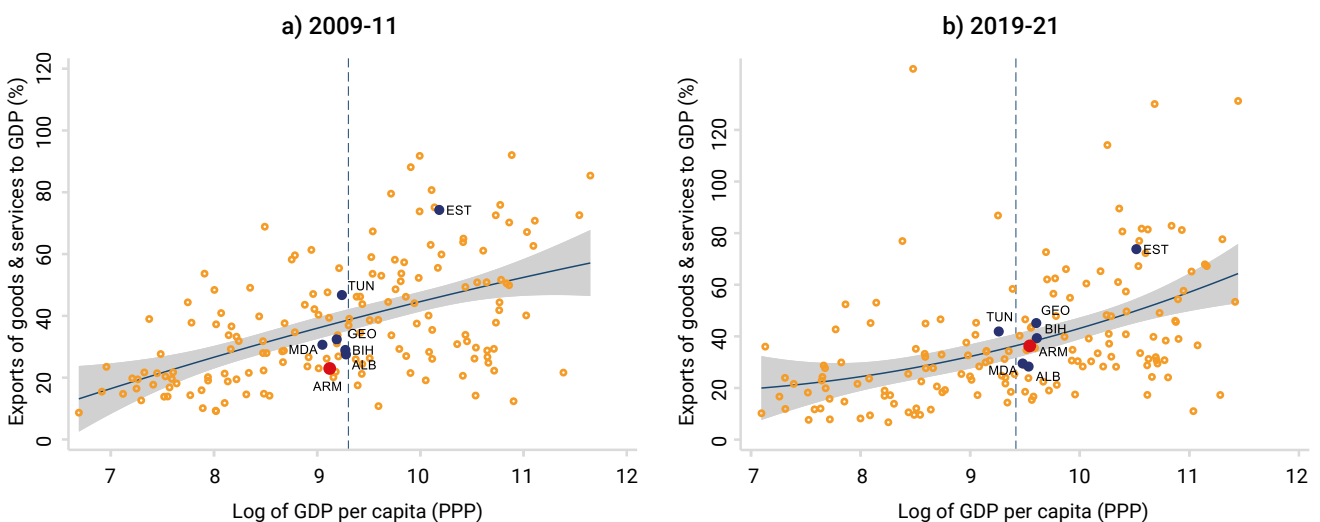
The surge in goods exports growth was driven primarily by copper ores. Armenia took advantage of the commodity prices boom in the mid-2010s and increased its copper ores exports. The average share of copper ores in total exports increased by more than 50 percent over the past decade, from 16 percent between 2009–11 to 25 percent between 2019–21, and copper ores continue to be the

country's top export (Figure 3, panel a). Other export products such as cigarettes, hard liquor, ferroalloys, and gold have been performing well in recent years. Diamonds used to be Armenia's major export product in the early 2000s and accounted for almost half of Armenia's total goods exports in 2002, but by 2021, they accounted for just 3 percent of total goods exports.

Diversification in goods exports has been limited, with commodities dominating Armenia's export basket, while the number of product discoveries has been declining.

The share of commodities in Armenia's total exports exceeded 40 percent in 2019 (Figure 4, panel a), with a higher level of export product concentration compared to peer countries such as Estonia and Bosnia & Herzegovina. Manufacturing exports only accounted for approximately 20 percent of goods exports in 2019 (Figure 4, panel b), which also suggests higher dependence on commodities. As a result, Armenia has had fewer new product discoveries in the last decade, with only 65 new products introduced in the export basket in 2021, compared to 449 introduced in 2003 (Figure 3, panel b). Another indicator of diversification is revealed comparative advantage (RCA, meaning products that a country exports more intensively than the rest of the world), and Akepanidaworn et al. (2022) found that Armenia's number of products with a high measure of RCA has been dropping constantly.

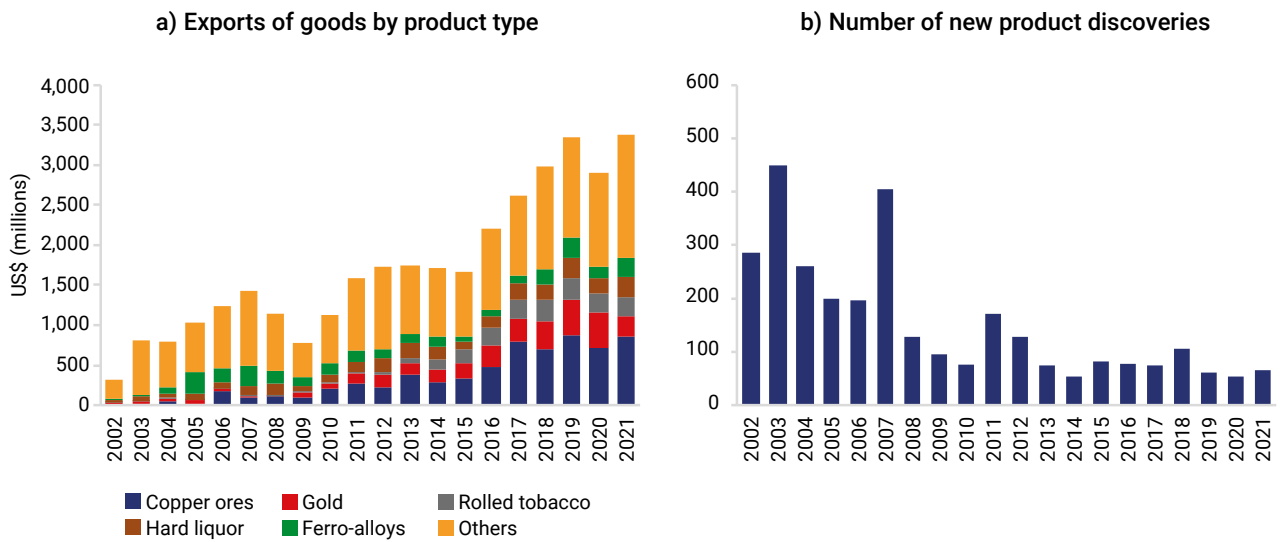
Figure 2: Exports of goods and services to GDP, Armenia and peer countries



Source: World Bank staff estimates based on World Development Indicators.

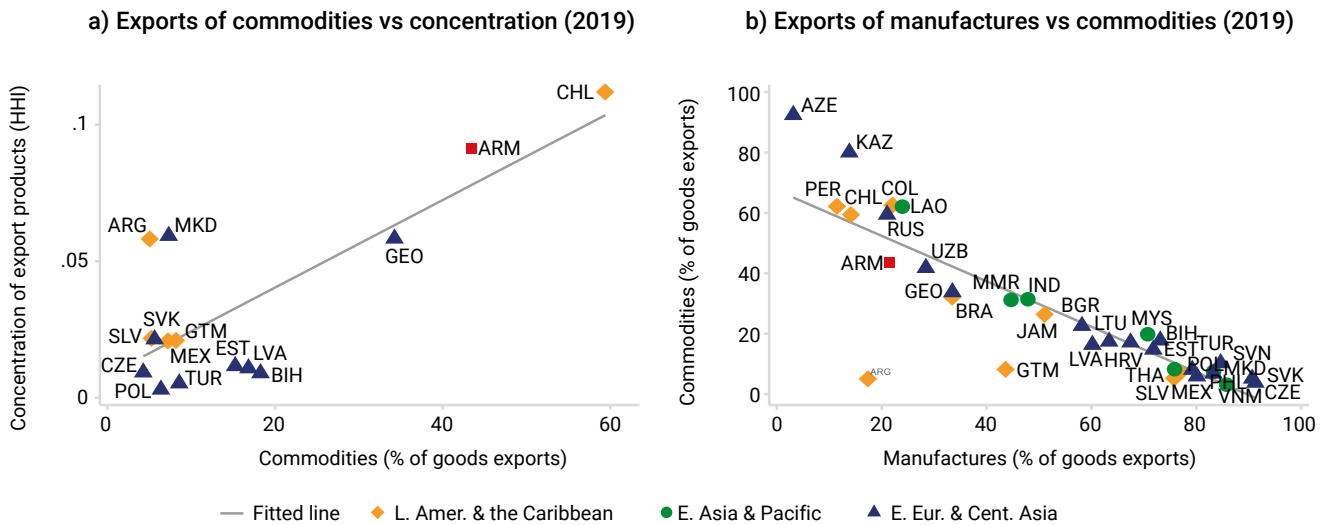
Note: This figure shows exports of goods to GDP for 2009–11 and 2019–21 for Armenia and peer countries (the TCD uses similar peer countries to those used in the forthcoming World Bank Systematic Country Diagnostic). Other dots represent other countries in the world. The dotted line represents the average per capita income for countries in the sample. PPP = purchasing power parity.

Figure 3: Exports by product type in Armenia



Source: World Bank staff estimates based on data from BACI.
Note: Panel b shows number of new product discoveries (2002–21).

Figure 4: Commodities versus manufactures as a share of goods exports and product concentration in selected countries, 2019

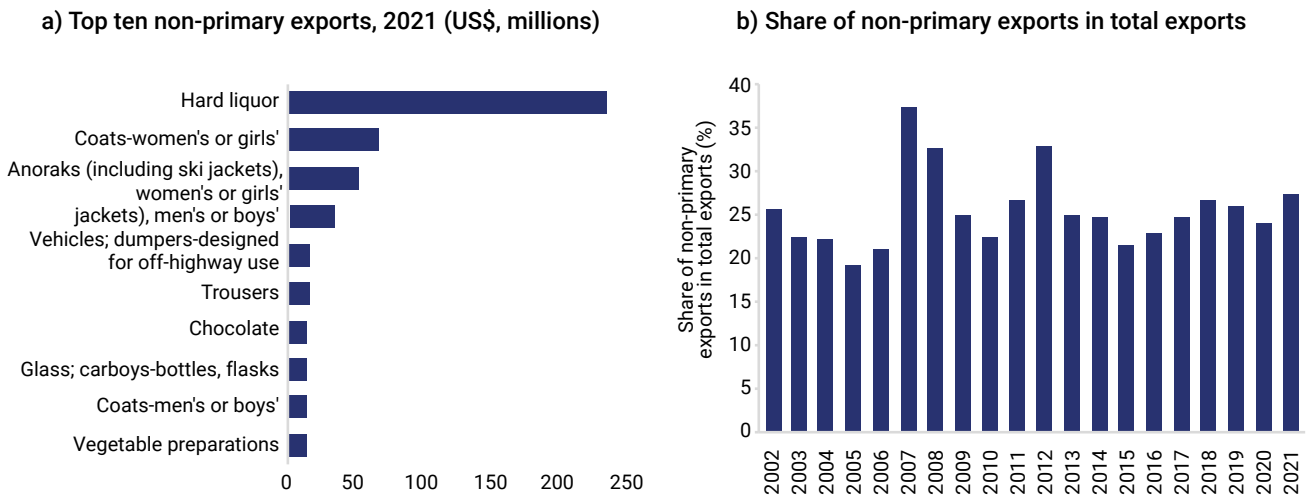


Source: World Bank staff calculations based on World Development Indicators and Fernandes, Neivas, and Winkler 2022.
Note: HHI = Herfindahl-Hirschman Index.

Non-primary exports are dominated by hard liquor, followed by coats and anoraks. In 2021, hard liquor exports amounted to US\$232 million, which constituted 7 percent of Armenia’s total goods exports. Other important manufactures exports are women’s or girls’ coats,

anoraks, and other textile products (Figure 5, panel a). The share of non-primary exports has fluctuated but mostly remained around 25 percent over the last two decades (Figure 5, panel b).

Figure 5: Exports of non-primary products for Armenia



Source: World Bank staff estimates based on data from BACI.

1.2 Manufacturing sectors with growth potential

Armenia’s manufacturing sector has a comparative advantage in metal products, textiles and apparel, and food and beverages. Countries are said to enjoy a comparative advantage in a certain good when they can produce it more efficiently (at a lesser cost) than other countries. Estimates from a gravity model using 2021 data suggest that Armenia’s strongest comparative advantage in the manufacturing sector relative to agriculture is in metal products. Textiles and wearing apparel, food and beverages, and other manufacturing have a comparative advantage—as measured by RCA—of greater than 0.8 relative to agriculture (Figure 6, and see Appendix A for a description of how to estimate RCA). Key manufacturing sectors that normally drive export growth, such as electricals and machinery and other manufacturing, have lower comparative advantage scores and trail behind peer countries such as Estonia.

Armenia is poorly positioned in the manufacturing sector in relation to global demand. While Armenia has made progress in growing sectors that are mostly commodities,

it has been losing in sectors such as machinery, parts and components, and apparel. Armenia’s share in world exports in sectors where world imports have been growing is very small. These sectors include electricals and machinery (7 percent), pharmaceutical products (11 percent), apparel (5 percent), and plastic and rubber (6 percent). The country has the potential to scale up exports of these products as world demand has been growing significantly over time. Along with these products, examples of other products for which Armenia can develop its comparative advantage and for which world demand is growing are shown in Table C.1 in Appendix C.¹

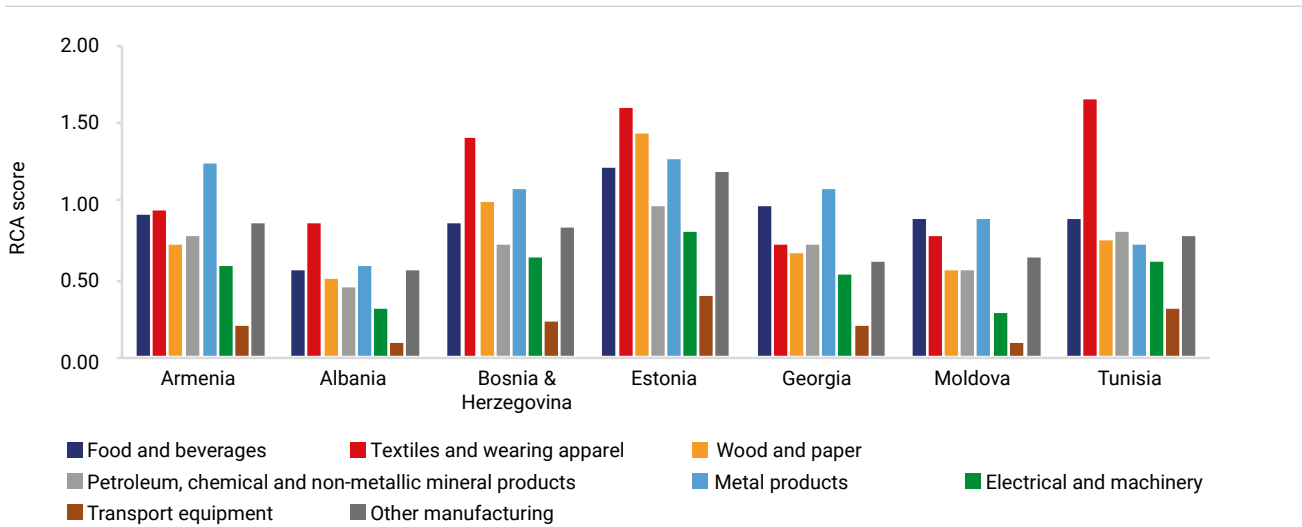
1.2.1 The role of agribusiness

Agrifood products—especially alcoholic beverages and tobacco—are a major export for Armenia. In 2021, agricultural exports accounted for 26 percent of total goods exports, up from 15 percent in 2011 (Figure 7). Alcoholic beverages—particularly traditional Armenian brandy—and tobacco products were the main drivers of the surge and together accounted for over two-thirds of total agricultural exports in 2021.²

1 In 2023, Armenia passed a resolution designating key sectors such as heavy industry (including metallurgy and chemistry), the pharmaceutical industry, jewelry and diamond production and equipment manufacturing (encompassing devices, machines and solar technologies) as key sectors in the manufacturing industry. Subsequently, the government also adopted a 5 year action plan for the development of the pharmaceutical industry. The government plans to introduce new technologies and automation particularly in pharmaceuticals and heavy industries, in addition to funding training programs of workers in priority sectors.

2 According to official figures from the State Revenue Committee of Armenia, agribusiness accounts for 30 percent of total goods exports, while alcoholic beverages and tobacco products account for over half of total agricultural exports.

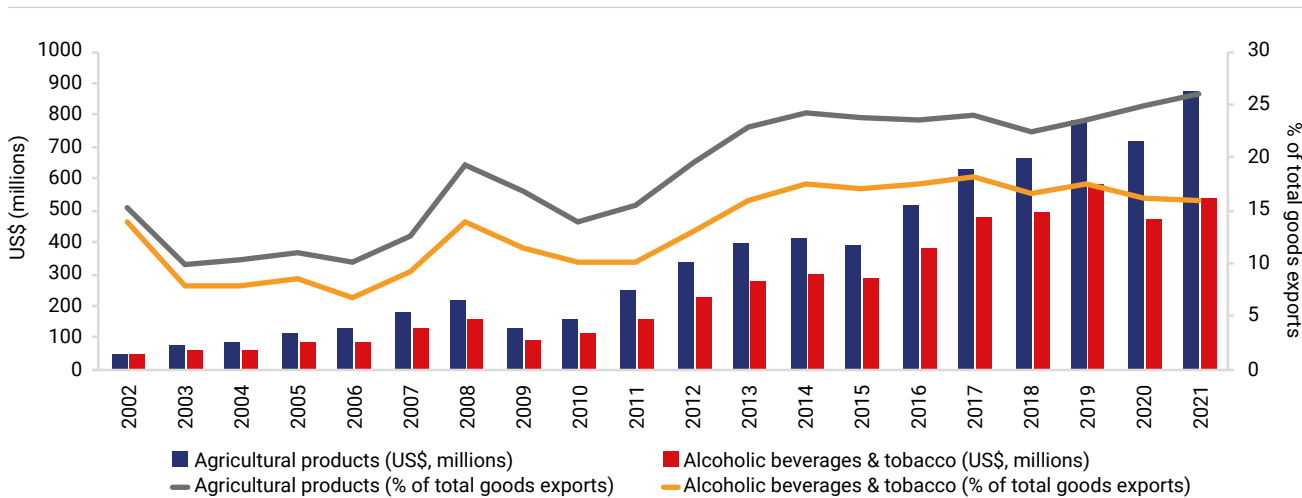
Figure 6: Comparative advantage in manufacturing sectors, Armenia, and peer countries, 2021



Source: World Bank staff calculations based on gravity modeling using Eora data.

Note: RCA = revealed comparative advantage. The RCA is computed relative to agriculture, which takes the value of 1.

Figure 7: Exports of agricultural products for Armenia



Source: World Bank staff calculations based on data from BACI.

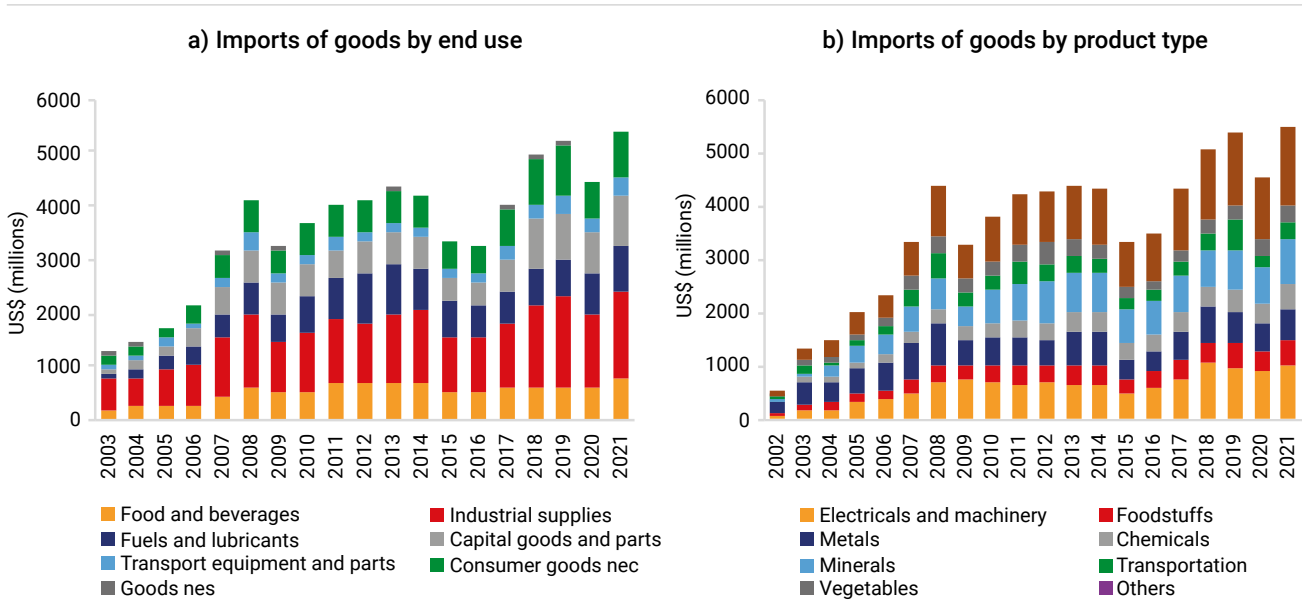
Note: Agricultural products consist of all products between HS 010000 and HS 240000.

Tomato and fish exports have also increased significantly since 2016.³ In 2021, Armenia exported approximately US\$44 million worth of tomatoes, up from US\$19 million in 2016. Before 2016, Armenia barely exported any tomatoes. Similarly, Armenia exported around US\$58 million worth of fresh fish in 2021, up from just US\$9 million in 2016. Almost all the tomatoes and fresh fish are

destined for the Russian Federation. Armenia's exports of fresh fruits such as strawberries and peaches also grew briskly between 2016–21. Armenia has opportunities to scale up exports of these products and deliver them to international markets using the same modern processing and packaging technologies used in the production of alcoholic beverages.

3 Armenia started to export most agricultural products in 2016. Before 2016, exports in this sector were concentrated only in food, beverages, and tobacco products.

Figure 8: Imports of goods by product type and end use



Source: World Bank staff calculations based on data from BACI and UN Comtrade reported data.
Note: nes means not elsewhere specified.

Armenia could unlock the agricultural sector’s potential through value chain development. Armenia already has examples of successful value chain development initiatives, such as for the Yerevan Brandy Company which has established a circle of “anchor” suppliers (World Bank, forthcoming). This initiative involves providing farmers with inputs, agronomic advisory services, and printed information leaflets. In return, these suppliers provide raw materials to the company according to their contractual agreements. This approach facilitates market access for producers and has the potential for scalability.

1.2.2 The role of apparel

The apparel sector’s contribution to Armenia’s export growth has been increasing. The sector’s average share in total exports between 2015–21 was 7.7 percent. Its average contribution to the country’s export growth was 11.7 percent during the same period, up from just 0.1 percent between 2009–14. The growth in apparel exports between 2015–21 was driven mainly by increased apparel exports to the European Union (EU) and Russia.⁴ Coats and anoraks have experienced increased dynamism and contributed to the growth in Armenia’s overall goods exports. However, fewer new products have been added to the export basket in recent years.

1.3 A surge in imports over the past two decades

Imports of goods surged over the past two decades, mainly driven by industrial supplies, fuels and lubricants, and capital goods. In 2021, total imports stood at US\$5.5 billion, with industrial supplies accounting for one-third of Armenia’s total imports (Figure 8, panel a). Fuels and lubricants, consumer goods, and capital goods are also essential imports for Armenia. At the product level, Armenia imports minerals, metals, and electricals and machinery (Figure 8, panel b). In 2021, natural gas and refined petroleum were Armenia’s top two imports and together accounted for almost 13 percent of total imports. Other essential imports are radio transmission apparatus, medicaments, and gold.

Despite the increase in imports, domestic firms may face trade barriers or challenges in accessing foreign markets. These include existing trade constraints such as being landlocked and the geopolitical complexities with neighboring countries, which make it difficult for Armenia to trade with regional and global markets. In addition, higher tariffs may be impeding the ability of domestic firms to access cheaper and more affordable intermediate inputs for further processing and to expand their export

⁴ Armenia has been a beneficiary of the Special Incentive Arrangement for Sustainable Development and Good Governance (GSP+) under the reformed EU Generalised Scheme of Preferences (GSP) as of January 1, 2014.

activities. As a result, the increased imports are primarily supporting domestic production.

1.4 Growing importance of Russia and China as export and import partners

Armenia's exports are concentrated on a few destinations, with the EU and Russia absorbing more than two-thirds of the country's exports. Because of its market size and geographical proximity, the EU remains an important destination, although its export share declined from 43 percent in 2011 to 23 percent in 2021. This decline is not surprising given that Armenia joined the Eurasian Economic Union (EAEU) customs union with Russia and former Soviet States in 2015.⁵ Other possible explanations for the fall in EU exports include the expected loss of preferential access to the EU market as a result of graduation from the Generalized Scheme of Preferences Plus (GSP+) and the lack of capacity to conform with the EU's increasing mandatory standards and different conformity assessment procedures by Armenian exporters.

The decline in EU exports leaves Armenia more dependent on trade with Russia and China. As the share of Armenia's exports to the EU declined, the share of

exports to Russia increased from 14 percent in 2011 to 23 percent in 2021 (Figure 9, panel a). Exports to Russia increased significantly after Russia's invasion of Ukraine (see Box 1 for details), confirming the growing importance of Russia as a key trading partner for Armenia. Similarly, exports to China grew from just 1 percent to 13 percent of total exports during the same period. Exports to Switzerland and India represented 18 percent of the total (Table 1). These exports are concentrated in mineral products (mostly gold). Exports to Georgia—mainly glass (bottles, flasks, and jars), cigarettes, and copper ores and concentrates—represented only 3 percent of Armenia's total exports in 2021.⁶

Russia and China are also becoming key suppliers to Armenia. Imports from Russia represented 33 percent of total imports in 2021, up from 19 percent in 2011. Similarly, imports from China grew from 10 percent to 15 percent of total imports between 2011–21. The EU is still a major source of imports for Armenia but is no longer its major supplier, and its exports have declined significantly from 28 percent in 2011 to 19 percent in 2021 (Figure 9, panel b). Armenia also reduced its imports from Georgia during the same period, indicating the impact of Russia and the EAEU agreement on trade with the EU and in the South Caucasus region. Trade with other EAEU member states is very low.

Table 1: Armenia's exports by destination

Average 2002–08		Average 2009–14		Average 2015–20		2021	
Market	Share (%)	Market	Share (%)	Market	Share (%)	Market	Share (%)
Germany	13	Russian Federation	17	Russian Federation	21	Russian Federation	23
Russian Federation	13	Germany	11	Switzerland	15	China	13
Belgium	11	Canada	9	Bulgaria	7	Switzerland	11
Netherlands	8	Bulgaria	9	China	7	India	7
Israel	8	United States	6	Iraq	6	Bulgaria	6
United States	6	Belgium	6	Germany	5	Netherlands	6
Yemen	5	Georgia	6	Georgia	4	Iraq	5
Georgia	4	Netherlands	6	Canada	4	Germany	4
Switzerland	4	Iran	5	Netherlands	4	United States	3
United Kingdom	3	China	4	Iran	3	Georgia	3

Source: World Bank staff calculations based on data from BACI.

Note: Table is only showing top 10 destinations for each period.

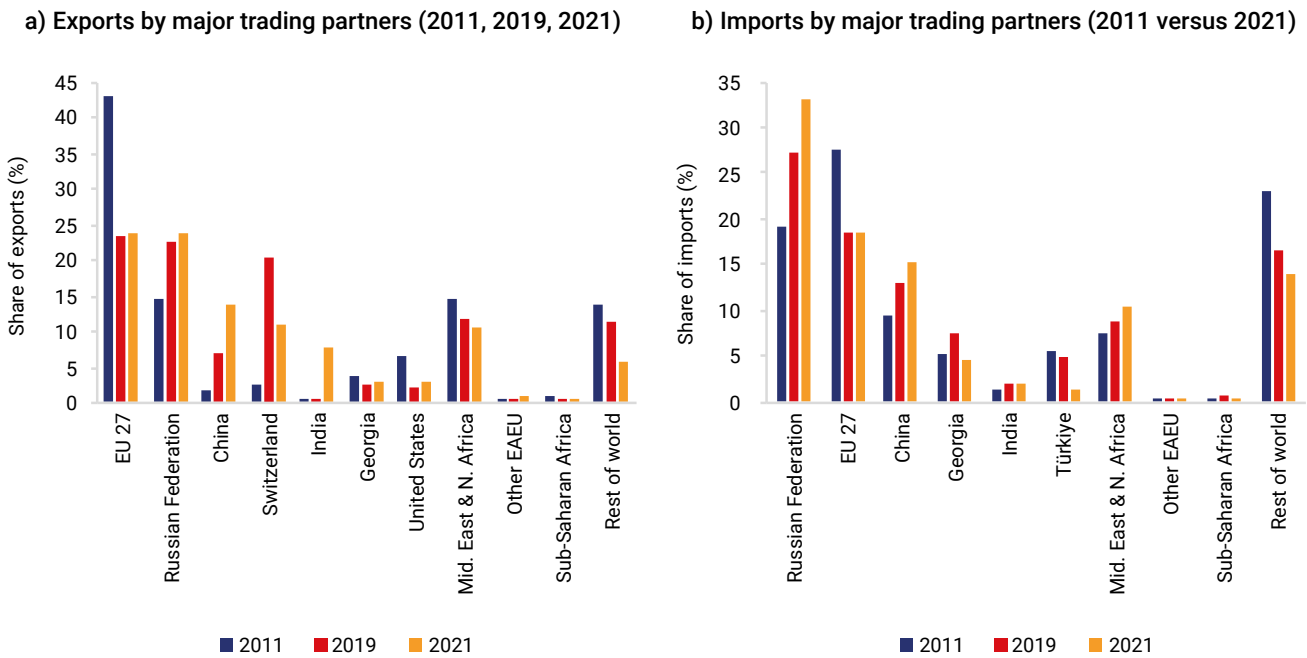
5 The Eurasian Economic Union (EAEU) is a customs union consisting of five member states: Russia, Belarus, Kazakhstan, Kyrgyz Republic, and Armenia. Additional features of the customs union are described in detail in Section 5.1.

6 National Statistics from Georgia reports a much higher value for their imports from Armenia.

The heavy dependence on imports from fewer trading partners makes Armenia vulnerable to external shocks. Like exports, large shares of imports are sourced from fewer trading partners (Table 2). In 2021, imports from Russia and China accounted for almost half of Armenia's

total imports. Of special interest given the current geopolitical context in Europe and Central Asia, Armenia is highly dependent on petroleum, coal, cereal, and oil-seed imports from Russia and Ukraine.

Figure 9: Armenia major trading partners



Source: World Bank staff calculations based on data from BACI.

Note: Other EAEU means other members of the Eurasian Economic Union (Belarus, Kazakhstan, Kyrgyzstan, and Armenia) except the Russian Federation. EU27 includes all European Union (EU) which consists of 27 countries (Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden).

Table 2: Armenia's imports by trading partner

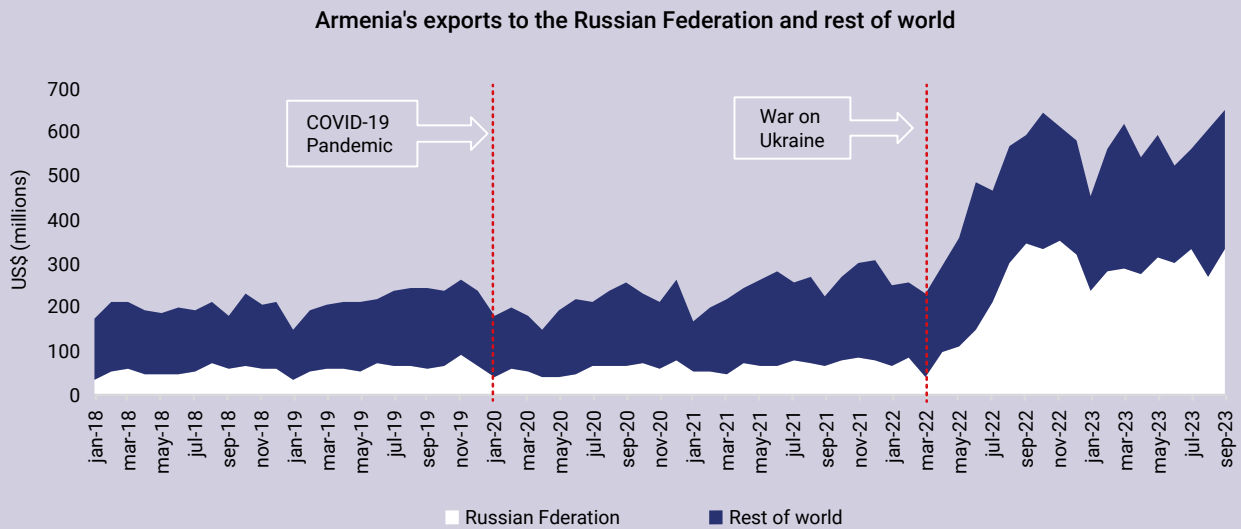
Average 2002–08		Average 2009–14		Average 2015–20		2021	
Market	Share (%)	Market	Share (%)	Market	Share (%)	Market	Share (%)
Russian Federation	16	Russian Federation	21	Russian Federation	28	Russian Federation	33
United States	7	China	9	China	12	China	15
Belgium	6	Georgia	5	Iran	6	Iran	7
Iran	6	Türkiye	5	Georgia	5	Georgia	5
Ukraine	5	Iran	5	Germany	5	Germany	4
China	5	Ukraine	5	Türkiye	5	Italy	4
Germany	5	Germany	5	Italy	4	United Arab Emirates	3
Italy	4	Italy	4	Ukraine	3	Ukraine	2
Türkiye	4	United States	3	United Arab Emirates	3	India	2
Israel	4	Switzerland	2	United States	2	United States	2

Source: World Bank staff calculations based on data from BACI.

Note: Table shows top 10 imports for each period.

BOX 1. Russia’s Invasion of Ukraine and Armenia’s trade in goods

Armenia experienced a surge in trade flows following the Russian Federation's invasion of Ukraine. Between March and September 2021, exports of goods to Russia amounted to US\$452 million, then this figure more than doubled to US\$1.2 billion between March and September 2022. The increase in exports was driven by re-exports of machinery and transport vehicles, among other goods. Exports to Russia have remained high and continue to rise: between March and September 2023, exports to Russia reached US\$2.1 billion, indicating a sustained and significant level of trade between Armenia and Russia. Notably, these figures represent the trade flows during specific time periods and reflect the impacts of geopolitical events.



Source: World Bank staff calculations based on UN Comtrade reported data.



02

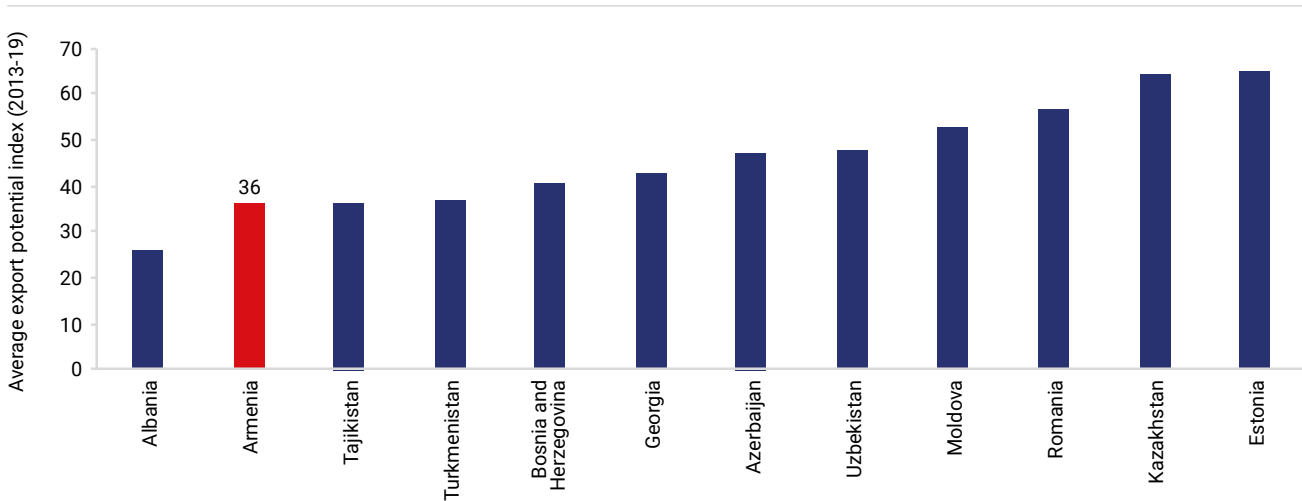
Leveraging opportunities: two pathways for diversifying trade

2.1 Armenia’s untapped export potential

According to the empirical assessment using a gravity model, Armenia’s exports are estimated to be at only 36 percent of their potential (Figure 10). Using data from 2013 to 2019, the gravity model considers various factors such as current bilateral trade flows, existing trade agreements, economic size,

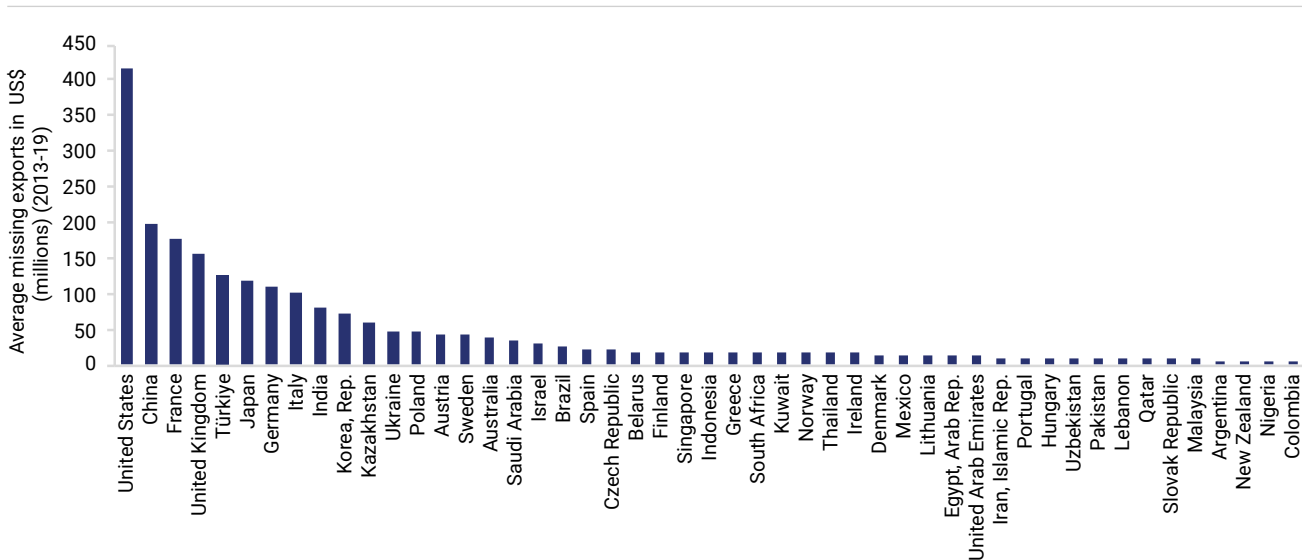
and geographical distances between countries. Based on these factors and current policies, it is expected that Armenia’s exports would more than double their current level if Armenia were to perform at the average level of other countries. The unrealized export potential in Armenia can be attributed to several factors, including key challenges such as lack of connectivity and competitiveness issues. Trade policy also poses obstacles to expanding exports. These issues are discussed in detail in Section 3.

Figure 10: Index of realization of export potential, Armenia and peers



Source: World Bank staff calculations based on CEPII trade and gravity data.

Figure 11: Missing exports by country



Source: World Bank staff calculations based on CEPII trade and gravity data.

Note: This analysis was done using data before the onset of the COVID-19 pandemic. Trade patterns between Armenia and Russia have changed significantly after the imposition of sanctions on Russia due to Russia’s invasion of Ukraine.

Country-level estimates indicate that Armenia has significant export potential with the United States and neighboring countries. For example, exports to the United States, which amounted to US\$65 million in 2019, have the potential to reach US\$416 million. Exports to Türkiye, which are currently at zero, could potentially reach US\$124 million. Similarly, exports to neighboring countries like Azerbaijan, which are currently at zero, have the potential to reach US\$4.5 million (Figure 11). As discussed earlier, Armenia already has significant trade with neighboring Georgia and Russia, with the latter being Armenia's major export destination. Strengthening trade relationships with these countries can further contribute to Armenia's export growth and economic development.

Armenia could pursue two pathways to unlock its export potential. First, Armenia could increase its participation in GVCs. Second, it could expand its digital services exports. These opportunities are discussed in greater detail below.

2.1.1 Increasing value added through value chain participation

GVC integration brings growth opportunities through increased value added. Cross-country evidence—particularly from Mexico, Cambodia, Vietnam, and Bangladesh—demonstrates how participation in GVCs has supported economic growth and brought structural change (World Bank 2020). More recent instances of rapid development, such as in Vietnam and in some respects China, have focused on joining existing supply chains rather than developing them from scratch (World Bank 2021). In the GVC development model, countries specialize in narrowly defined tasks rather than full sectors, they trade intermediate goods and services extensively, and over time they move into higher value-added activities.

2.1.1.1 Scope to increase reliance on imported inputs in export production

Compared to peers, Armenia's participation in GVCs through backward linkages is limited. The current specialization in exporting commodities for processing and onward export by other countries explains Armenia's limited backward participation in GVCs. In the manufacturing sector, Armenia has a high degree of integration (forward participation) in metals products. While Armenia still relies on forward linkages, its peers such as Albania, Bosnia & Herzegovina, and Estonia skew toward backward linkages in terms of their GVC participation in many manufacturing sectors (Figure 12).

Armenia's strong backward linkages for transport equipment and petroleum products are possibly explained by used cars re-exported to neighboring countries and purchases made by the government. Except for Georgia, Armenia has the lowest level of backward linkages in textiles and apparels (30 percent) compared with peer countries, which points to the challenges of accessing affordable inputs from the rest of the world. Sourcing high-quality inputs at world market prices is essential for local producers, particularly in the textiles industry, as it increases their competitiveness in the global market.

Armenia needs to concentrate more on backward linkages if it wants to progressively move up the value chain over time. Drawing from global experiences, upgrading from participation in commodities to limited manufacturing is associated with increased backward participation in GVCs. For example, the backward GVC participation for countries like Estonia and Tunisia suggests that those countries increasingly engage in limited manufacturing, as evidenced by their high participation in textiles and apparel.

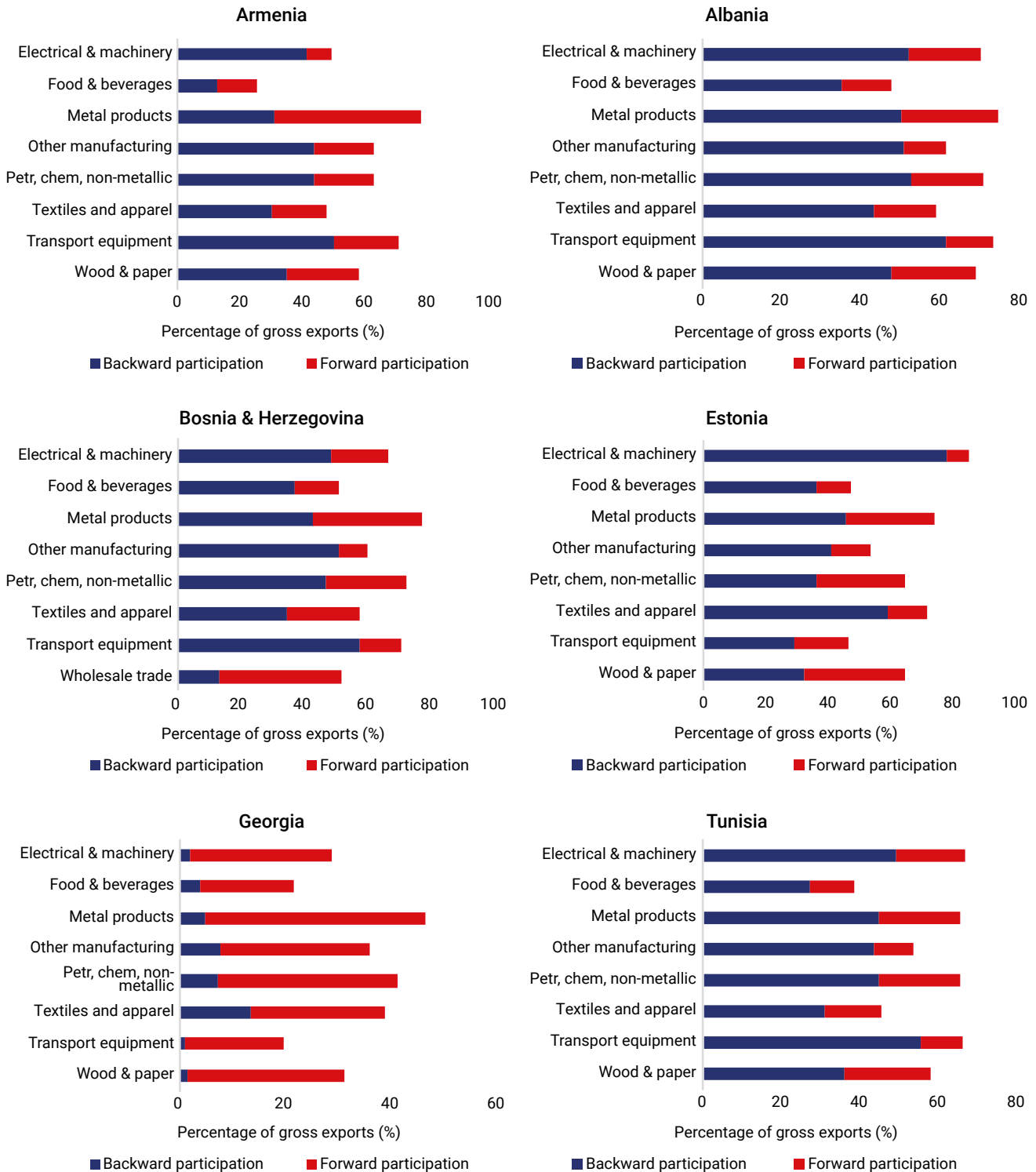
Services exports in Armenia show a strong dominance of forward linkages. This dominance is lower, however, than in manufacturing (Figure 13). Armenia's low backward participation in services indicates less reliance on imported inputs and high value-added creation in ICT within the country. At the same time, the relatively high forward participation reflects that those services are embodied in partner countries' exports.

2.1.1.2 Scope to embed domestic services into manufacturing exports

Armenia can potentially reap more benefits from GVC participation by embedding services into its manufacturing exports. Armenia has had limited success in embedding services into manufactured products to increase their value added. An important way of looking at GVC integration in services is to take the origin perspective of Johnson and Noguera (2012), who assess the proportion of gross export value in manufacturing that is made up of inputs sourced from services sectors, distinguishing between domestic and foreign sourcing. On average across manufacturing sectors, Armenia is one of the countries with the lowest proportion of embodied services value added after Georgia (Figure 14, panel a). The textiles and apparel sector, which has shown recent dynamism over the last few years, only shows 19 percent of services value added, compared to 34 percent for Estonia (Figure

14, panel b). Thus, Armenia has significant scope to use the booming services sector, particularly in ICT services, to boost the sophistication of the manufacturing sector (servicification).

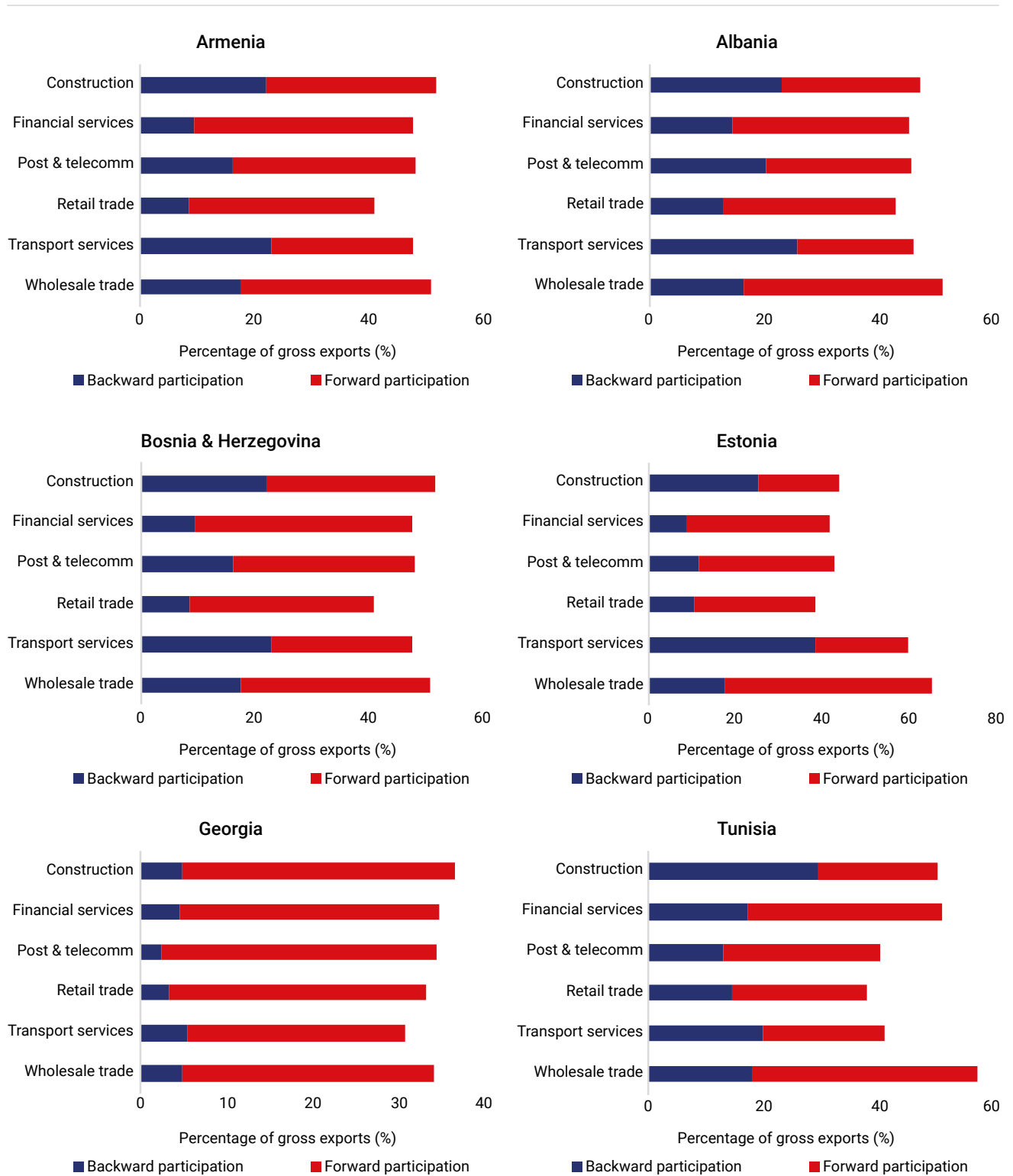
Figure 12: GVC integration in manufacturing, Armenia and peers



Source: World Bank staff calculations based on data from Eora.

Note: Backward participation is the foreign value-added content of gross exports, while forward participation is the domestic value-added content embodied in foreign exports. The GVC indicators are extracted from Borin, Mancini, and Taglioni 2021.

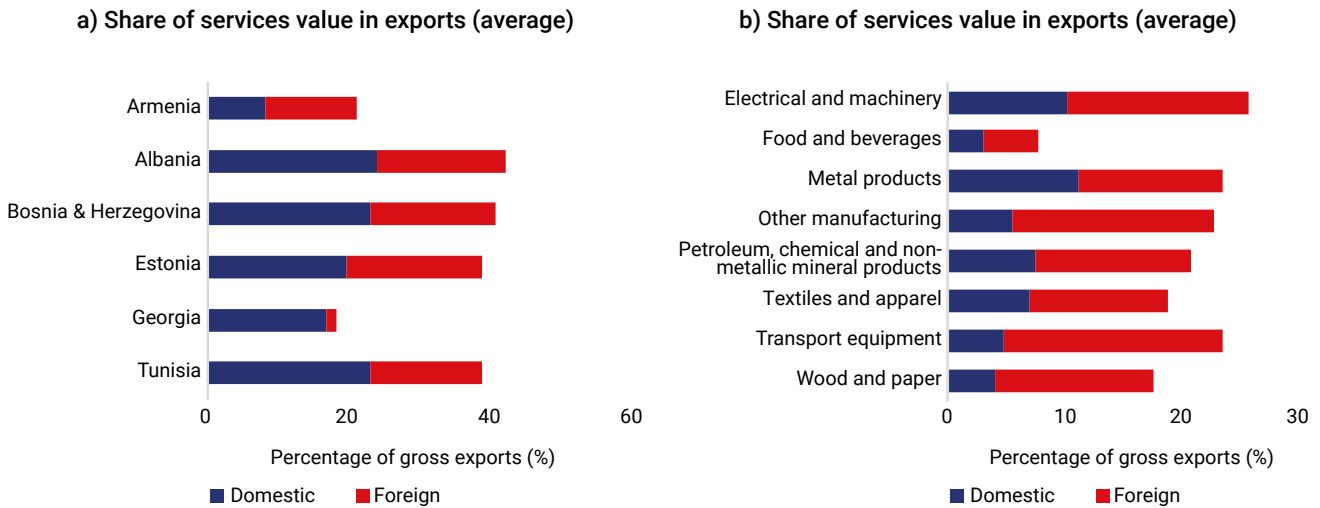
Figure 13: GVC integration in services, Armenia and peers



Source: World Bank staff calculations based on data from Eora.

Note: Backward participation is the foreign value-added content of gross exports, while forward participation is the domestic value-added content embodied in foreign exports. The GVC indicators are extracted from the GVC Module on World Integrated Trade Solutions (WITS) Database and Borin, Mancini, and Taglioni 2021.

Figure 14: Embodied services value added as a percentage of gross exports, 2021



Source: World Bank staff calculations based on data from Eora.

2.1.2 Digital services trade as an opportunity to overcome trade constraints

Armenia’s services exports surged in the 2000s and remained high through 2010s. Services exports exhibited dynamism, rising from 25 percent of total exports in 2002 to almost 50 percent in 2009, driven by travel and tourism (Figure 15). After 2010, the share of services in total exports remained remarkably stable, before dropping to less than 30 percent in 2020 due to the COVID-19 pandemic. Services exports then rebounded in 2021, adding 35 percent to overall exports.

Commercial services exports were an important contributor to Armenia’s trade performance. Between 2005–21, commercial services exports grew by 8 percent annually on average, outpacing most of Armenia’s peers such as Albania, Bosnia & Herzegovina, Estonia, and Tunisia (Figure 16, panel a). Even excluding travel and transport which dominate its services exports, Armenia outperformed all of its peers, with services increasing more than fivefold in value terms during the same period (Figure 16, panel b).

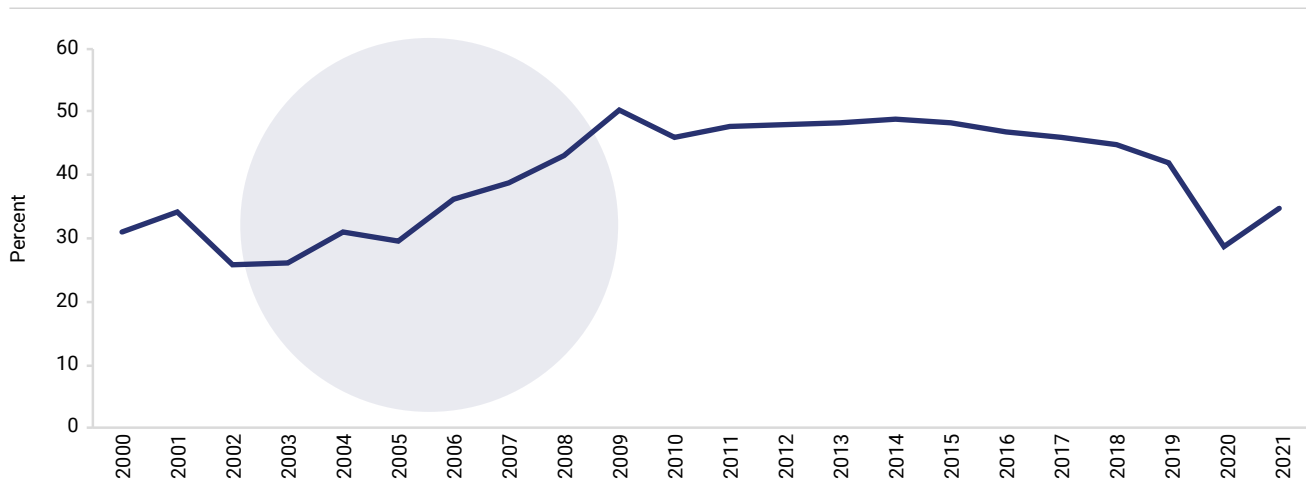
As noted above, travel and transport dominate services exports for Armenia, followed by ICT services. Travel (including tourism) and transport rebounded quickly after the COVID-19 pandemic and accounted for

approximately one-third of total services exports in 2021. During the same period, ICT services accounted for one-fifth of total commercial services exports. Peer countries such as Albania and Tunisia also show a high degree of concentration in transport and travel (Figure 17, panel a). In terms of ICT services, Armenia and Moldova have managed to build strong exports of IT-related services over the past few years, while Estonia specializes in business services (including back-office activities). However, Armenia purchases other business-related services and intellectual property from abroad (Figure 17, panel b). Its services imports increased rapidly between 2005–19 but remain low relative to peer countries such as Estonia, Georgia, and Bosnia and Herzegovina.

Armenia outperforms its peers in post and telecommunications services relative to agriculture.

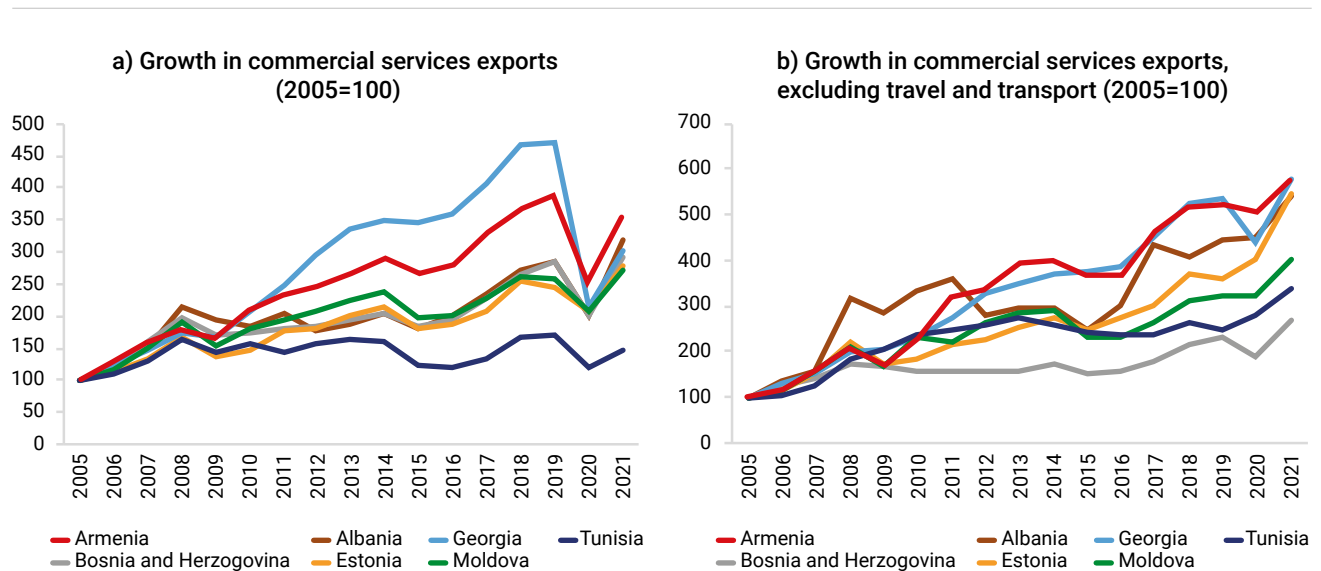
The gravity model shows that Armenia has a stronger comparative advantage in post and telecommunications than all of its peers, with an RCA score of 0.79 in 2021 (Figure 18). This strong comparative advantage is mainly driven by the emergence of ICT services. Peer countries doing well in the sector are Estonia (0.77) and Bosnia and Herzegovina (0.66). Another sector in which Armenia has a strong comparative advantage is construction abroad, with a score of 1.49 in 2021. However, Armenia is not well-positioned in finance and business services.

Figure 15: Share of services in Armenia's exports



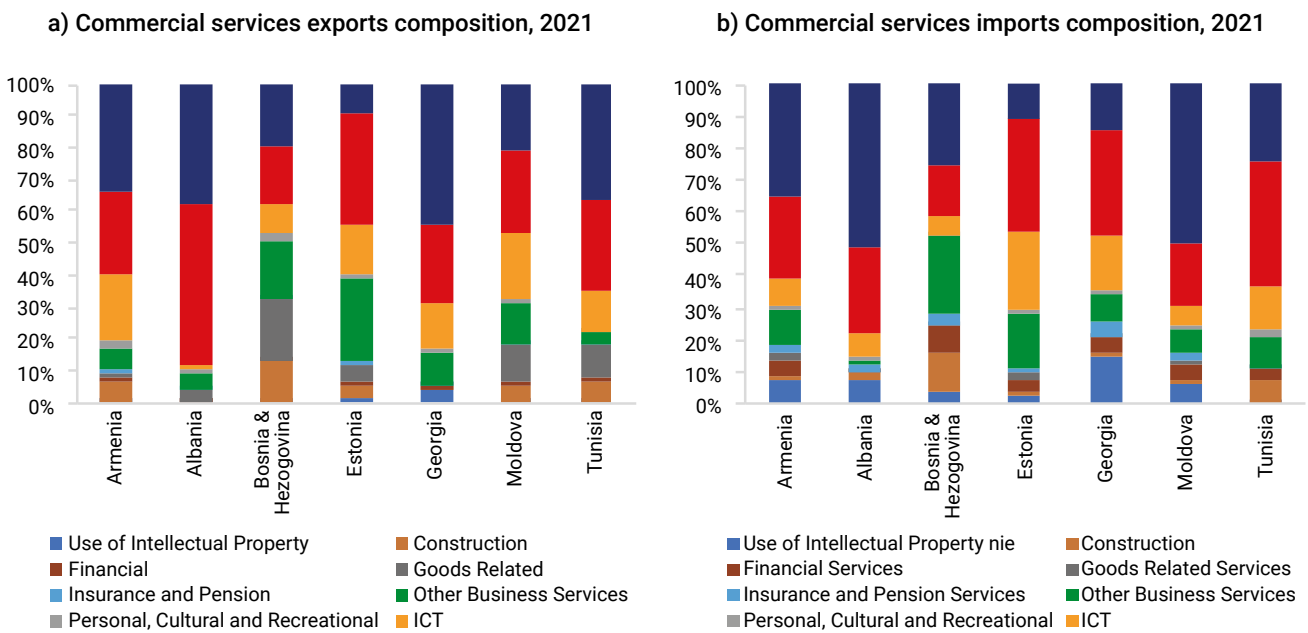
Source: World Bank staff calculations based on data from BACI.

Figure 16: Growth in commercial services exports, Armenia, and peer countries



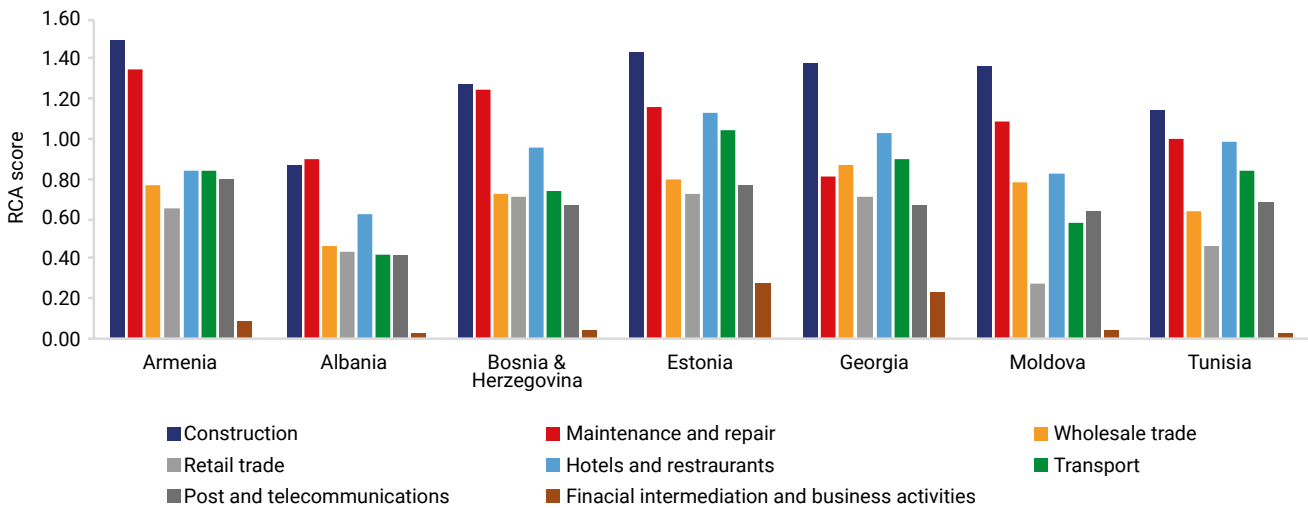
Source: World Bank staff calculations based on data from the OECD-WTO BaTIS database.

Figure 17: Composition of commercial services exports and imports, Armenia and peer countries



Source: World Bank staff calculations based on data from the OECD-WTO BaTIS database.

Figure 18: Comparative advantage in services sectors for Armenia and peer countries, 2021



Source: World Bank staff calculations based on gravity modeling using Eora data.

Note: The RCA score is computed relative to agriculture, which takes the value of 1.

03

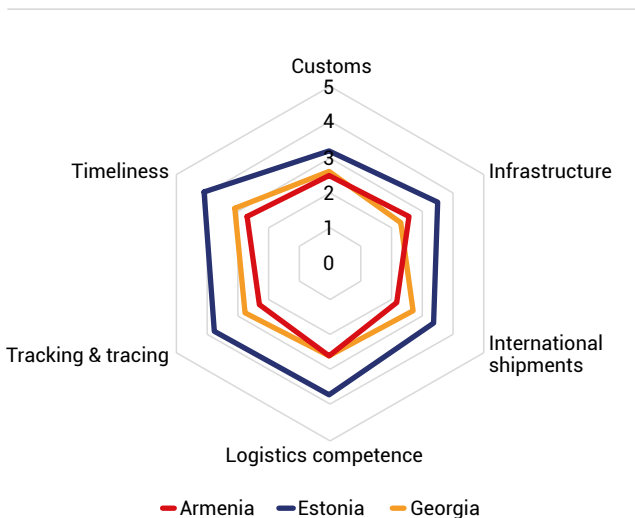
What is limiting Armenia's trade prospects?

3.1 Connectivity bottlenecks and border closures

Armenia suffers from gaps in cross-border connectivity and trade integration due to conflict. The bulk of Armenia's trade travels over land and faces higher trade costs than in neighboring countries. As discussed earlier, in addition to being landlocked, Armenia has had closed borders with Azerbaijan and Türkiye since the early 1990s, so Georgia and Iran provide the only trade land routes. These barriers not only halt trade but also hinder the magnitude and efficiency of the flows of both trade and transit freight between and through the region, its neighbors, and the rest of the world.

The Logistics Performance Index (LPI) reveals several bottlenecks in trade, especially timeliness, tracking and tracing, and international shipments. Armenia performs more poorly than its peers in the region. For example, it lags behind peer countries in timeliness, which is measured as the frequency with which shipments reach consignees within scheduled or expected delivery times. Armenia also lags in tracking and tracing and international shipments (Figure 19). Armenia's logistics competence (trucking, forwarding, and customs brokerage) and customs procedures are on par with Georgia but far below aspirational peer countries such as Estonia.

Figure 19: Logistics Performance Index and sub-components



Source: World Bank staff calculations based on 2023 Logistics Performance Index data.

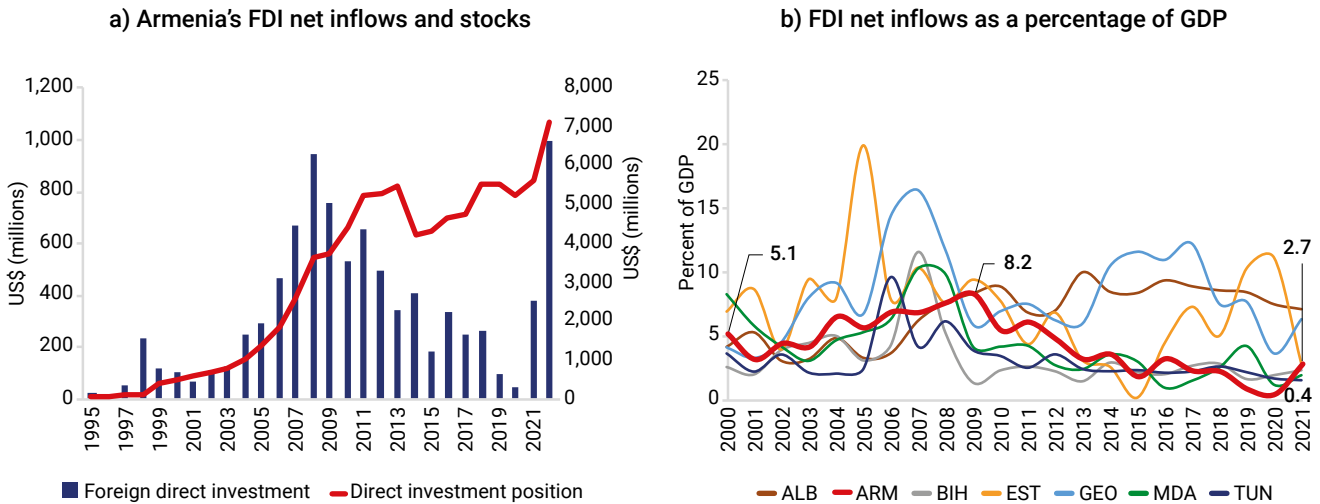
3.2 Declining foreign direct investment

Armenia's foreign direct investment (FDI) inflows declined gradually since 2009 and bottomed during the pandemic, prior to recovering strongly in 2021. Armenia's FDI amounted to 0.4 percent of GDP in 2020, the lowest share in over two decades and the lowest share among all peers in 2020 (Figure 20, panel b). FDI net inflows and stocks rebounded strongly in 2021 and 2022 (Figure 20, panel a), but their dynamism relative to GDP did not. FDI stocks as a share of GDP remained in the range of 40 percent, significantly lower than for most peers and in line with levels since the mid-2010s (Figure 21, panel a). Russia is still the largest holder of FDI stocks in Armenia, but its share has declined since 2014 as the shares of the EU, North America, Middle East, and other regions have increased (Figure 21, panel b).

A survey conducted by the International Finance Corporation (IFC) in 2023 identified numerous factors the discourage investment in Armenia. The survey revealed that the most severe problems for investment activities in Armenia are related to human capital, bureaucracy, legal issues, and infrastructure. In addition, the obstacles to attracting FDI in Armenia were lack of predictability and the lack of a strategic big picture within the country. Other reasons mentioned in the survey were the lack of projects large enough to attract institutional investors, few exit routes and exit strategies for investors due to the underdeveloped stock market, and the lack of highly qualified human capital.

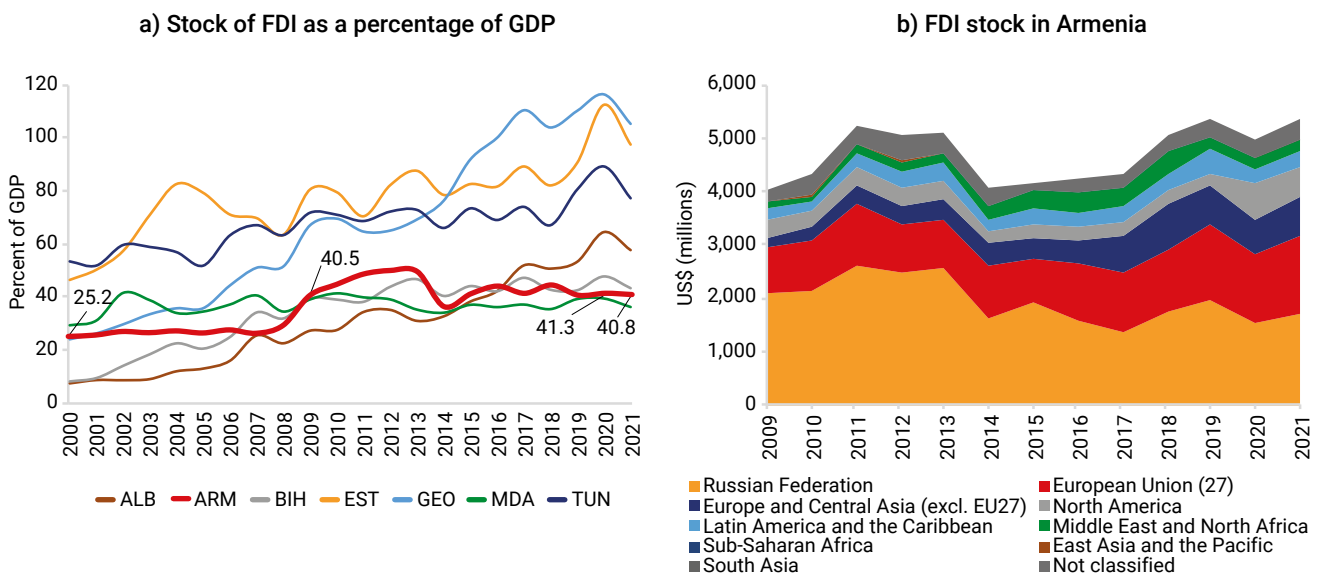
To complement official statistics on bilateral and sector specific FDI, announced greenfield investments were examined to shed light on the main sources and sectors of FDI. Between 2003 and 2018, the main investors in Armenia included Russia and the EU, North America (United States and Canada), Western European countries other than the EU (notably the United Kingdom and Switzerland), and Middle Eastern countries (United Arab Emirates, Iran, Lebanon, and recently Saudi Arabia) (Figure 22). The projects were mostly in mining, services (notably financial, IT, and trade), and utilities, as well as in selected manufacturing sectors (computer/electronics, transportation equipment). The EU, Russia, and North America covered the widest range of sectors, while other regions targeted only a few sectors. IT services projects were announced primarily by Russia, the EU, North America, United Kingdom, and East Asia; electronics manufacturing

Figure 20: Armenia FDI inflows



Source: UNCTAD data and IMF Coordinated Direct Investment Survey.
Note: RUS=Russian Federation, USA=United States of America, UK=United Kingdom, MEA = Middle East and N. Africa, EAS=East Asia and Pacific, ECS=Europe and Central Asia (excluding EU27 and UK), SSA=Sub Saharan Africa.

Figure 21: FDI stocks



Source: UNCTAD and IMF Coordinated Direct Investment Survey.

by North America and the EU; mining projects by the EU, United Kingdom, and North America; utilities by the Middle East, East Asia, and Russia. Armenia has had little FDI in food processing, apparel manufacturing, and accommodation services.

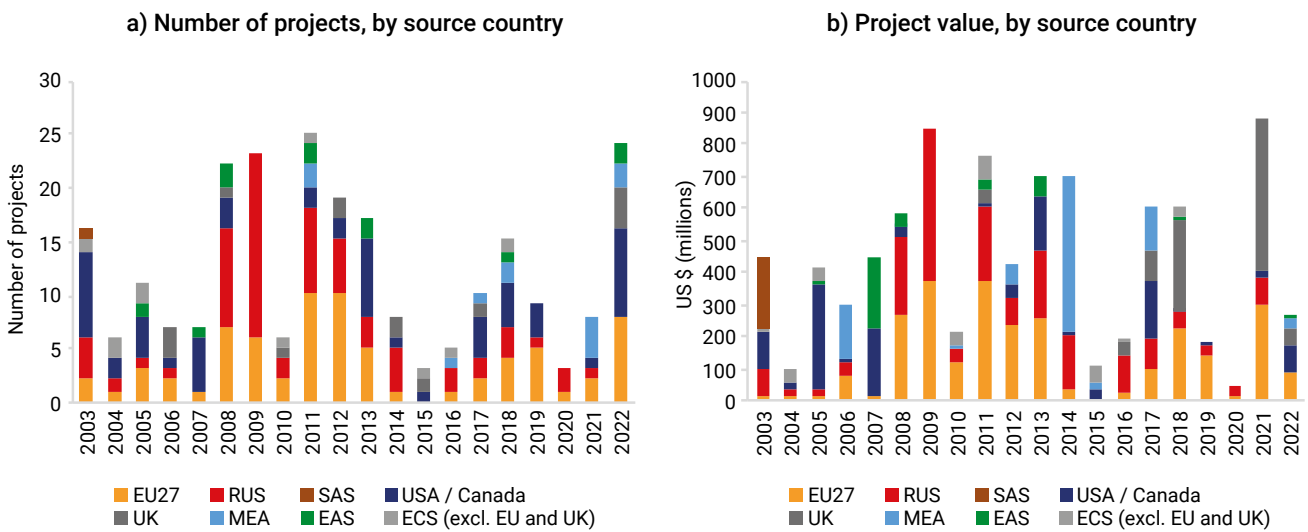
The lower implementation rates of the announced greenfield investments may in part explain Armenia's

FDI decline since 2009. During the period of declining FDI inflows, the value of the announced greenfield projects plus the value of mergers and acquisitions (M&As) tended to significantly exceed the value of FDI inflows (Figure 23, panel a). This is shown more clearly in panel b of Figure 23, where FDI inflows as well as M&A and announced greenfield projects are presented as five-year trailing sums to account for the fact that

projects announced in a year are typically implemented in several subsequent yearly tranches. While some specific developments prevented the projects from being implemented according to the plan (for example, the drying out of investment, particularly from Russia,

during the commodity prices slowdown in 2015 and 2016; the pandemic in 2020; and geopolitical tensions), other restrictive barriers to FDI are a driving factor, as the discussion on ICT services exports in section 5 will demonstrate.

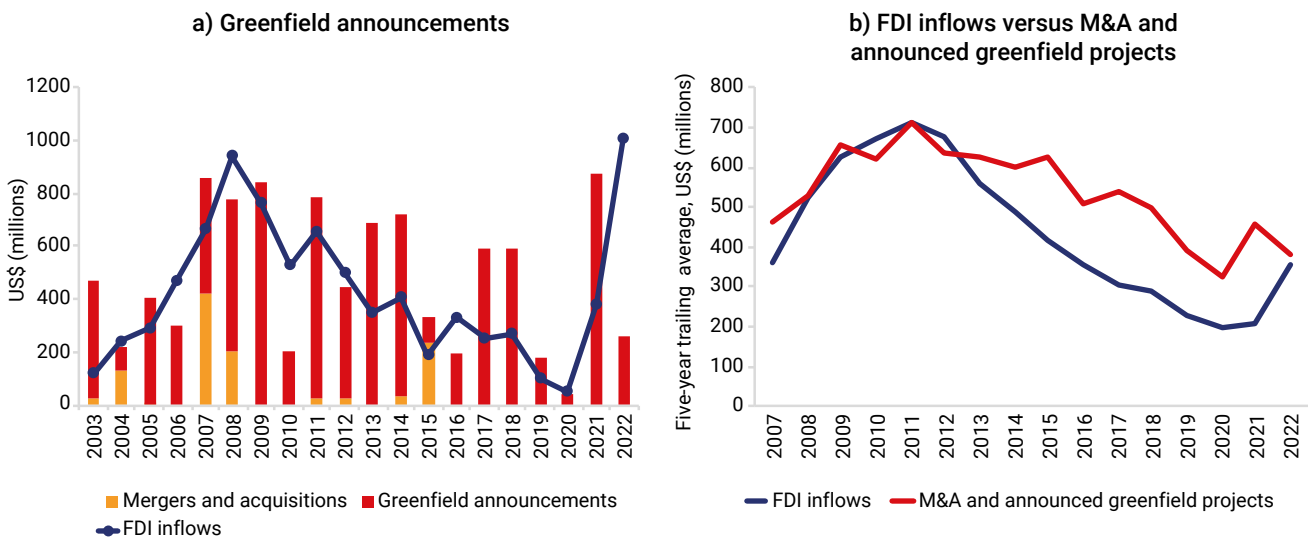
Figure 22: Announced greenfield investments to Armenia



Source: UNCTAD data and IMF Coordinated Direct Investment Survey.

Note: RUS=Russian Federation, USA=United States of America, UK=United Kingdom, MEA = Middle East and N. Africa, EAS=East Asia and Pacific, ECS=Europe and Central Asia (excluding EU27 and UK), SSA=Sub Saharan Africa.

Figure 23: FDI inflows by type: greenfield investments versus M&A



Source: Central Bank of Armenia, FDI Markets, and UNCTAD's World Investment Report 2022.

Note: While detailed data on implemented greenfield investments are not easily available, looking at greenfield announcements (which include both implemented and not implemented projects) sheds light on the source countries and recipient sectors in Armenia.

3.3 Trade policy limiting trade

3.3.1 The EAEU trade agreement

Armenia's accession to the EAEU in 2015 resulted in increased tariffs. As part of the EAEU, Armenia was required to harmonize tariffs and adopt a common most favored nation (MFN) tariff schedule, with temporary exemptions that phase out over different periods of time. Armenia is therefore bound by the EAEU and cannot change its tariffs unilaterally outside of the EAEU. Effectively, the harmonization of tariffs and the adoption of a common MFN tariff schedule led to an increase in

some bilateral tariffs. According to the WTO country tariff profiles, Armenia's simple average MFN tariff reached 8.1 percent as of 2021. Prior to Armenia's EAEU accession, tariffs on imports were applied at rates of zero or 10 percent, and the average effectively applied tariff rate was nearly 3 percent in 2009.⁷

As a result, tariffs are significantly higher across all broad economic categories compared to peer countries, making it difficult for domestic firms to compete globally. Armenia's tariffs are the highest on industrial inputs and capital goods (Figure 24). The high tariffs make it difficult for domestic firms to compete globally and to access foreign technology embodied in machinery and other investment goods as

Table 3: Tariffs by product group for Armenia

Product groups	Final bound duties				MFN bound duties		
	Avg	Duty free in %	Max	Binding in %	Avg	Duty free in %	Max
Animal products	15	0	15	100	11.5	17.5	80
Dairy products	15	0	15	100	14.7	0	15
Fruit, vegetables, plants	15	0	15	100	7.9	5.8	15
Coffee, tea	14.2	0	15	100	5.3	29.2	15
Cereals & preparations	15	0	15	100	9.1	3.6	30
Oilseeds, fats & oils	13.4	10.8	15	100	6.5	18.1	15
Sugars and confectionery	14.4	0	15	100	8.1	0	15
Beverages & tobacco	14.7	2	15	100	10.7	4.2	20
Cotton	15	0	15	100	0	100	0
Other agricultural products	14.6	0.7	15	100	4.7	10.1	10
Fish & fish products	15	0	15	100	6.6	2.1	15
Minerals & metals	7.2	45.8	15	100	7.2	8.2	20
Petroleum	5	0	5	100	4.4	12.7	5
Chemicals	0.3	96.4	15	100	4.5	10.5	10
Wood, paper	3.4	75.4	15	100	7.9	5.8	15
Textiles	9.2	5.1	15	100	7.5	1	18
Clothing	15	0	15	100	7.9	0	18
Leather, footwear	13.8	7.7	15	100	5.6	12.1	15
Non-electrical machinery	9.4	30	15	100	2.6	66.3	15
Electrical machinery	10.3	31	15	100	4.5	44.4	15
Transport equipment	9.1	12.9	15	100	8.2	13.3	20
Manufactures n.e.s	10.5	29.6	15	100	7.2	22.4	20

Source: WTO country tariff profiles.

Note: n.e.s means not elsewhere specified.

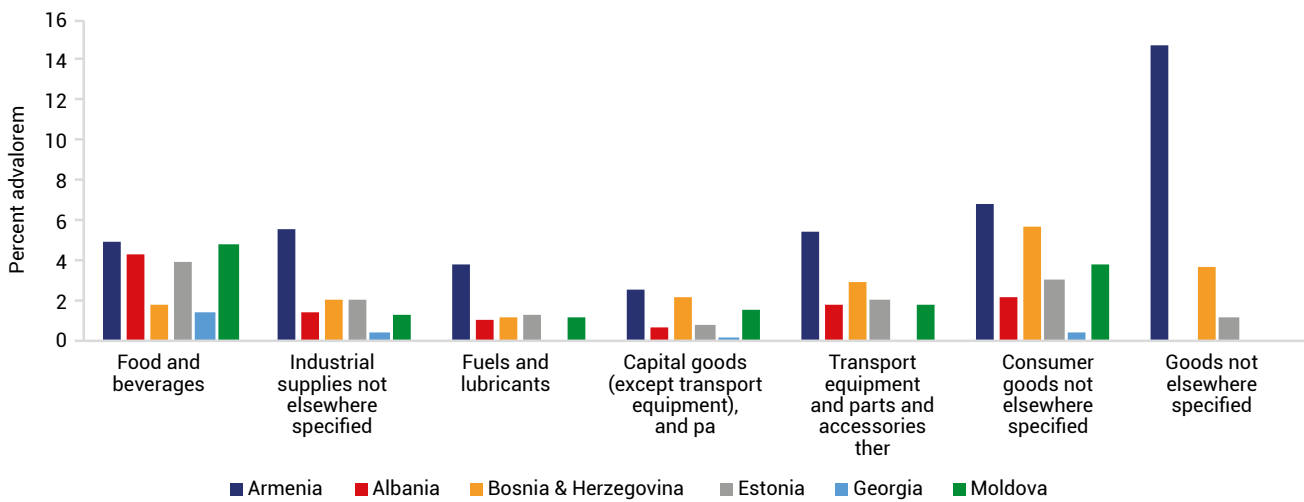
⁷ <https://www.trade.gov/country-commercial-guides/armenia-import-tariffs>

well as cheaper and affordable inputs used in production. At the same time, high tariffs on consumer goods not elsewhere specified (6.73 percent) reduce competition for domestic firms and disincentivize them to exploit foreign markets. Other products that are highly protected are dairy products (14.7 percent), animal products (11.5 percent), and beverages and tobacco (10.7 percent) (Table 3).

While Armenia has been part of the EAEU since 2015, it could benefit from several free trade agreements

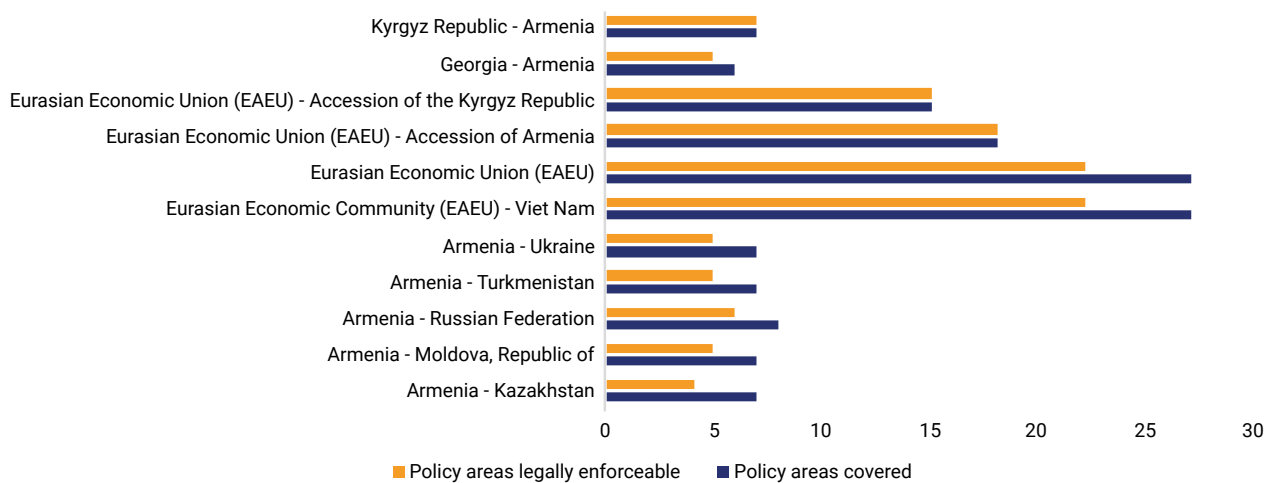
(FTAs) in force by promoting market access in those member states. Armenia has bilateral FTAs with the Kyrgyz Republic, Georgia, Ukraine, Turkmenistan, Russian Federation, Moldova, and Kazakhstan (Figure 25). Furthermore, as a member of the EAEU, Armenia has FTAs with Vietnam, Serbia, Singapore and Iran, as well as an agreement on trade and economic cooperation with China. The expansion of FTAs signed by the EAEU could help address the increased protectionism of Armenia's trade policy (UNDP 2017).

Figure 24: Average effectively applied tariffs, latest available year



Source: World Integrated Trade Solution, UNCTAD-TRAINS (Trade Analysis and Information System).
Note: Latest available year is 2021 for Armenia and peer countries except Albania (2020).

Figure 25: Depth of trade agreements signed by Armenia (number of policy areas covered)



Source: World Bank Deep Trade Agreements Database.

3.3.2 Graduation from the EU's GSP+ preferential scheme

As noted earlier, Armenia graduated from the EU's GSP+ preferential scheme at the beginning of 2022, losing preferential access to the EU.⁸ The GSP+ is part of the WTO special provisions allowing developed countries to treat developing countries more favorably than other countries. With its GSP+ status with the EU, Armenia had duty-free access to the EU market for many goods. Major changes with its "graduation" from GSP+ were in prepared foodstuffs, textiles, footwear, headgear and umbrellas, and chemical products (Table 4). Initial estimates using reported data indicate that both exports and imports to the EU have been increasing since January 2022 and have continued to rise due to Russia's invasion of Ukraine. It is not possible to predict whether all these changes are transitory, and the country may be affected negatively in the medium term due to loss of preferences with the EU market.

3.3.3 Weak implementation of the WTO Trade Facilitation Agreement

The ineffective implementation of the Trade Facilitation Agreement (TFA) presents a significant trade policy obstacle for Armenia. Despite being a World Trade

Organization (WTO) member since 2003 and ratifying the TFA in 2017, Armenia's implementation of its obligations remains incomplete, with a compliance level of 94.5 percent. The ineffective implementation, like higher tariffs, escalates the costs associated with trade. When benchmarked against peer countries such as Georgia and Estonia, Armenia's lags in areas such as engagement with the trade community, documentation processes, automation, and cross-border cooperation (Figure 26).

Evidence indicates that improving the trade facilitation environment can help boost both overall trade performance and specifically GVC integration. Shepherd (2021) shows that poor trade facilitation performance can act as a drag on GVC integration. This, combined with Armenia's restrictive tariffs, result in a setting that is relatively unfavorable to global input sourcing. Improving the trade facilitation environment in this context means taking steps to reduce the administrative burden linked to moving goods across borders, as set out in the WTO TFA.

After the loss of preferences to the EU market, Armenia's adaptability can be strengthened by aligning standards and conformity assessment procedures with international requirements. Armenia's standards are determined by its commitments to the EAEU and by national legislation. The EAEU demands that products produced within the

Table 4: EU import tariffs before and after GSP+ graduation

	EU import duty with GSP+ (%)	EU MFN (%)	Difference
Animal products	5.5	12.5	7
Vegetable products	3.2	7.4	4.2
Animal or vegetable fats and oils	2.6	8.8	6.2
Prepared foodstuffs	5.2	16.6	11.4
Mineral products	0	0.03	0.3
Chemical products, rubber, plastics	0.1	4.7	4.6
Textiles and textile articles	0	7.7	7.7
Footwear, headgear, umbrellas	0	7.3	7.3
Base metals and articles of base metals	0.1	2	1.9
Machinery and equipment	0	2.7	2.7
Other manufacturing products	0.3	1.7	1.4
Simple average	0.8	5.1	4.2

Source: https://www.german-economic-team.com/wp-content/uploads/2022/01/GET_ARM_PB_06_2020.pdf

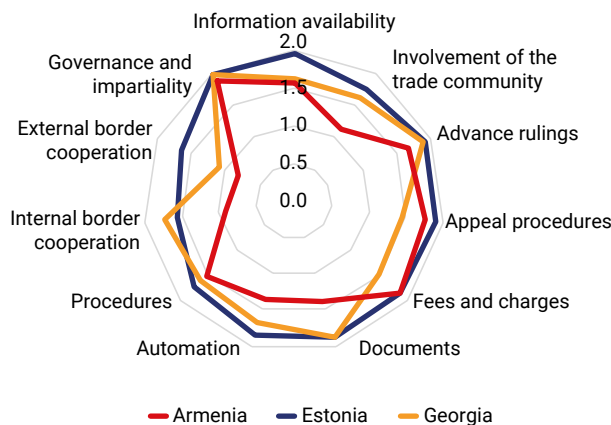
⁸ The GSP+ is a trade arrangement between the EU and eligible developing countries that provides preferential market access to the EU market for certain products. A country "graduates" from GSP+ preferences if it no longer meets the eligibility criteria for the GSP+ program. This includes progress in implementing international conventions related to human rights, labor rights, environmental protection, and good governance.

customs union comply with EAEU’s technical regulations.⁹ The National Body for Standards and Metrology (SARM) issues certificates of quality and safety for most food and non-food products. SARM is a member of the International Organization for Standardization (ISO) and a partner of the European Committee for Standardization. Adopting international standards would help Armenian firms with international market access, particularly for the EU. However, it is important that conformity assessment requirements are also aligned, including to avoid repeated testing requirements, for example. In addition, adopting best practices to facilitate certification of products—for example, e-Phyto—and automatic exchange of information with trading partners will be important.¹⁰ Adopting international standards supports firms in accessing international good practices codified in standards and helps them integrate into GVCs.

3.4 Trade policy reform scenarios

Given the challenges described above, the TCD analysis explored trade reform scenarios for Armenia. As discussed above, Armenia’s trade policies remain restrictive to the rest of the world, and accession to the EAEU in 2015 resulted in increased tariffs. For the TCD, an NQTM analysis was conducted to simulate possible scenarios¹¹ in which Armenia cannot change its tariffs unilaterally.

Figure 26: Trade facilitation performance by pillar, 2022



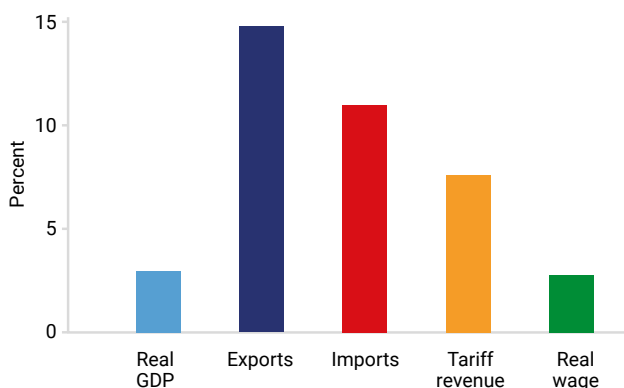
Source: OECD Trade Facilitation Indicators.

The simulations were based on a model used in Shepherd (2022), Aichele and Heiland (2018), and Caliendo and Parro (2015) which incorporates technology differences across countries that drive differences in the cost of a composite input. In this model, production takes place under perfect competition; consumers maximize utility through a Cobb-Douglas function, subject to their budget constraint; tariff revenue is recycled; and there is a single factor of production (labor) that is fully employed. As a result, there is no savings or investment, and the trade deficit is exogenous. Trade takes place subject to variable costs of the iceberg type. Additional details of the model, underlying assumptions, and data are provided in Appendix B.

The scenario considers full WTO TFA implementation relative to the baseline captured in 2019 OECD TFIs.

Improved trade facilitation under this scenario translates into lower trade costs and a strong trade boost. Imports increase by 10.9 percent, and exports increase by 14.8 percent. At a macroeconomic level, the primary result of the increase in trade integration is a reduction in the price level, which in turn supports significant increases in real GDP (2.9 percent) and real wages (2.7 percent) (Figure 27). The first-round impact of improved trade facilitation in Armenia is on imports, so exports will increase in part due to the pro-competitiveness effect of lower-cost imported intermediates. Given that there is no change in tariff rates, the increase in imports drives a substantial increase in tariff revenue (7.6 percent).

Figure 27: Results from the NQTM simulations on full TFA implementation in Armenia



Source: World Bank staff calculations based on data from Eora.

9 <https://www.trade.gov/country-commercial-guides/armenia-standards-trade>

10 Since 2016, the National Accreditation Body of the Republic of Armenia (ARMNAB) has been an associate member of the European Accreditation Cooperation (EA). Effective December 2024, ARMNAB’s application will prompt a peer review by EA. A successful evaluation will enable ARMNAB to sign a Multilateral Recognition Agreement with EA, facilitating mutual recognition with the International Laboratory Accreditation and the International Accreditation Forum without additional assessments. This is expected to lower costs for producers by removing or minimizing the need for product reevaluation in other countries, thus easing free movement of goods.

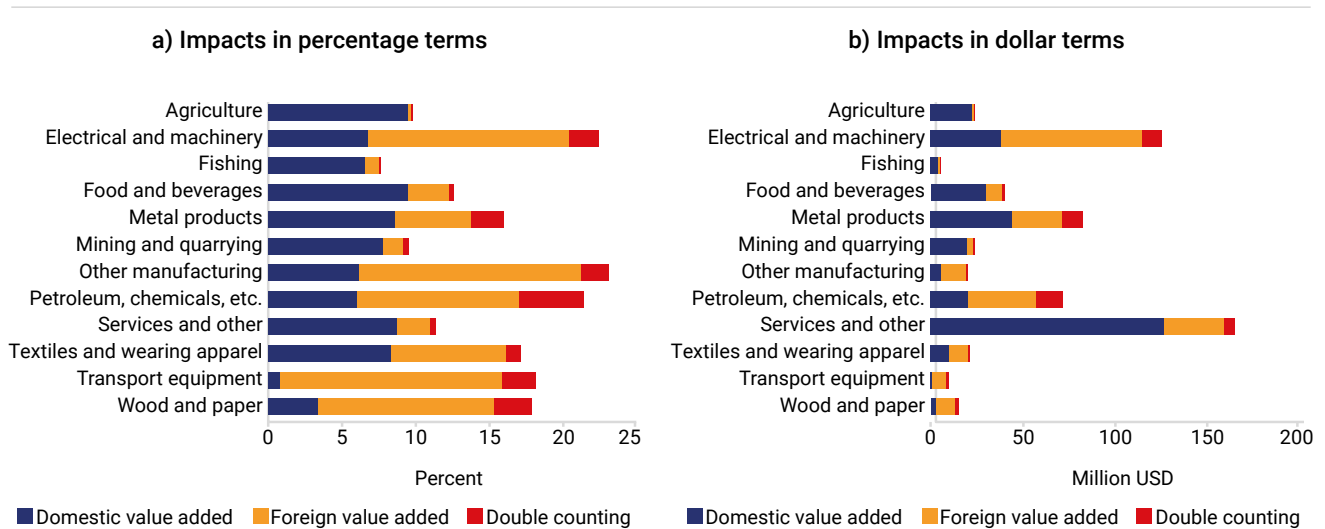
11 Tariff data come from TRAINS, for baseline year 2021. The remaining data come from the Eora MRIO Table. Trade elasticities come from Egger et al. (2018), concorded to Eora sectors. Elasticities of bilateral trade with respect to trade facilitation performance come from Shepherd (2022).

A cross-sectoral breakdown shows that while exports increase in all sectors, the largest percentage changes are in the other manufacturing, petroleum and chemicals, and electrical and machinery sectors. This last sector also sees a large change in dollar terms, although general equilibrium effects mean that the services and other category also sees a large increase in dollar terms, even though the impact is relatively small (Figure 28). Given that Armenian firms source inputs from a variety of locations, part of the increase in exports is accounted for by increased use of foreign intermediate goods and services, which acts like a productivity improvement for

the relevant sectors.

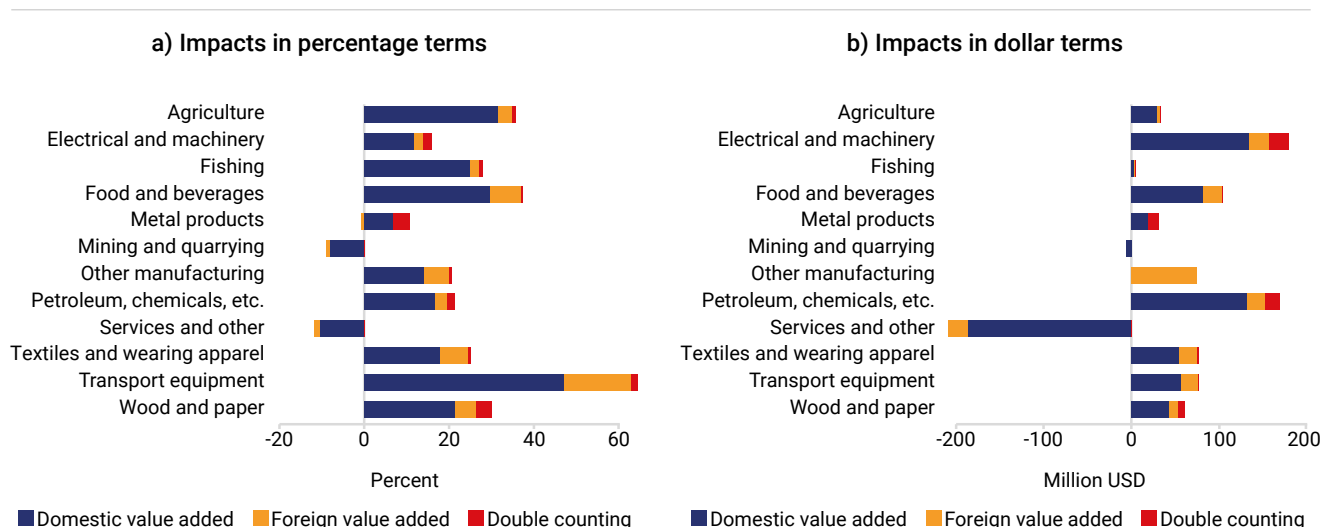
In terms of imports, increases are strongest in relative terms for transport equipment, as well as agriculture and food and beverage. The different pattern of sectoral changes in exports and imports reflects Armenia's underlying pattern of comparative advantage, as well as the nature of its bilateral trade relations. In this case, there is a fall in imports in the services and other sectors as well as mining and quarrying due to general equilibrium effects that tend to reorient purchasing to sectors that experience reductions in cost (Figure 29).

Figure 28: Sectoral impacts on exports by Armenia



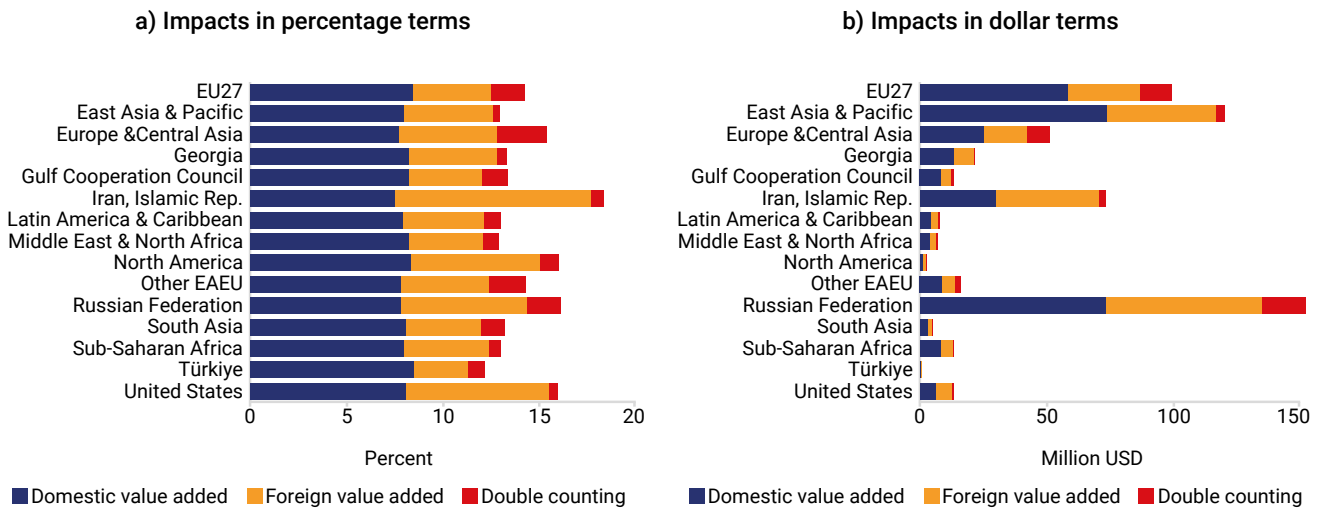
Source: World Bank staff calculations based on data from Eora.

Figure 29: Sectoral impacts on imports



Source: World Bank staff calculations based on data from Eora.

Figure 30: Impacts on Armenia's exports, by partner country



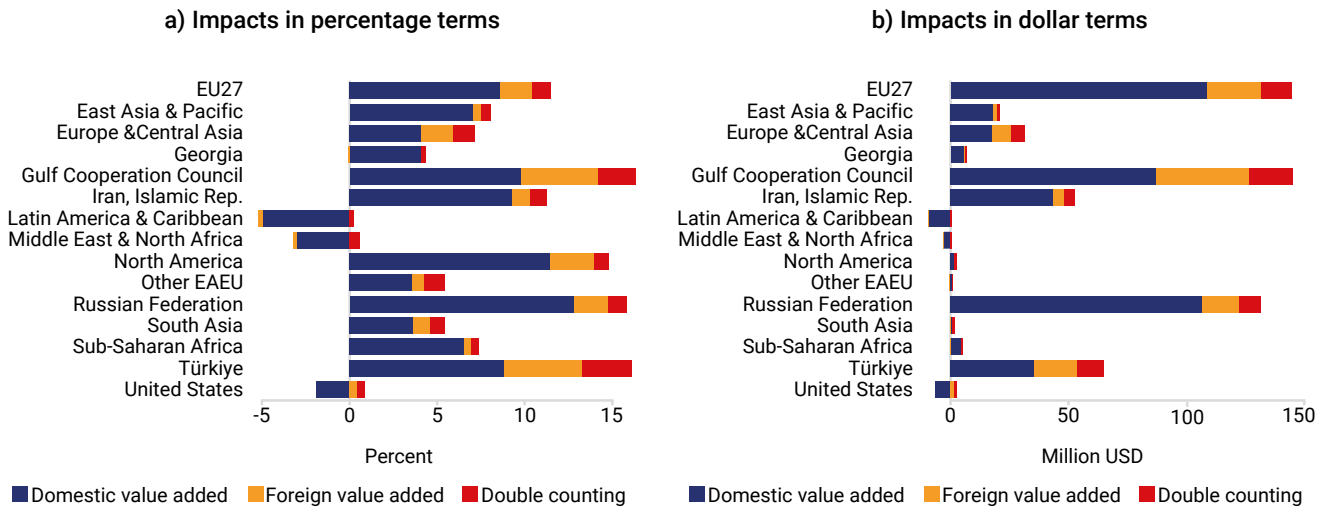
Source: World Bank staff calculations based on data from Eora.

Disaggregating exports by partner country shows that percentage increases are relatively constant across partners, although slightly larger in the case of Iran. In dollar terms, the largest increases in export flows are with Russia, East Asia and the Pacific, and the EU (Figure 30). In part, these changes reflect existing trade relationships and their underlying geographical patterns, but the result for East Asia and the Pacific also shows that TFA implementation can help deepen trade relationships with relatively distant partners.

The pattern for imports is more mixed, but several countries stand out as having relatively large percentage changes in imports for Armenia. These countries include the Gulf Cooperation Council (GCC) countries, Türkiye, Russia, and North America. These changes largely reflect long-standing relationships, but the result for North America shows that more distant partners can also effectively be brought closer through improved trade facilitation. At the same time, the largest dollar impacts are with the EU, GCC countries, and Russia. Imports fall in some regions—namely, Latin America and the Caribbean, the Middle East and North Africa, and the United States—but these changes are relatively small in dollar terms (Figure 31).

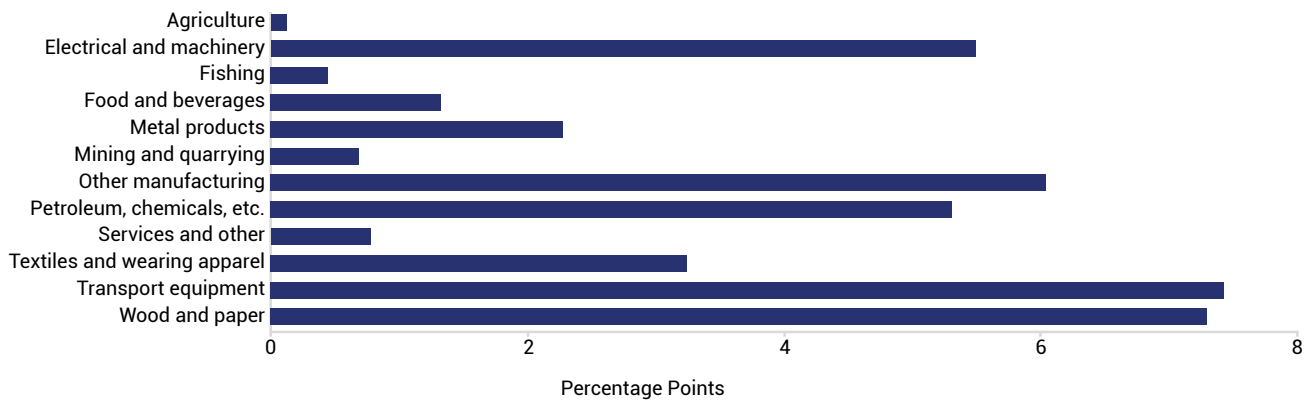
The analysis also looked at the impacts of TFA implementation on GVC integration. WTO TFA implementation results in substantial increases in GVC integration in all sectors. Transport equipment, wood and paper, and electrical and machinery stand out with particularly large gains (Figure 32). In conclusion, TFA implementation strongly reinforces GVC integration in Armenia.

Figure 31: Impacts on imports for Armenia, by partner country



Source: World Bank staff calculations based on data from Eora.

Figure 32: Changes in GVC integration as a percentage of gross exports for Armenia



Source: World Bank staff calculations based on data from Eora.



Priorities for enhancing Armenia's competitiveness

To summarize the challenges identified by the TCD analysis, while Armenia's trade performance has been dynamic over the past decade, little diversification has taken place in terms of products and destinations. While Armenia has seen robust export growth driven by minerals and agricultural products, there has been little evidence of diversification, and exports have become more concentrated on primary products. Current trade policies pose significant trade barriers to imports of intermediate inputs and capital goods, so as a result, Armenia participates in GVCs mainly through forward linkages and not as much as peers through backward linkages. Trade openness to imported inputs—particularly in textiles and apparel—will be crucial, as Armenia cannot produce them. In addition, for agribusiness, which is more upstream, access to chemicals, seeds and machinery will be of paramount importance

This section identifies priority areas for enhancing Armenia's competitiveness, providing two pathways through which Armenia can reconfigure its trade to overcome geopolitical complexities and geographical limitations. The first pathway is effective implementation of the WTO TFA. The second pathway to promote export diversification, upgrading, and integration into GVCs. To maximize the benefits of the proposed policy options, greater regional (road and rail) transport access to larger and more diverse markets will be required.

4.1 Effective implementation of the WTO TFA

Effective implementation of trade facilitation measures can help mitigate losses caused by graduation from the EU's GSP+ program. As discussed earlier, Armenia has made significant progress in implementing the WTO TFA over the past few years, but full implementation will help consolidate gains and mitigate the loss of preferences from the EU. For example, Armenia launched the electronic "Single Window" system at the end of 2021 thanks to cooperation between Armenia and the EU. With effective implementation of the system, the process of obtaining customs services and practically all permits will be simplified. Government and private sector agencies participating in the Single Window include the State Revenue Committee (responsible body), Ministry of Health, Ministry of High-Tech Industry, Food Safety Inspection Body, National Postal operator "HayPost," customs brokers, organizations carrying out courier services, as well as foreign economic activity (FEA) implementers.

A TFA Gap Assessment could be used to determine whether the provisions have been fully and effectively implemented or whether any gaps remain. The provisions of the TFA can be implemented at different maturity levels, leading to differences in trade facilitation, speed of trade flows, and related costs. For example, a country may implement risk management in customs in alignment with WTO TFA-related provisions but still physically inspect more than 20 percent of the cargo, while more mature administrations inspect less than 5 percent of all cargo as their risk management systems are more effective and usually supported by post-clearance audits. Similarly, many countries already assess that they have implemented single window solutions, while some processes and procedures are still paper based. The TFA Gap Assessment methodology analyzes the situation of the country considering full and effective implementation of provisions, not necessarily the minimum requirement to comply with the agreement.

While more in-depth assessment of the trade facilitation situation is warranted, the TCD analysis points to these strategic policy recommendations for Armenia:

Strengthen the governance framework to coordinate whole-of-government trade facilitation reforms

Armenia can institutionalize a National Committee on Trade Facilitation or a similar body to coordinate various cross-border regulatory agencies. This ensures engagement and consultation with the private sector (importers, exporters, carriers, freight forwarders, customs brokers, logistic operators). The committee will be responsible for (i) implementing a robust framework to monitor performance and results (for instance, based on regular Time Release Studies and client surveys) (ii) approving a National Trade Facilitation Development Plan to consolidate initiatives, ensure synergies of projects, mobilize necessary resources and external support, and enable dialogue and secure commitment by all relevant stakeholders and (iii) reviewing and updating the legal framework to align with international best practices and standards and enable automation and paperless clearance processes.

Further enhance the single window to facilitate flow of information

Enhance the Trade Single Window system to improve the exchange of information among FEA members and

governmental agencies, streamlining cross-border processes. The system should provide standardized, digitized services that are of high quality and cater to modern client needs. This enhancement will also support better coordination in compliance and border management at the national level, such as through the creation of an Integrated Targeting and Operation Center and the roll-out of the Authorized Economic Operator Program. Additionally, Armenia should leverage cutting-edge technologies to overhaul border procedures, incorporating tools like non-intrusive inspection equipment, vehicle plate readers, tracking and tracing devices, biometric solutions, and surveillance cameras, to establish efficient and smart border infrastructure

4.2 Promote export diversification, upgrading, and integration into GVCs

Attract a new wave of value added FDI in IT and manufacturing

To support diversification in light manufacturing exports like electrical and machinery, textiles and clothing, and food processing, Armenia needs to implement targeted programs to attract new and higher-quality FDI. The country has had little FDI in food processing and apparel manufacturing, and there has been little FDI in electronics manufacturing by North America and the EU. With the right policies and incentives in place, Armenia could tap into foreign knowledge, facilitate productivity spillovers, and incentivize adoption of new technologies and automation. For example, FDI played a significant role in Vietnam's textiles upgrading and export activity across all product categories.

To leverage the full benefits of FDI for export diversification and upgrading, the authorities need to address the key binding constraints to attracting more and higher-quality investments in a systematic way. This will require a comprehensive review of Armenia's current FDI policies and programs based on solid analytics and evidence to identify key reform areas. Effective FDI attraction efforts should be focused on a narrow set of target sectors and value chains with the highest potential to generate exports and linkages. In addition to strengthening investor protections, which is particularly important in a high political risk environment, successful FDI attraction will also require the provision of enhanced investor facilitation

services through a strengthened and fully enabled lead agency for investment attraction. Armenia already has an agency responsible for it called Enterprise Armenia (Box 2), but the authorities need to build the agency's capacity so it can fully implement its services. Finally, the authorities should promote investments in research and development (R&D) by foreign firms by allowing these R&D expenditures to be offset against taxes, which will incentivize foreign firms to continuously invest in Armenia. R&D industrial support through taxes allows firms to import and adopt new technologies that enable them to compete with other global firms.

Support domestic firms' integration in GVCs in the apparels sector

Armenia needs to facilitate and strengthen supplier linkage programs between domestic firms and large multinational firms. A possible strategy is to establish an agency or mandate an existing institution to offer basic matchmaking services between domestic firms and large multinational corporations. Other countries have established public bodies that assist exporters (including first-time exporters) in coordinating local supplies and provide access to information and supply opportunities. Different types of tools that can be used to facilitate the bridging of information asymmetries between large international corporations and local suppliers include supplier databases, digital marketplaces, and B2B platforms. In addition, the authorities could support the development of joint ventures with international brands, particularly in the textiles and apparel sector. Domestic firms in Armenia could engage with suitable foreign partners to foster value addition and learning. For example, Sri Lanka used strategic joint ventures to build out its capacity in certain product niches (including within apparel) as well as cultivate its design and branding capabilities. Prerequisites for success based on experiences in other countries are presented in Box 3.

Link small and medium enterprises in domestic agriculture to food exporting companies

To promote domestic backward linkages in the agriculture sector, it is crucial to develop connections between domestic small and medium enterprises (SMEs) in agriculture and leading food exporting firms. Targeted public sector resources and measures are needed to support private value chain development initiatives. These initiatives should aim to involve a larger number of

BOX 2. Enterprise Armenia

The main mission of Enterprise Armenia is to foster a supportive environment for both foreign and domestic investors, positioning Armenia as a highly desirable investment destination on the global stage. Enterprise Armenia carries out the following services:

Concierging

Informing: Providing comprehensive and precise information on investment opportunities in Armenia, including general economic data, statistics, and sectoral information.

Advising: Advising investors on investment laws and regulations, business opportunities, and investment projects; identifying potential investment locations; providing business consulting through hotlines and inquiries from online platforms.

Guiding: Preparing site visits and accompanying potential investors to prospective development locations, guiding investors throughout the whole project investment life cycle.

Bridging

Institutional Cooperation: Ensuring institutional cooperation with local and international organizations and financial institutions, carrying out joint business events, maintaining contacts received from embassies and providing necessary advice and support.

Presenting: Identifying potential investors and directing them to Armenia, promoting investments projects, establishing partnerships, gathering the necessary information, providing access to its business networks.

Matchmaking: Linking with government institutions to facilitate investment implementation and business development; preparing site visits, business forums, and B2B meetings; and connecting investors with local partners.

Promoting

Image building: Promoting Armenia as an attractive investment destination for doing business, raising awareness of business opportunities as well as raising awareness of Enterprise Armenia as a one-stop shop for investors.

Reaching out: Conducting outreach campaigns, roadshows, and business missions; hosting business delegations and organizing business events.

Source: Enterprise Armenia (<https://enterprisearmenia.am/about-us/our-services/>)

smallholder farmers and other actors in the value chain. The success of these initiatives relies on producers' abilities to meet market standards, supply produce in sufficient and consistent volumes, and make a profit. To support this, technical knowledge, appropriate farm technologies, and management practices are essential. Public support can complement private sector efforts in this regard through partnerships, providing the necessary resources and expertise to help producers meet market requirements and achieve success in the value chain.

Support adoption of international standards and address constraints in conformity assessments

Investing in firm-level adoption of international standards could strengthen Armenia's adaptability after the loss of preferences with the EU market. International

experience shows that domestic firms usually face challenges in complying with product standards and certification requirements, which are very important when entering food processing and agribusiness GVCs (World Bank, 2021). This applies to quality and safety standards and requires a long-term commitment by the authorities. To support firms, it is essential for Armenia to adopt international standards where feasible, including adopting best practices to facilitate the certification of products—for example, usage of e-Phyto for sanitary and phytosanitary (SPS) controls. In addition, the government could consider expanding targeted capacity building to firms to help them comply with relevant industry standards, including voluntary standards and certifications demanded by consumers and lead firms (such as Worldwide Responsible Accredited Production (WRAP) for apparel).

Box 3. International experience in linkage programs—prerequisites for success

What can Armenia learn from other countries that have implemented linkage programs? The experiences of the Czech Republic, Malaysia, Chile, and Costa Rica point to the following prerequisites for success:

- High-level political commitment and ownership of the program is critical for spearheading strategy, policies, and institutional arrangements and coordinating across agencies and stakeholders.
- The government needs to identify and develop an agency to manage program design; develop the FDI strategy, policies, and instruments; and coordinate with relevant stakeholders for effective implementation. This role was played by CORFO (Economic Development Agency) in Chile, while CzechInvest (Investment Promotion Agency) was the lead agency in the Czech Republic. PROCOMER headed Costa Rica's linkage program.
- Autonomy of the agency is key, and typically the agency is placed under the purview of the Ministry of Trade and Industry.
- A coordinating mechanism is needed for aligning roles and responsibilities among government agencies. The setup does not work if there are too many agencies involved with overlapping functions and if coordination across agencies is weak. The lead agencies in all four countries were empowered and worked across government agencies.

Source: Adopted from Akhlaque et al. (2017).

In addition to standardization, the government can support the private sector by creating a well-functioning and internationally harmonized conformity assessment infrastructure. This requires ensuring international recognition of Armenia's conformity assessment services and creating an enabling environment for private conformity assessment providers to enter the market. The implementation of the EU-Armenia Comprehensive and Enhanced Partnership Agreement can provide important market access improvements through the alignment of technical regulations and conformity assessment procedures.

Embed services into manufacturing and other sectors

Embedding services sectors such as ICT and financial services into manufacturing and other sectors would help with domestic upgrading and can boost exports. Services play a large role in enabling growth of other sectors: by providing inputs (for example, financial services), facilitating technology (for example, digital technologies provided by ICT sectors), and facilitating trade (for example, the logistics sector). While Armenia's ICT sector has been dynamic over the past decade, other

sectors such as financial services are still yet to develop. The proportion of embodied services value added in manufacturing is low compared to peers. It will be important to assess the legal and operational constraints hindering cross-sectoral linkages. The authorities can work with the private sector to reform regulations that may be constraining the services sectors.

Engage in trade promotion activities to increase market access with trading partners

The authorities should actively engage in trade promotion activities to increase market access with members of the EAEU as well as countries with which Armenia has bilateral FTAs. These activities could include organizing trade missions, participating in trade fairs and exhibitions, and facilitating business-to-business (B2B) contacts to connect Armenian exporters with potential buyers in other member states. A new separate agency dedicated solely to export promotion can spearhead these efforts should be established. The agency could create targeted policies and programs and provide better coordination with other agencies and stakeholders involved in the exporting process.



Deep dive: the Armenia ICT services sector

The ICT sector offers the best opportunity for Armenia to scale up its services exports as it is already on an upward trajectory, with established diaspora networks committed to creating business opportunities unlike in other sectors where FDI has been declining. The sector grew from US\$49 million to US\$711 million – almost 15-fold – between 2005–22 and has the capacity to grow even further thanks to the increased availability of funding sources, including venture (Granatus Ventures, HIVE Ventures), seed (SmartGateVC), angel (Business Angel Network of Armenia (BANA), Angel Investor Club of Armenia (AICA), Science and Technology Angels Network (STAN) by Foundation for Armenian Science and Technology (FAST), and other forms of startup financing. In addition, existing diaspora networks have created business opportunities and continue to bring foreign investments and significant knowledge transfers in the sector. The Enterprise Incubator Foundation (EIF), FAST Foundation, and Armenian Society of Fellows (ASOF) have been quite active recently in their efforts to institutionalize diaspora networks in science and research.

The ICT sector has already been shifting toward higher value-added ICT services exports, for which global demand has grown in the post-COVID-19 global economy. The industry has been showing signs of shifting from an outsourcing/outstaffing business model to product development, as evidenced by the share of telecommunications services exports declining to just 3 percent, while exports of computer services rose exponentially. The shift toward computer services positions Armenia to tap into the increasing global demand in this segment in the post-COVID-19 global economy.

Moreover, the industry faces less internet connectivity-related issues and fewer trade policy-related restrictions compared to other sectors. ICT services trade is less constrained by connectivity-related issues than goods trade. In addition, Armenia has signed various international agreements to promote investments in the ICT sector. These agreements include the Partnership Agreement with the EU on services, the Trade and Investment Framework Agreement with the United States, the EAEU, as well as the

Commonwealth of Independent States (CIS) Multilateral Convention on the Protection of Investor Rights in addition to its WTO commitments in Trade in Services.

5.1 ICT services sector performance

Armenia's IT sector has been growing rapidly since the early 2000s. In the earlier stages, this expansion was mainly led by the IT outsourcing industry and investments from technology multinational corporations which set up local R&D operations in Armenia. The development of the domestic IT labor force locally contributed to accelerated growth in the number of IT-related startups in the last few years. The IT startup ecosystem was ranked 60th in the 2022 Global Startup Ecosystem Index.^{12,13,14} The government has been supporting the startups and granted 1,074 IT startup certifications of tax exemption between 2015–21.¹⁵ Armenian IT firms raised US\$700 million in investment between 2020–22.¹⁶

By 2021, ICT firms accounted for approximately 4 percent of the total number of firms in Armenia and for 15 percent of newly established firms, according to Armstat. Approximately 3,700 registered firms in Armenia operate in information and communication, of which 87 percent are microenterprises. Of the microenterprises, 40 percent operate as freelancers. The local ecosystem has two unicorns, one of which—PicsArt—was born locally. Following Russia's invasion of Ukraine, around 500 Russian tech firms relocated operations or opened branches in Armenia in 2022.¹⁷ These companies export a major portion of their output, primarily for outsourcing purposes, and make a notable contribution to Armenia's exports.¹⁸

The ICT sector employs over 32,000 employees, constituting approximately 4.4 percent of the total labor force in Armenia. The number of employees more than doubled over the last five years. The sector's 27.5 percent average annual growth surpassed the 4.9 percent average growth in total employment over the same period (Figure 33, panel a). Although many firms have been reporting

12 StartupBlink. "Global Startup Ecosystem Index 2022", <https://www.startupblink.com/startupecosystemreport>

13 Ranking in terms of 6 Success Factors: Performance; Funding; Connectedness; Market Reach; Knowledge; Talent & Experience.

14 The ranking compares 1,000 cities and 100 countries.

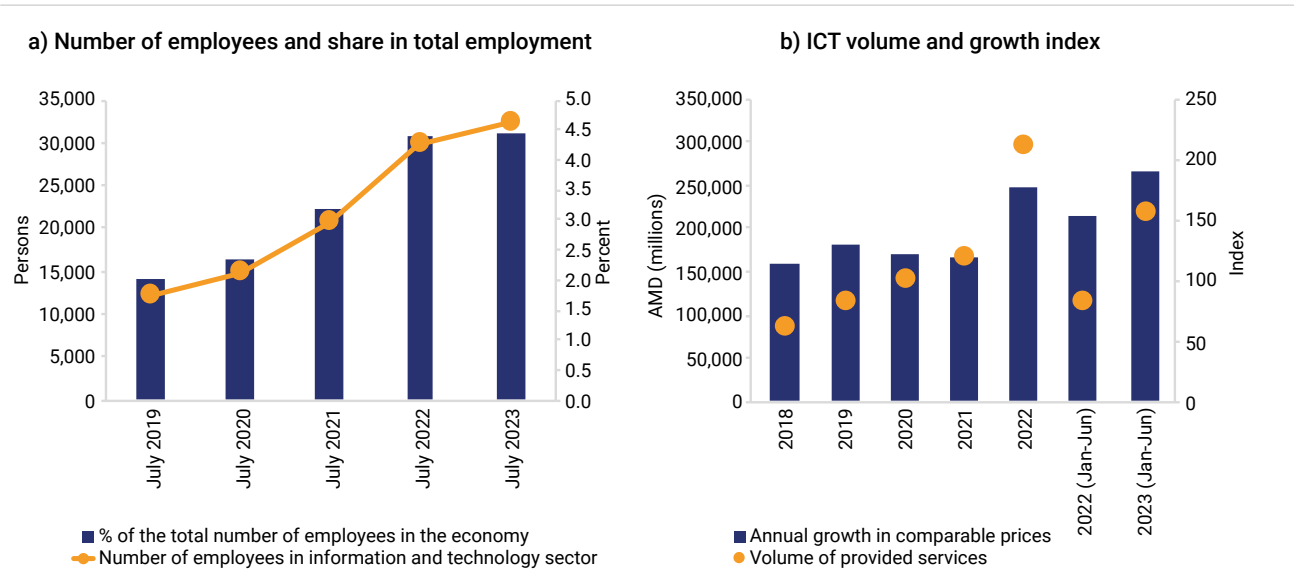
15 <https://investin.am/news/in-2022-1039-startups-in-armenia-received-tax-incentives-for-it-companies/>

16 <https://investin.am/news/in-2022-1039-startups-in-armenia-received-tax-incentives-for-it-companies/>

17 <https://www.trade.gov/country-commercial-guides/armenia-information-and-telecommunication-technology>

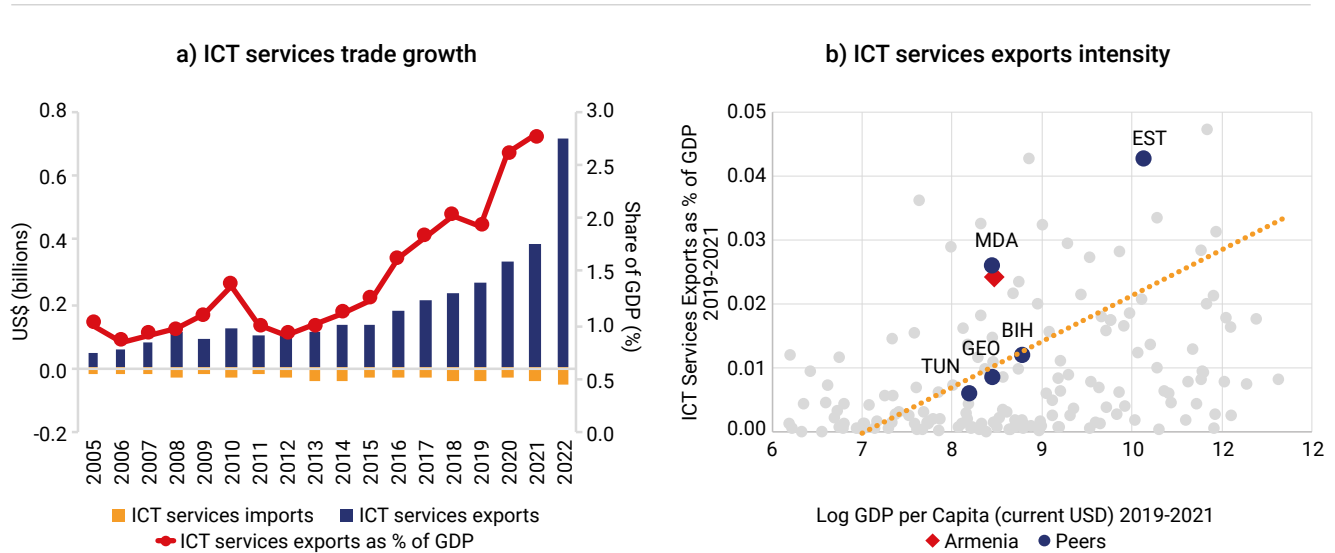
18 Following Russia's invasion of Ukraine, a big inflow of companies and individual professionals relocated from Russia to Armenia. According to the International Organization for Migration (IOM), the number of Russian, Ukrainian, and Belarusian citizens temporarily living in Armenia ranged from 53,000 to 58,000 as of mid-2022. Recently relocated IT firms from Russia contribute to the fiscus through paying taxes. Between January to September 2023, half of tax collections paid by the 20 biggest IT firms were from firms that relocated from Russia.

Figure 33: ICT services sector employment and growth



Source: Armstat.

Figure 34: ICT services export performance



Source: World Bank staff calculations based on data from UNCTAD and WDI.

decreases in revenues and increased layoffs in 2023, the sector recorded strong growth. Between January and June 2023, the sector sales revenue grew by almost 90 percent, compared to 75 percent recorded during the same period in 2022 (Figure 33, panel b).

ICT services exports have increased rapidly in Armenia thanks to the growth of the domestic IT sector. Between

2005–22, ICT services exports grew from US\$49 million to US\$711 million. This substantial growth in ICT services exports has contributed significantly to Armenia’s services trade surplus in the sector (Figure 34, panel a). Notably, Armenia’s ICT services export intensity, considering its income per capita, is above expected levels and exceeds that of most countries, trailing only behind Estonia and Moldova in its peer group (Figure 34, panel b).

BOX 4. The role of the government and the public sector in fostering the growth of the ICT sector in Armenia

Armenia offers incentives for exporters of ICT services to attract investments. IT startups accredited by the Ministry of High-Tech Industry of Armenia and having less than 30 employees are eligible for a 10 percent income tax rate (paid from monthly salaries)—versus the 21 percent income tax rate applied for other sectors employees—as well as zero percent profit tax and no VAT on exports for all businesses, if the main exporting market is international.

Armenia also has very few restrictions on foreign ownership or control of commercial enterprises. For example, Armenia has 100 percent ownership of resident legal entities permitted to foreigners; no restrictions on the access to almost any sector and geographic location within the country; and a legal regime no less favorable than the one for nationals, unless a more favorable regime is provided by a respective treaty. Companies registered by a foreign citizen in Armenia have the right to own land, and foreign citizens can have long-term lease contracts. In addition, Armenia does not have restrictions on remittances, staff recruitment, foreign currency exchanges, and profit repatriation.

The government has constructed several techno parks, shared laboratory infrastructure, co-working spaces, and office spaces especially designed for IT companies, as well as incubators across Armenia. These include Engineering City, Armenian National Engineering Laboratories, Gyumri Technology Center, Mergelyan Cluster, COWO, ISTC, and Vanadzor Technology Center.

Universities in Armenia offer STEM education. Some of the educational centers include Yerevan State University, State Engineering University of Armenia, American University of Armenia, and Armenian-Russian Slavonic University. Technology education in schools is heavily promoted and financed by public and private initiatives, such as Armath Engineering Laboratories, TUMO, COAF, FAST, and educational programs at Vanadzor and Gyumri Educational Centers. Several private training centers, such as Armenia Code Academy, Microsoft Innovation Center Armenia, and Armenian-Indian Center for Excellence in ICT provide services to close the IT skills gap in the market.

While all of these interventions have helped the ICT sector, a review of these government interventions is warranted. For example, consultations with the private sector reveal that the long-term objectives of the current tax incentive program are unclear, implementation is poor, and support is often delayed. In addition, there is currently inadequate infrastructure such as co-working spaces, and if office spaces are available, they are expensive compared to other major ICT hubs. Finally, the current model of STEM education being implemented by the Armenian universities is not producing graduates that are ready to be hired by ICT firms.

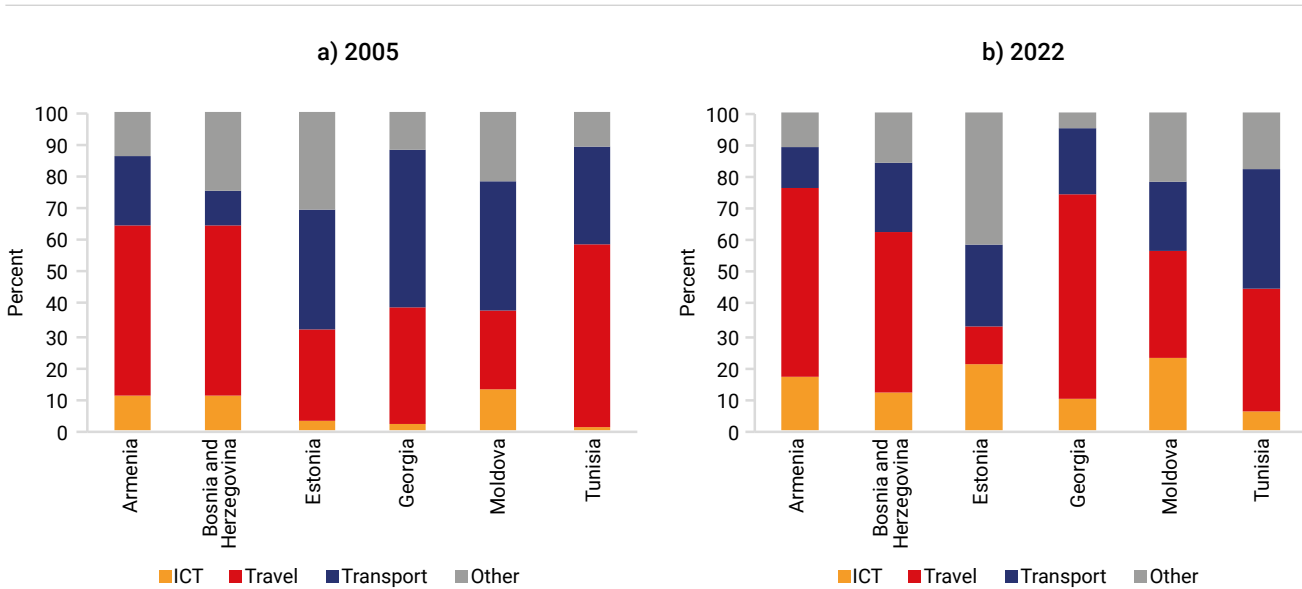
Source: Enterprise Armenia and findings from private sector consultations.

The sustained growth of the ICT sector in Armenia can be attributed to several favorable conditions that helped attract investment. These factors include the availability of a highly skilled labor force with good English proficiency, competitive labor and operating costs, high internet connectivity levels, government incentives such as tax reductions and exemptions, as well as a strong diaspora network. For example, a strong educational foundation in mathematics, physics, and engineering has yielded a skilled IT labor force. In terms of government

incentives, the government introduced legislation granting tax incentives to ICT startups in 2015.¹⁹ The country has several technoparks, shared research labs, and incubators (See Box 4 for details). In the aftermath of Russia's invasion of Ukraine, the government's proactive stance in welcoming companies from countries like Russia, Ukraine, and Belarus by providing extra support, easy incorporation processes, and favorable conditions for financial transactions has further stimulated the sector's growth.

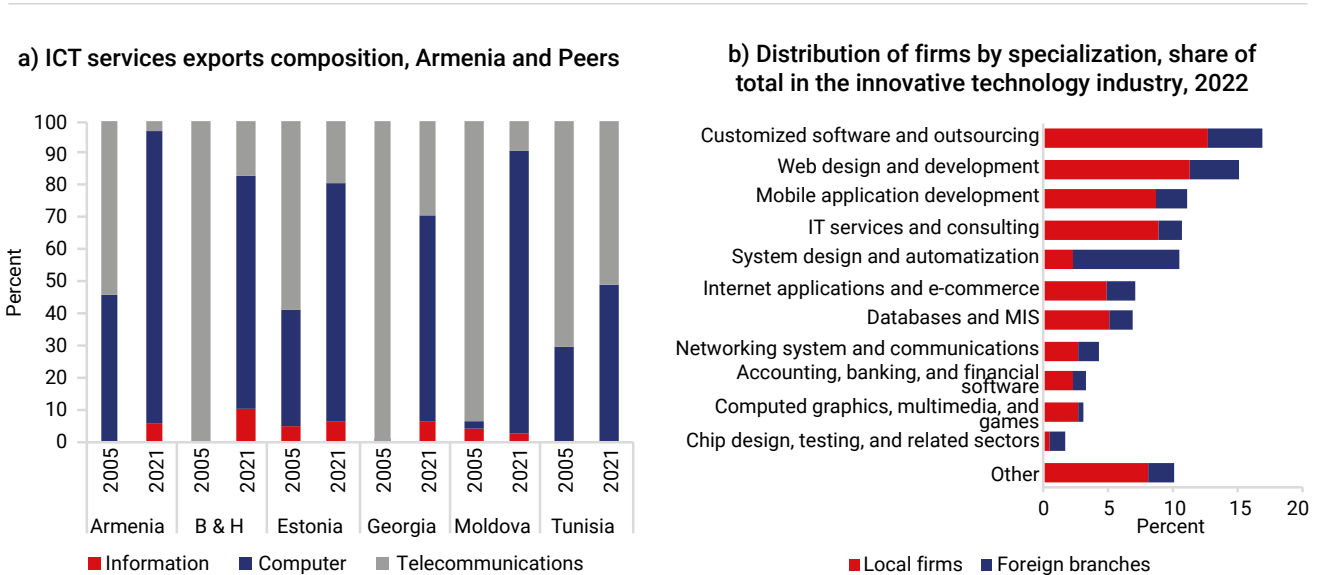
19 <https://www.bdo.global/en-gb/microsites/tax-newsletters/corporate-tax-news/issue-52-september-2019/armenia-tax-incentives-for-information-technology-startups-extended>

Figure 35: Share of IT services exports in total services exports



Source: World Bank staff calculations based on data from UNCTAD.

Figure 36: Armenia IT services exports composition and specialization



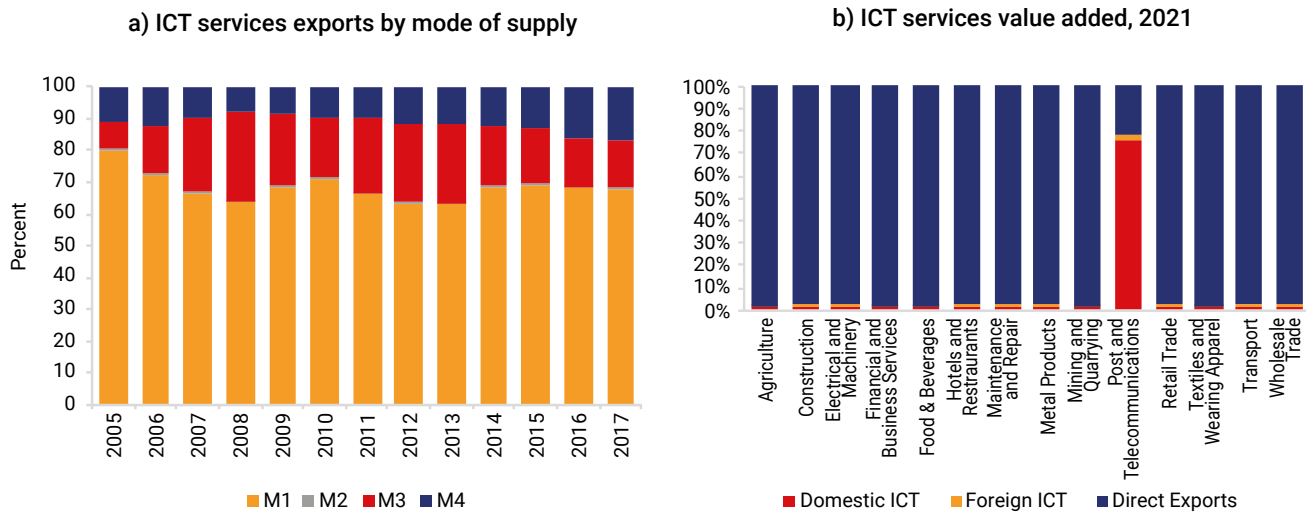
Source: World Bank staff calculations based on data from UNCTAD and Enterprise Armenia.
 Note: B & H means Bosnia and Herzegovina.

ICT services exports has emerged as the second-largest category of traded services in Armenia, second only to travel services. In 2022, the share of ICT services exports accounted for the second-largest share of commercial services exported (17 percent), only behind travel (59 percent) and surpassing the share of transport services (13.5 percent) (Figure 35, panel b). The growth in the

share of ICT services exports to total commercial services exports has also been observed in peers, especially in Estonia and Moldova.

Computer services exports have been driving the growth in IT services exports, accounting for more than 90 percent of ICT services exports in 2021. This marks a

Figure 37: ICT services exports by mode of supply and value added



Source: World Bank staff calculations based on data from TISMOS and Eora.

substantial increase from 2005 when computer services exports accounted for only 45.6 percent of ICT services exports. Armenia’s share of computer services exports is higher than all of its peers (Figure 36, panel a). Armenia exports a variety of computer services, with firms specializing in several areas such as customized software, web design and development, mobile applications development, IT services and consulting, automation, computer graphics, and multimedia and games (Figure 36, panel b). As Armenia seeks to move up the value chain and remain competitive, local firms are increasingly investing in the development of their own products to compete in the international market, while foreign companies are also investing in outstaffing in Armenia. Fields such as quantum computing and artificial intelligence are also emerging but are at very early stages in the country.

ICT services in Armenia are mostly exported via cross-border trade through ICT networks (mode 1) and direct exports.²⁰ In Armenia, the most prevalent mode of supply for ICT services exports is mode 1 (68 percent), in which services are supplied through ICT networks without the services provider or consumer required to be in physical proximity (Figure 37, panel a). Mode 4, in which ICT services professionals move abroad for the provision of ICT services in the foreign country, represents approximately 17 percent of all ICT services exported,

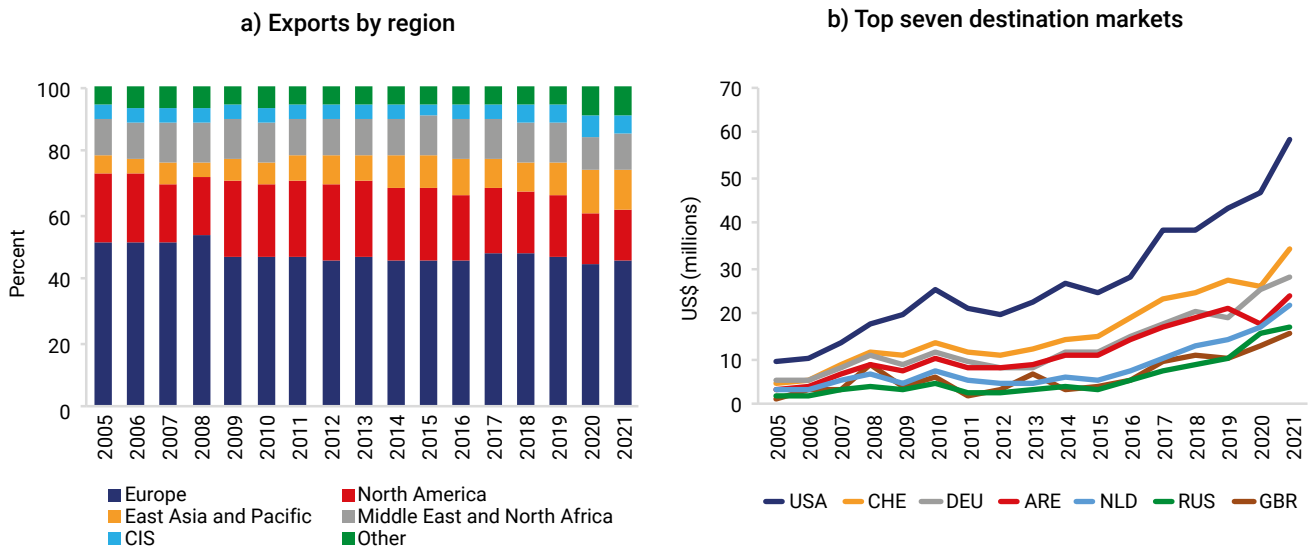
while Mode 3—the establishment of commercial presence in the foreign country, for example branches, subsidiaries, or representative offices—represents about 16 percent. Most of the ICT services produced in Armenia are exported via direct exports to other sectors, except for post and telecommunications which absorbs a larger share of the domestic production (Figure 37, panel b).

The United States and Europe are the main destinations for Armenia’s ICT services exports, thanks in part to the strong Armenian diaspora network in those markets.

The share of ICT services exports to the United States and Europe have remained almost unchanged since 2005 (Figure 38, panel a). However, in recent years, the share of ICT services exports to North America has been declining—suggesting a decline in exports to Canada—while exports to East Asia and Pacific have been growing. At the country level, the United States is the biggest importer of Armenia’s ICT services (Figure 38, panel b). A strong Armenian diaspora network in these markets has played a fundamental role in the development of ICT services exports by attracting initial investments and connecting Armenia to the global IT landscape. Private sector consultations revealed that the diaspora connection is still used as one of the most effective sales mechanisms for local firms to expand their exports into new international markets.

²⁰ The modes of supply for services refer to the various ways in which services can be delivered across borders. These modes, as defined by the General Agreement on Trade in Services (GATS), are cross-border (mode 1), consumption abroad (mode 2), commercial presence (mode 3), and movement of natural persons (mode 4).

Figure 38: Armenia's services exports by destination market



Source: World Bank staff calculations using data from BaTIS.

Note: USA = United States of America, CHE = Switzerland, DEU = Germany, ARE = United Arab Emirates, NLD = Netherlands, RUS = Russian Federation, and GBR = United Kingdom.

As discussed earlier, Armenia has signed numerous bilateral and multilateral trade agreements and has various memberships to promote investments and trade relations. In addition to all of the agreements and memberships mentioned earlier, Armenia is a signatory of the International Convention of Investment Disputes (ICSID) and signed a Trade and Investment Framework Agreement with the United States in 2015. In 2017, it signed a Partnership Agreement with the EU on services—including information on ICT services—aimed at improving its investment climate and business environment. Armenia also has Bilateral Investment Treaties (BITs) in force with several countries (WTO Regional Trade Agreements; Netherlands Ministry of Foreign Affairs).

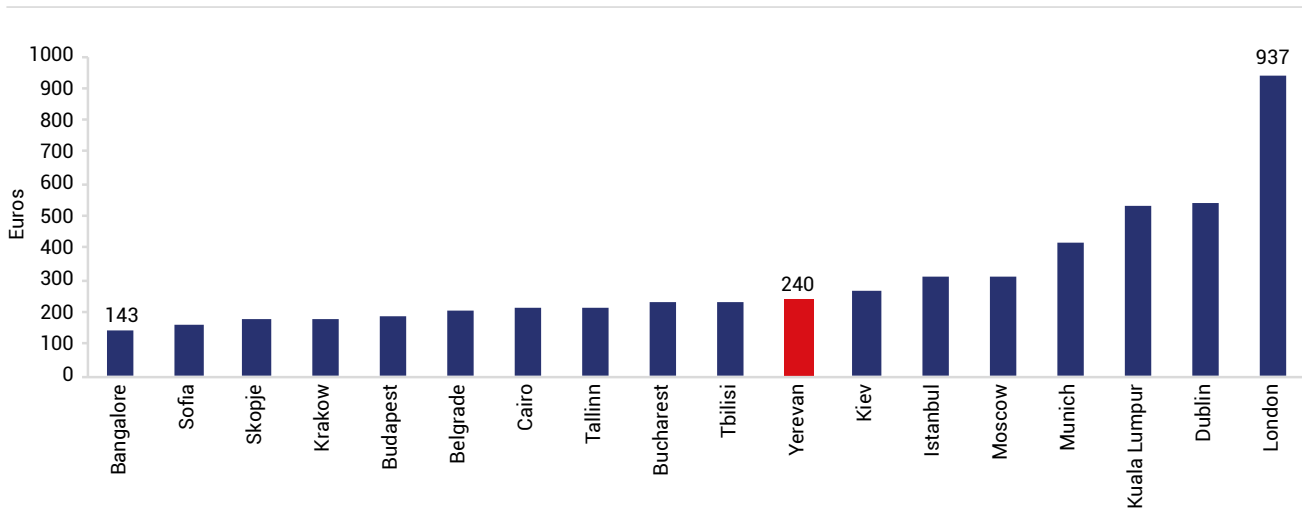
5.2 Global and geopolitical events risks progress in the ICT sector

Although the ICT sector has been growing rapidly, recent geopolitical and global events have created new challenges for the sector. The 2020 military conflict with Azerbaijan, which followed the outbreak of the COVID-19 pandemic, led to notable disruptions in ICT sales and contracting due to political risks and labor supply disruptions.

With the arrival of Russian professionals and companies relocating from Russia, the gaps in Armenia's accommodation and business infrastructure have become more apparent. The arrival of the estimated 50,000 migrants from Russia heightened demand for working and living spaces in Armenia and led to soaring real estate prices (IOM, 2023). According to a recent survey by the International Organization for Migration, housing prices are the biggest challenge for migrants in Armenia: 36 percent of survey respondents mentioned challenges with high accommodation rental prices and quality of accommodation; around 19 percent pointed to challenges with the quality of infrastructure such as roads and electricity as well as water cuts; and 8 percent found the overall cost of living to be very high.

The availability of quality and versatile spaces designed to accommodate IT firms is also becoming a major issue in Armenia. Although Armenia was an easy destination for Russian-speaking entrepreneurs and provided an easy way for many companies to relocate from Russia, consultations reveal that several firms have considered moving to other countries that provide special business infrastructure such as co-working and co-living spaces and business centers. Additionally, the average annual rent per m² in Yerevan, at €240, is higher compared to ICT hubs such as Sofia and Bangalore (Figure 39). While

Figure 39: Average annual rent for Class-A office space per m2 (2023)



Source: Enterprise Armenia.

the government has constructed several techno parks, shared laboratories, and working spaces for ICT firms as mentioned above, the infrastructure is inadequate, and if office spaces are available, they are becoming more expensive compared to other major ICT hubs. The list of countries competing to host the firms and professionals relocating from Russia includes Georgia, Türkiye, United Arab Emirates, Bulgaria, and other European countries.

In addition, Armenian IT exports were significantly affected by the recent strengthening of the local currency. Russia's invasion of Ukraine, which led to a considerable number of Russian IT specialists migrating to Armenia as discussed above, resulted in significant appreciation of the Armenian dram.²¹ Without adjustment of US\$ salaries, IT services exporters reported a significant decrease in profit margins. Larger firms survived the decline in revenues by cutting costs on benefits and various amenities awarded to employees prior to the crisis, but smaller firms did not have this buffer and had to either cut down on operations significantly or shut down.

5.3 Structural challenges affecting ICT services competitiveness in Armenia

In addition to the recent geopolitical challenges noted above, Armenia's ICT sector still faces several structural challenges that impede progress in its global

competitiveness. Key structural challenges include skills shortages, regulatory gaps in Armenia's regulatory environment, and lack of coordinated state efforts to promote Armenia as an ICT destination. Another challenge are gaps in data collection efforts to comprehensively monitor developments in the ICT sector. These themes are discussed in the following sections.

5.3.1 Domestic skills shortages

Consultations with the private sector unveiled various challenges faced by the ICT services industry in Armenia when recruiting ICT professionals. Key challenges relate to the small pool of relevant skills, as well as a mismatch between graduate capabilities and business needs. Armenia has a shortage of senior developers and engineers. Other skills that are lacking include product management and sales and marketing. Several educational initiatives such as training centers have been created by the private sector to upskill recently graduated university students. These training centers collaborate with international partners, local industry associations, and leading U.S. multinational companies—including Microsoft, IBM, and National Instruments—to train and invest in ICT-related research laboratories. Nonetheless, ICT firms still report that the educational system for the IT industry needs to be improved (PWC 2021), and the ready-to-hire population is still small. Training costs are borne by the private sector, but the ICT sector alone cannot bridge the IT skills gap in Armenia.

21 In 2022, a 34 percent appreciation of the real effective exchange rate of the Armenian dram was observed, according to the Central Bank of Armenia.

The advent of new technologies also presents challenges within the sector. The presence of a high-skilled labor force has played an important role in the development of the ICT industry in Armenia. However, as new technology emerges such as automation, artificial intelligence, and the Internet of Things, it will be critical for Armenia to develop, upskill, and reskill the labor force in order to remain competitive in the international market. The ICT business environment is dynamic—what is current today may potentially become obsolete tomorrow due to the rapid changes in the ICT industry. As a knowledge-intensive industry, the competitiveness of the ICT services sector relies heavily on the availability of talent resources, and the flourishing ICT ecosystem is further increasing this demand for talent.

The education sector reports several challenges that hinder training of the ICT talent pool in Armenia. A survey conducted by EIF in 2018 revealed that one of the main challenges faced by the education sector is inadequate public financing. Current subsidies are not adequate for most universities, and the private sector involvement is not enough to bridge the gap. In addition, raising tuition is not an option for many universities as it is already high for the average Armenian student. Other issues faced by the sector include challenges associated with cooperation with the private sector and challenges in recruiting new specialists to replace aging faculty (EIF 2018).

Increased competition with ICT professionals from other markets poses an additional challenge for the local IT labor force. One of the main factors behind the growth of the ICT sector in Armenia was the availability of high-skilled ICT workers at competitive costs. While the pandemic has increased the demand for the ICT workforce, the digitalization of many services made it easier for companies to hire talent from many different parts of the

world online. This in turn increases the supply of labor, especially at lower cost for many foreign companies, which increases competition for Armenia's local labor force. Consultations with the private sector revealed that Armenia's labor force is becoming more costly and less skill-competitive relative to other talent markets that have been evolving at a much faster pace.

5.3.2 Gaps in the regulatory framework affecting investments

Armenia's laws and regulations on electronic documentation (E-documents) are generally consistent with international standards. The country's Law on Electronic Documents and Electronic Signatures, which was introduced in 2005, recognizes electronic documents as equivalent to paper-based documents and acknowledges the validity of electronic communications. Armenia's Civil Procedure Code also has provisions that deal with the admissibility of e-documents as evidence (Table 5). In addition, the Law on Electronic Documents and Electronic Signatures includes rules on the storage of electronic documents.

However, the regulations remain unclear regarding the concept of technological neutrality. The Law stipulates that an electronic document verified by electronic signature is deemed to have been adequately stored if its signature-verification data has been kept. Although this provision appears to promote cybersecurity measures, it can also be interpreted as requiring specific cybersecurity requirements for electronic document storage, which could unnecessarily limit the types of electronic documents that can be used. This requirement could be unduly restrictive since parties to a contract should have the freedom to choose the most appropriate approach based on their individual circumstances.

Table 5: Electronic documents, Armenia, and peers

Electronic documents	are legally valid	have power as paper docs	are admissible as evidence	have technology neutrality
Armenia	✓	✓	✓	✓
Albania	✓	✗	✓	✓
Bosnia and Herzegovina	✓	✗	✓	✓
Estonia	✓	✓	✓	✓
Georgia	✓	✓	✓	✗
Moldova	✓	✓	✓	✓
Tunisia	✓	✓	✗	✓

Source: World Bank staff analysis based on national legislation.

Table 6: Electronic signatures, Armenia and peers

Electronic signatures	are legally valid	have power as paper signatures	valid regardless of technology	is equal to foreign signatures
Armenia	✗	✓	✓	✓
Albania	✓	✓	✓	✓
Bosnia and Herzegovina	✓	✓	✓	✓
Estonia	✓	✓	✗	✗
Georgia	✓	✓	✗	✓
Moldova	✓	✓	✗	✓
Tunisia	✗	✓	✗	✗

Source: World Bank staff analysis based on national legislation.

Table 7: Personal data protection, Armenia and peers

Country	General personal data protection law	Provision of sensitive personal data	Cross-border data transfer Accountability	Legal basis for data collection
Armenia	✓	✓	✗	✗
Albania	✓	✓	✗	✓
Bosnia and Herzegovina	✓	✓	✗	✓
Estonia	✓	✓	✓	✓
Georgia	✓	✓	✓	✓
Moldova	✓	✓	✗	✓
Tunisia	✓	✓	✗	✗

Source: World Bank staff analysis based on national legislation.

Note: B. and H. = Bosnia and Herzegovina.

Although significant progress has been made toward providing legal recognition for electronic signatures in Armenia, no laws regarding their validity have been enacted (Table 6). In digital trade, remote contracts are often made on an international level, making the recognition of electronic signatures crucial. To facilitate digital trade, it is important for a regulatory framework to acknowledge the legality of electronic signatures in accepting obligations or document terms. In addition, the framework should establish criteria that electronic signatures need to meet to be considered valid and enforceable, like handwritten signatures. Recognizing electronic signatures would offer greater flexibility and convenience, allowing for a wider range of options for document authentication. By expanding the range of

acceptable signature methods, Armenia could provide greater accessibility and ease of use while maintaining the security and integrity of important documents.

The realm of personal data protection and cross-border data transfers is marked by the need for legal and technological enhancements, especially given the absence of legislation regarding data transfer across borders. The Constitution of Armenia protects the right to protection of personal data as set out in the Personal Data Protection Law of 2015.²² The Personal Data Protection Agency under the Ministry of Justice is responsible for enforcing the laws and regulations governing personal data protection. The agency's powers include checking compliance, applying sanctions, and managing data

22 In addition, there are several laws that impose an obligation of certain categories of personal data to treat such data as confidential and guarantee a certain level of protection of personal data. These include (1) the Law on Electronic Communications, with protections for electronic communications services providers' clients' data; (2) the Law on Banking Secrecy, with protections for data collected by banks; (3) the Law of insurance, with protections for data transferred to insurance companies and intermediaries; (4) the Law of Combating Money Laundering and Terrorism Financing, and (5) the Law of Circulation of Credit information and activities of credit bureaus.

breaches. However, the agency's capacity to enforce these regulations effectively, especially in cross-border scenarios, remains a critical area for development. The Personal Data Protection Law is not clear on its jurisdictional scope, as it does not specify which rules apply to a foreign company's collection and transfer of Armenian citizens' personal data collected within Armenia. Other peer countries such as Estonia and Georgia have these clauses on cross-border data transfer accountability and legal basis for data collection (Table 7).

5.3.3 Ineffective implementation of the current ICT strategy

Consultations with the private sector revealed that there is no government strategy they are aware of that focuses on positioning the ICT sector at global levels. The current ICT strategy for Armenia, developed more than 10 years ago, had clear goals and courses of action for positioning the Armenian ICT industry at global level. However, implementation of the strategy has been weak, as perceived by the private sector companies. Armenian ICT firms typically rely on their connections or agents for coordination and communication with customers or investors, and there are limited resources available for domestic ICT firms that detail the needs and strategies for accessing new markets. Additionally, there is insufficient support by the state in promoting the sector globally, in positioning Armenia as a lucrative outsourcing destination for ICT services and in attracting potential investors and customers to explore the capabilities and processes for doing business in Armenia. There are opportunities for the government to partner with international development organizations and the donor community to update the ICT strategy and enhance the strategy implementation capabilities.

5.3.4 Little coordination on data sharing between government and ICT Firms

Consultations revealed that there is little coordination between the government and ICT firms for administrative data sharing in Armenia. The institutional framework for data sharing in Armenia needs to be reviewed. Currently, the institutional ecosystem for data is comprised of several agencies, with different reporting lines and mandates. In the ICT sector, the Ministry of High-Tech Industry leads its own project, with little coordination with other agencies. Most publicly accessible data is available and shared by Armstat through PDF files and old Excel files, which makes data processing and use challenging. While

various e-government websites have been developed over the last few years, they do not have consistent metadata structures and standards that enable easy data flows. Evidence shows that countries that incentivize the culture of data use, data sharing, and data management in a transparent and effective manner can effectively push for reforms through timely interventions.

5.4 Policy recommendations for enhancing ICT sector competitiveness in Armenia

5.4.1 Upskill and foster innovation

The government should formalize, map, and institutionalize education and training initiatives and coordinate those to ensure that the skills supply meets the changing needs of ICT firms. Stakeholder consultations reveal that coordination efforts are currently done by organizations like the UATE and private companies. An immediate step for the authorities is to establish an advisory board that constantly updates the tertiary education curriculum at the bachelors, masters, and PhD levels in the field of IT through an annual curriculum review process to suit the requirements of the industry. For example, Ireland created Expert Group on Future Skills Needs, which was responsible for advising the government on current and future skills needs of the economy and on other labor market issues (see Box 5). This constant review process should be done in consultation with the private sector. Targeted investments in education infrastructure, teacher training programs, and partnerships with IT industry experts can enhance the practical relevance of education. These investments include allocating funds for the development of specialized IT courses and research centers and allocating scholarships to top students. Collaborating with IT firms for internships and apprenticeships is another avenue to bridge the gap between education and industry requirements.

The authorities should also provide a platform that provides access to information and opportunities in ICT services trade to attract and retain skills. Armenia has a strong diaspora network that includes experienced researchers in top companies and universities. The government could facilitate collaboration by creating a platform that could help set up networks of skilled expatriates to mobilize knowledge, networking opportunities, and the transfer

of expertise to domestic firms and startups that are engaged in ICT services exports. This platform could also be used to collect feedback about critical issues that are currently transforming IT services trade in other countries. Similar knowledge platforms have been put in place by governments and other stakeholders from the public and private sectors in other countries.

To foster innovation, authorities need to better coordinate and support the development of local R&D, innovation initiatives, and locally developed applications or products. The government should coordinate the mapping and sharing of current R&D efforts and help in identifying development opportunities and developing a shared knowledge base on research priorities and capabilities. The government should also co-develop and promote local products, services, and innovations and the accompanying knowledge base through lead adoption of

these solutions to solve national challenges. In addition, the government could organize regular social coding events for specific themes to encourage the development of new ideas, solutions, and services.

5.4.2 Promote new investments in the ICT sector

The Government should centrally coordinate and align all outward marketing efforts across the ICT sector. An Investment Promotion Agency, mandated by the government, should be the main interface for foreign ICT investors at the country level. Currently, Enterprise Armenia oversees all investment promotion and attraction as well as business facilitation in Armenia. Together with the Ministry of High-Tech Industry, Enterprise Armenia should coordinate the development of a common sector vision and associated action plan for the ICT industry

BOX 5. Ireland—expert group on future skills needs

In Ireland, workforce development is fully integrated into national policies and strategies, with the roles and responsibilities of key stakeholders in workforce development institutionalized. Businesses and industry have executive and advisory roles in shaping and implementing workforce development priorities based on well-informed analysis, and recommendations on future skill supply are implemented and policies routinely reviewed and updated. Stakeholders have influence over training curricula and advisory and decision-making roles in the operations of public training institutions, while incentives are in place to ensure that private and non-governmental organization (NGO) providers meet quality standards. A culture of routine monitoring and evaluation—one aided by reliable and freely available data—is well-developed.

A key vehicle for aligning skills supply with current and future industry needs is the Expert Group on Future Skills Needs (EGFSN). The EGFSN advises the Irish Government on current and future skills needs of the economy and on other labor market issues that affect Ireland's enterprise and employment growth. It has a central role in ensuring that labor market needs for skilled workers are anticipated and met.

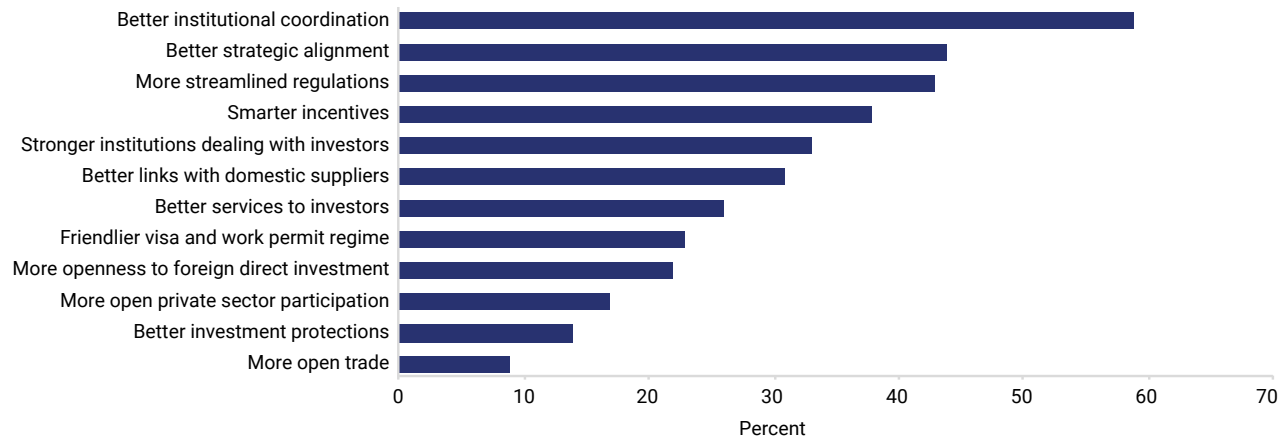
Established in 1997, the EGFSN reports to the Minister for Jobs, Enterprise and Innovation and the Minister for Education and Skills. The Department of Jobs, Enterprise, and Innovation, in conjunction with SOLAS, provides the EGFSN with research and secretariat support. The SOLAS Skills and Labor Market Research Unit provides the Group with data, analysis, and research and manages the National Skills Database. The Group's work program is managed by the Head of Secretariat based in the Department of Jobs, Enterprise, and Innovation. The EGFSN's budget comes from the National Training Fund.

In terms of functions, the EGFSN provides advice to the government on skills issues affecting enterprises through:

- Skills foresight and benchmarking
- Strategic advice on building skills through education and training
- Data collection and analysis on demand and supply of skilled labor
- Influencing and monitoring implementation.

Source: International Finance Cooperation (IFC) (forthcoming).

Figure 40: Reforms implemented by investment promotion agencies to improve attraction and retention of investments in their countries



Source: World Bank staff calculations based on 2019 World Bank Group Global IPA survey.

Note: The survey received responses from 86 national IPAs globally. In terms of income classification, 41 percent are from high-income countries, 29 percent are from upper-middle-income countries, 22 percent are from lower-middle-income countries, and 9 percent are from low-income countries. World Bank income classification: low-income economies are defined as those with a gross national income per capita of US\$1,025 or less in 2018; lower-middle-income economies are those with a GNI per capita between US\$1,026 and US\$3,995; upper-middle-income economies are those with a GNI per capita between US\$3,996 and US\$12,375; and high-income economies are those with a GNI per capita of US\$12,376 or more

in Armenia. Figure 40 shows reforms implemented by investment promotion agencies to improve attraction and retention of investments from a sample of 86 national investment promotion agencies (IPAs) globally. Armenia should prioritize activities related to investment retention, investor development, after care, and policy advocacy roles in addition to existing investment promotion efforts and attraction of new projects.

To establish Armenia as a prominent IT destination, the government should introduce a strong advocacy component by Armenian consulates abroad to connect investors with indigenous firms. The government could introduce a strong advocacy component for the IT sector in Armenian embassies abroad to promote the country's capabilities, which will help attract newer foreign investments and partnerships between global firms and domestic ICT entrepreneurs. In addition, supporting startups by encouraging them to participate in international trade fairs and networking events will provide them with valuable resources and mentorship and exposure to global markets.

To attract new investments, the authorities need to review the structure of current tax incentives for the ICT sector. According to official data, the ICT sector already faces a

substantially lower-than-average effective profit tax rate, so in aggregate terms, there is no evidence that the tax burden is unfair or too high in the ICT sector relative to other sectors. Regardless, Armenia can take steps to use tax incentives in a more targeted and cost-efficient manner. This can be done by implementing tailored reform strategies based on (1) targeting incentives at those investors whose decision to invest is most likely swayed by incentives—this requires a thorough review and understanding of the type of FDI coming to Armenia and the costs and benefits of existing incentives—and (2) improving the design, transparency, and administration of the incentives to reduce fiscal losses, rent seeking, tax evasion, and economic distortions. It is important to note that a simpler tax system—with very limited tax incentives and other preferential treatment—that is rigorously enforced will always be the gold standard, not only from a fiscal viewpoint but also for investment attraction.

5.4.3 Enhance state capacity to effectively implement the ICT strategy

Armenia needs to update and revise its ICT strategy. To develop a new strategy, the government needs to align with current global trends and focuses on positioning the Armenian ICT sector at a global level. This updated

strategy should have clear goals, actionable steps, and a comprehensive approach to support the growth and competitiveness of the ICT industry. This should be done in regular consultation and dialogue with the private sector, including ICT firms, startups, and industry associations to ensure the strategy reflects the needs of the private sector.

To address the lack of state capacity in ICT strategy implementation, the government should invest in training and capacity building for government officials.

First, the government should identify the specific training needs of government officials involved in ICT strategy implementation, then develop tailored training programs that address the identified skills and knowledge gaps. The government can also collaborate with international development organizations for technical assistance and support, while engaging with the donor community to secure financial resources for training and capacity building programs. Additionally, fostering partnerships and knowledge sharing with successful ICT implementers can provide valuable insights and learning opportunities. By investing in training, seeking external support, and promoting collaboration, the government can enhance its capacity to effectively implement ICT strategies and drive the growth and competitiveness of the ICT sector in the country.

5.4.4 Facilitate the integration of new skilled tech professionals from Russia

Armenia can offer support services to help skilled tech professionals from Russia integrate into the local community. This includes assistance with finding accommodation, navigating administrative processes, and facilitating networking opportunities. In terms of accommodation assistance, Armenia can provide information on housing options, connect Russian tech professionals with real estate agents or online platforms, and offer guidance on rental agreements and lease terms.

Armenia can also replicate what other countries such as Georgia are doing in offering business support services to Russian tech professionals who are interested in starting their own ventures. These services include assistance with company registration, legal and accounting services, access to co-working spaces, and guidance on business development and growth strategies. Armenia can also facilitate networking opportunities for Russian tech professionals to connect with locals, entrepreneurs, and industry experts, for example by organizing tech

events and meetups where professionals can exchange knowledge, collaborate on projects, and build professional relationships. These support services can make the transition and integration process smoother for Russian tech professionals.

5.4.5 Close existing gaps in the regulatory framework and review existing laws

Armenia needs to review existing laws on e-services—particularly on the validity of e-signatures—and strengthen the institutional framework for implementation of e-services. This includes conducting a regulatory gap assessment review of all e-services in Armenia. Furthermore, the implementation of e-services in Armenia is fragmented because of the current approach to the development of services and platforms. For example, beyond customs, other relevant regulatory agencies should be empowered to utilize the National Single Window system. This would enhance the efficiency and scope of digital trade procedures, ensuring a more integrated approach across various sectors.

The government urgently needs to review and update the Personal Data Protection Law of 2015 and related clauses pertaining to data protection. As discussed, the Law is not clear on its jurisdictional scope, and it does not cover subsidiaries of Armenian firms in other countries collecting, storing, and processing personal data. Clarification of such a scope, particularly stricter laws to protect personal data, would be key for ICT firms wishing to engage in Armenia. The law should be enforceable for all firms, domestic or foreign, or an individual that collects, processes, and shares personal data.

The government should prioritize the systematization of a whole-of-government approach to data collection, use, and archiving with appropriate safeguards. To enable effective data sharing, laws, and regulations must be reviewed and complemented by infrastructure and institutions that are robust and well-resourced. Efforts should prioritize the release of data in accessible websites and databases and other publicly computer-readable files. Additionally, it will be important to have safeguards to protect confidentiality, precise and complete documentation, translations, and training opportunities to familiarize stakeholders with complex databases. Creating an enabling framework for all agencies involved in data collection, analysis, publication, and dissemination

to establish adequate data classification standards and access restrictions is key. Policy must also be clear on the costs of breaching the laws and regulations regarding restricted data and confidentiality issues and make these available to data users in a transparent manner, in addition to making public data accessible to all stakeholders. This will ensure that feedback on emerging negative impacts of government policies is captured, then support can be mobilized to address these impacts.

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Appendixes



Appendix A

Estimating revealed comparative advantage

Costinot et al. (2012) develop a Ricardian model of trade, extending the work of Eaton and Kortum (2002). Their objective is to quantify the importance of productivity differences as a driver of trade, but as a by-product of their investigation, they develop a simple method for analyzing patterns of comparative advantage that is fully consistent with their theoretical setup. Like many models of trade, their model can be reduced to a gravity-like relation. Specifically, their theory predicts that bilateral trade flows by sector should satisfy the following relation:

$$(1) X_{ij}^k = b_{ij} f_j^k z_i^{k\theta} e_{ij}^k$$

Where: X_{ij}^k is exports from country i to country j in sector k ; b_{ij} is a country pair fixed effect capturing structural features of the model, such as trade costs; f_j^k groups together importer-sector factors in a fixed effect; θ is a parameter from the theory capturing intra-industry heterogeneity in productivity; z_i^k is the fundamental productivity of country i in sector k , taking account of factors like climate, infrastructure, and institutions that affect all producers within a country; and e_{ij}^k is an error term satisfying standard assumptions. As suggested by the use of a parameter like this, the objective of the exercise is to quantify comparative advantage, not to uncover its sources as in models like Chor (2010), applied to services by van der Marel (2011).

Costinot et al. (2012) initially estimate (1) directly, using productivity estimates drawn from available data. However, such an approach is not practical for application to a wide range of countries and particularly to developing ones, as such estimates are not readily available on a comparable basis. As the authors note, they are also subject to significant concerns regarding measurement error.

An alternative approach is therefore to replace the productivity variable with an exporter-sector fixed effect d :

$$(2) X_{ij}^k = b_{ij} f_j^k d_i^{k\theta} e_{ij}^k$$

The standard Poisson Pseudo-Maximum Likelihood (PPML) estimate will produce consistent estimates of the exporter-sector fixed effects. Once the estimates have been obtained, a value of θ from the literature can be used to construct revealed productivity measures by exponentiation, i.e. $z_i^k = \exp\left(\frac{d_i^{k\theta}}{\theta}\right)$ where the numerator is simply the PPML estimate of the exporter-sector fixed effect.

There are important advantages to proceeding in this way. First, the only limit on application is the availability of trade data. Second, the revealed productivity measure can be interpreted, as the authors do, in terms of a theoretical revealed comparative advantage measure by scaling it relative to a baseline country (the United States) and a baseline sector in each country (agriculture). The theory-consistent measure of comparative advantage has several advantages over the Balassa measure that is more commonly used. First, the Balassa measure is not informative about comparative advantage in a world with varying trade costs (French 2017), whereas the measure here explicitly controls for the impact of trade costs. Second, the modification used here takes account of domestic production, which arguably is closer to the core idea of comparative advantage than a measure based on trade only, as is the case of the Balassa measure. Third, the measure does not have an artificial cutoff but is instead continuous (Costinot et al. 2012). The original source uses a log-linearized model. The presentation here retains the nonlinear form for the reasons set out in Santos Silva and Tenreyro (2006). Estimation is therefore by Poisson Pseudo-Maximum Likelihood (PPML) rather than Ordinary Least Squares (OLS). Similarly, internal trade is included in line with now-standard practice in gravity modeling, and as implied by theory (Yotov et al. 2016). Estimation uses the PPMLHDFE package (Correia et al. 2019).

Estimating export potential for Armenia using a Gravity Model ²³

The gravity model

To assess Armenia's export potential, we follow earlier work done by Mulabdic and Yasar (2021) by estimating a gravity equation²⁴ using data for 160 countries over the 2013–19 period.²⁵ Bilateral exports are modeled as a function of exporters' and importers' nominal GDPs, economic development (GDP per capita), and remoteness indexes. Trade costs are proxied by policy variables such as the level of weighted applied tariff duties and presence of trade agreements in addition to distance and controls for sharing a common border, language, or colonial ties.

Methodology and data

Bilateral trade data at the HS 6-digit (HS 2002) level are from the CEPII's BACI database. The data cover 160 countries across all geographic regions for the 2013–19 period. The sample is restricted to countries with populations greater than 1 million. Population data are from the WDI database. To empirically assess if Armenia is under-exporting, we use a PPML estimator to estimate the following gravity equation:

$$\begin{aligned}
 X_{ijt}^{Industry} = \exp & \left(\beta_1 \ln(1 + tariff_{ijt}) + \beta_2 RTA_{ijt} + \beta_3 \ln(Dist_{ij}) + \beta_4 Contig_{ij} \right. \\
 & + \beta_5 Lang_{ij} + \beta_6 Colony_{ij} + \beta_7 \ln(GDP_{it}) + \beta_8 \ln(GDP_{jt}) \\
 & + \beta_9 Resource Rich_i + \beta_{10} Resource Rich_j + \beta_{11} \ln(Rem Exp_{it}) \\
 & + \beta_{12} \ln(Rem Imp_{jt}) + \beta_{13} \ln\left(\frac{K_{it}}{L_{it}}\right) + \beta_{14} \ln\left(\frac{K_{jt}}{L_{jt}}\right) \\
 & \left. + \beta_{15} \ln(GDPpc_{it}) + \beta_{16} \ln(GDPpc_{jt}) \right) + \varepsilon_{ijt}
 \end{aligned} \quad (1)$$

where $X_{ijt}^{Industry}$ is the bilateral trade flow from country j to country i in a specific industry, $tariff_{ijt}$ are bilateral applied tariff duties, RTA_{ijt} comes from Mario Larch's Regional Trade Agreements Database from Egger and Larch (2008) and is an indicator variable that takes value of 1 if i and j have a trade agreement in year t , $Dist_{ij}$ is the geographical distance between i and j , $Contig_{ij}$ is a variable that takes value of 1 for country-pairs that share a border, $Lang_{ij}$ is a binary variable equal to 1 if i and j share the same language, and $Colony_{ij}$ captures the presence of any colonial ties. Bilateral tariff duties are from the Market Access Map (MAcMap) database, while all the other variables come from CEPII's gravity database.

Other control variables such as exporters' and importers' GDPs as well as per capita GDPs are from the WDI. Finally, we control for a dummy of mineral resources, which is equal to 1 if mineral exceeds 10 percent of GDP for the 2013–19 period, and capital per worker (Chor 2010; Romalis 2004) by extending the Eaton and Kortum (2002). We construct variables for capital stock per worker based on data from the Penn World Tables 9.1 following work by Levchenko and Zhang (2014). To control for the unobservable multilateral resistance terms, we construct "remoteness indexes" (Baier and Bergstrand 2007; Wei 1996) the gravity equation has been a workhorse for cross-country empirical analyses of international trade flows and, in particular, the effects of free trade agreements (FTAs instead of using exporter-year and importer-year fixed effects.²⁶

23 Based on Mulabdic and Yasar (2021) and World Bank (2022).

24 Our estimates are slightly different from Mulabdic and Yasar (2021) as our sample is restricted to the pre-COVID period. In addition, Mulabdic and Yasar (2021) used simple average tariffs in their estimation, while our model uses weighted average tariffs at the exporter-importer level.

25 See Mulabdic and Yasar (2021). The index is defined as $Export\ Potential\ Index_{i,t} = \left(\frac{\sum_j \hat{X}_{ijt} - \sum_j X_{ijt}}{\sum_j \hat{X}_{ijt} + \sum_j X_{ijt}} \right) * 100$, where X_{ijt} are observed exports from country i to j , while \hat{X}_{ijt} are the predicted flows based on a gravity model.

26 See Mulabdic and Yasar (2021) for details.

Appendix B

Armenia New Quantitative Trade Model (NQTM) Simulations

Model description

The model used in the main text is described in full in Shepherd (2022). It is closely based on Aichele and Heiland (2018), which in turn is based on Caliendo and Parro (2015). As such, it falls into the family of NQTMs analyzed by Ottaviano (2015) and Costinot and Rodriguez-Clare (2014). These models are general equilibrium models of global trade, with many sectors and input-output relationships among them. As such, they can provide insight into the counterfactual implications of trade policy changes both at a micro level (disaggregated trade flows) and at the level of the aggregate macroeconomy.

Bekkers (2017) argues that traditional computable general equilibrium (CGE) models have benefits relative to NQTMs in that their assumptions are more complex and thereby arguably incorporate greater realism. For instance, CGE models typically include different import demand shares by end user, incorporation of savings and investment decisions through a capital market, possible inclusion of non-homothetic preferences, more flexible substitution elasticities among intermediates and factors of production, and a variety of policy measures in addition to tariffs and non-tariff measures with a well-defined ad valorem equivalent.

In contrast, Costinot and Rodriguez-Clare (2014) and Ottaviano (2015) highlight a number of potential benefits of NQTMs relative to traditional CGE models. First, they use standard trade theories that move beyond the Armington assumption of country-level differentiation and which are easily recognizable without specialized training to any reader proficient in graduate-level international trade. Second, there are fewer parameters for which estimated or assumed values are required. In this model, there is only one parameter per sector, compared to tens of thousands in some CGE implementations. Third, the connection between theory and data is tighter because parameters can be estimated directly from the same source data used for simulation. Fourth, bilateral trade is governed by a structural gravity model, which is universally recognized as the empirical workhorse of international trade (for example, Head and Mayer 2014). On top of the advantages highlighted by those authors can be added high-level peer review: NQTMs have been published in “top 5” economics journals and the Journal of International Economics, which is not true of GTAP-style CGE models.

The NQTM used in the main text is regarded as state of the art in the academic literature. However, there is as yet no empirical differentiation between the outputs of CGE models and NQTMs.

The remainder of this Appendix outlines the main characteristics of the model, in particular its incorporation of GVCs.

Consumption side

The consumption side of the model comes from Caliendo and Parro (2015). A measure L_n of representative households in N countries (subscript) maximize Cobb-Douglas utility by consuming final goods in J sectors (superscript), with consumption shares α_n^j summing to unity.

$$(1) u(C_n) = \prod_{j=1}^J (C_n^j)^{\alpha_n^j}$$

Production Side

The production side of the model also comes from Caliendo and Parro (2015) via Aichele and Heiland (2018), which can be seen as a multi-sector generalization of Eaton and Kortum (2002). As in Aichele and Heiland (2018), there is provision for different shares in intermediate and final consumption.

Each sector produces a continuum of intermediate goods $\omega^j \in [0,1]$. Each intermediate good uses labor and composite intermediate goods from all sectors. Intermediate goods producers have production technology as follows:

$$(2) q_n^j(\omega^j) = z_n^j(\omega^j) [l_n(\omega^j)]^{\beta_n^j} \prod_{k=1}^J [m_n^{k,j}(\omega^j)]^{\gamma_n^{k,j}}$$

where $z_n^j(\omega^j)$ is the efficiency of producing intermediate good ω^j in country n , $l_n(\omega^j)$ is labor, $m_n^{k,j}(\omega^j)$ are the composite intermediate goods from sector k used for the production of intermediate good ω^j , β_n^j is the cost share of labor, and $(1 - \beta_n^j) \gamma_n^{k,j}$ is the cost share of intermediates from sector k used in the production of intermediate good ω^j , with $\sum_{k=1}^J \gamma_n^{k,j} = 1$.

Production of intermediate goods exhibits constant returns to scale with perfect competition, so firms price at marginal cost. The cost of an input bundle can therefore be written as follows:

$$(3) c_n^j = Y_n^j w_n^{\beta_n^j} \left(\prod_{k=1}^J (P_n^{k,m})^{\gamma_n^{k,j}} \right)^{1-\beta_n^j}$$

where $P_n^{k,m}$ is the price of a composite intermediate good from sector k , w is the wage, and Y_n^j is a constant.

Producers of composite intermediate goods in country n and sector j supply their output at minimum cost by purchasing intermediates from the lowest-cost suppliers across countries, similar to the mechanism in the single sector model of Eaton and Kortum (2002).

Composite intermediate goods from sector j are used in the production of intermediate good in amount $m_n^{j,k}(\omega^k)$ in all sectors k , as well as final goods in consumption C_n^j . The composite intermediate is produced using CES technology:

$$(4) Q_n^j = \left[\int r_n^j(\omega^j)^{1-\frac{1}{\sigma^j}} d\omega^j \right]^{\frac{\sigma^j}{\sigma^j-1}}$$

where r is demand from the lowest cost supplier, and σ is the elasticity of substitution across intermediate goods within a sector.

Solving the producer's problem gives an expression for demand:

$$(5) r_n^j(\omega^j) = \left(\frac{p_n(\omega^j)}{P_n^j} \right)^{-\sigma^j} Q_n^j$$

where $p_n(\omega^j)$ is the lowest price of a given intermediate good across countries, and $P_n^j = \left[\int p_n(\omega^j)^{1-\sigma^j} d\omega^j \right]^{\frac{1}{1-\sigma^j}}$ is the CES price index.

Trade costs and equilibrium

Trade costs consist of tariff and NTM components as in Aichele and Heiland (2018), in the standard iceberg formulation for imports by country n from country i , with trade costs potentially differing by end use (intermediate, m , or final, f):

$$(6) \kappa_{ni}^{jv} = (1 + t_{ni}^{jv}) * \tilde{t}_{ni}^{jv}, v \in (m, f)$$

where t is the ad valorem tariff, and \tilde{t} is NTM-related trade costs, including potential policy measures as well as geographical and historical factors that drive a wedge between producer prices in the exporting country and consumer

prices in the importing country (Anderson and Van Wincoop 2004). Unlike in Caliendo and Parro (2015), we assume that all sectors are tradable; this assumption accords with the reality in our data, where sectors are sufficiently aggregate that trade always takes place, at least to some degree.

With this definition of trade costs, the price of a given intermediate good in country n is:

$$(7) p_n^j(\omega^j) = \min_i \frac{c_i^j \kappa_{ni}^{jm}}{z_i^j(\omega^j)}$$

As in Eaton and Kortum (2002), the efficiency of producing ω^j in country n is the realization of a Fréchet distribution with location parameter $\lambda_n^j \geq 0$ and shape parameter $\theta^j > \sigma^j - 1$. The intermediate price index can therefore be rewritten as:

$$(8) P_n^{jm} = A^j \left[\sum_{i=1}^N \lambda_i^j (c_i^j \kappa_{ni}^{jm})^{-\theta^j} \right]^{-\frac{1}{\theta^j}}$$

where A^j is a constant.

Then from the utility function, prices are:

$$(9) P_n^f = \prod_{j=1}^N \left(\frac{P_n^{jf}}{\alpha_n^j} \right)^{\alpha_n^j}$$

Bringing together these ingredients gives a relationship for bilateral trade at the sector level that follows the general form of structural gravity, but developed in an explicitly multi-sectoral framework and with different relations for intermediate and final consumption:

$$(10) \pi_{ni}^{jv} = \frac{X_{ni}^{jv}}{X_n^{jv}} = \frac{\lambda_i^j [c_i^j \kappa_{ni}^{jv}]^{-\theta^j}}{\sum_{h=1}^N \lambda_h^j [c_h^j \kappa_{nh}^{jv}]^{-\theta^j}}$$

For analytical purposes, a key feature of the gravity model in equation 10 is that the unit costs term depends through equation 3 on trade costs in all sectors and countries. This result is an extension of the multilateral resistance reasoning in Anderson and Van Wincoop (2003) to the case of cross-sectoral linkages.

Goods market equilibrium is defined as follows, where Y is the gross value of production:

$$(11) Y_n^j = \sum_{i=1}^N \frac{\pi_{in}^{jm}}{1 + t_{in}^{jm}} X_i^{jm} + \sum_{i=1}^N \frac{\pi_{in}^{jf}}{1 + t_{in}^{jf}} X_i^{jf}$$

with:

$$(11) X_n^{jm} = \sum_{k=1}^J \frac{\pi_{in}^{jm}}{1 + t_{in}^{jm}} \gamma_h^{j,k} (1 - \beta_h^k) Y_h^k$$

$$(12) X_n^{jf} = \alpha_n^j I_n$$

National income is the sum of labor income, tariff rebates, and the exogenous trade deficit:

$$(12) I_n = w_n L_n + R_n + D_n$$

The model is then closed by setting income equal to expenditure:

$$(13) \sum_{j=1}^J X_n^{jm} \sum_{i=1}^N \frac{\pi_{ni}^{jm}}{1+t_{ni}^{jm}} + \sum_{j=1}^J X_n^{jf} \sum_{i=1}^N \frac{\pi_{ni}^{jf}}{1+t_{ni}^{jf}} - D_n = \sum_{j=1}^J Y_n^j$$

where I represents final absorption as the sum of labor income, tariff revenue, and the trade deficit; R is tariff revenue; and trade deficits sum to zero globally and to an exogenous constant nationally. So aggregate trade deficits are exogenous, but sectoral deficits are endogenous.

Caliendo and Parro (2015) show that the system defined by equations 3, 8, 10, 11, and 13 can be solved for equilibrium wages and prices, given tariffs and structural parameters.

Counterfactual simulation

Using exact hat algebra (Dekle et al. 2007), it is simpler to solve the model in relative changes than in levels. This process is equivalent to performing a counterfactual simulation in which a baseline variable is shocked to a counterfactual value v' , and the relative change is defined as $\hat{v} = \frac{v'}{v}$. Aichele and Heiland (2018) show that counterfactual changes in input costs are given by:

$$(14) \hat{c}_n^j = \hat{w}_n^{\beta_n^j} \left(\prod_{k=1}^J \hat{p}_n^{k_m} \gamma_n^{k,j} \right)^{1-\beta_n^j}$$

The change in the price index is:

$$(15) \hat{p}_n^{jv} = \left[\prod_{i=1}^N \pi_{ni}^{jv} [\hat{k}_{ni}^{jv} \hat{c}_i^j]^{-\theta^j} \right]^{-\frac{1}{\theta^j}}$$

The change in the bilateral trade share is:

$$(16) \hat{\pi}_{ni}^{jv} = \left[\frac{\hat{k}_{ni}^{jv} \hat{c}_i^j}{\hat{p}_n^{jv}} \right]^{-\theta^j}$$

Counterfactual intermediate goods and final goods expenditure are given by:

$$(17) X_n^{jm'} = \sum_{k=1}^N \gamma_n^{j,k} (1 - \beta_n^k) \left(\sum_{i=1}^N X_i^{km'} \frac{\pi_{in}^{km'}}{1+t_{in}^{km'}} + X_i^{kf'} \frac{\pi_{in}^{kf'}}{1+t_{in}^{kf'}} \right)$$

with:

$$(18) X_n^{jf'} = \alpha_n^j I_n'$$

$$(19) I_n' = \hat{w}_n w_n L_n + \sum_{j=1}^J X_n^{jm'} (1 - F_n^{jm'}) + \sum_{j=1}^J X_n^{jf'} (1 - F_n^{jf'}) + D_n$$

The trade balance condition requires:

$$(20) \sum_{j=1}^J F_n^{jm'} X_n^{jm'} + \sum_{j=1}^J F_n^{jf'} X_n^{jf'} - D_n = \sum_{j=1}^J \sum_{i=1}^N X_i^{jm'} \frac{\pi_{in}^{jm'}}{1+t_{in}^{jm'}} + \sum_{j=1}^J \sum_{i=1}^N X_i^{jf'} \frac{\pi_{in}^{jf'}}{1+t_{in}^{jf'}}$$

The change in welfare is given by the change in real income:

$$\widehat{W}_n = \frac{\widehat{I}_n}{\prod_{j=1}^J (\widehat{p}_n^{jf})^{\alpha_n^j}}$$

The relative change in trade costs is given by the definition of the counterfactual simulation, and in our specification can cover NTMs as well as tariffs. Solving the model using exact hat algebra makes it possible to conduct the counterfactual experiment without data on productivity and, importantly, without trade costs data other than those that are being simulated. Due to the multiplicative form of iceberg trade costs, solution in relative changes means that trade cost components such as geographical and historical factors, which are constant in the baseline and counterfactual, simply cancel out. The parameters β_n^j (cost share of labor), $(1 - \beta_n^j)\gamma_n^{k,j}$ (cost share of intermediates), and α_n^j (share of each sector in final demand) can be calibrated directly from the baseline data, as can value added ($w_n L_n$). Egger et al. (2018) provide updated estimates of the trade elasticity θ^j at the same level of disaggregation used in our data.

Caliendo and Parro (2015) develop an iterative procedure for solving the model, which we follow here in the modified version developed by Aichele and Heiland (2018).

For tariffs, counterfactual simulation is straightforward and uses only baseline and counterfactual tariff rates. For implementation of the trade facilitation agreement, we concord sectoral semi-elasticities from Shepherd (2022) and code full implementation of the agreement as an OECD Trade Facilitation Indicators score of 2.00.

Trade in value added

We follow Aichele and Heiland (2018) in extending the Caliendo and Parro (2015) framework to consider value added trade, which helps identify the proportion of gross value trade that is considered to take place within GVCs. We differ from them, however, in the concept of value added trade that we use. They use Johnson and Noguera (2012) and Koopman et al. (2014), but as Wang et al. (2013) point out, the measures derived in those papers only provide consistent results at an aggregate level. We are interested in a bilateral and sectoral disaggregation, so we follow the same basic approach of Aichele and Heiland (2018) but then apply the key result from Wang et al. (2013) when it comes time to decompose gross value trade into its value added components.

Given the model setup described in the previous subsection, Aichele and Heiland (2018) derive input-output coefficients as follows:

$$(20) \quad (1 + t_{ih}^{km}) a_{ih}^{k,j} = \pi_{ih}^{km} (1 - \beta_h^j) \gamma_h^{k,j}$$

where a is the input-output coefficient, and $(1 - \beta_h^j) \gamma_h^{k,j}$ is the cost share of intermediates from sector k .

Equation (20) makes clear that if the model dataset includes a baseline input-output table (A) as is necessary, then it is straightforward to calculate a counterfactual input-output matrix (A') using the outputs of the counterfactual solution defined above.

Wang et al. (2013) show that gross exports can then be fully and consistently decomposed into value added components at the bilateral level as follows (with sectoral superscripts suppressed for readability):

$$(21) \quad \pi_{ni}^j = DVA + FVA + PDC$$

$$DVA = (V^i B^{ii})' * Y^{ni} + (V^i L^{ii})' * (A^{ni} B^{nn} Y^{nn})$$

$$+ (V^i L^{ii})' * \left[A^{ni} \sum_{h \neq n, i}^N B^{hn} Y^{hh} + A^{ni} B^{nn} \sum_{h \neq n, i}^N Y^{hn} + A^{ni} \sum_{h \neq n, i}^N B^{hn} \sum_{k \neq n, i}^N Y^{kh} \right]$$

$$\begin{aligned}
 & +(V^i L^{ii})' * \left[A^{ni} B^{nn} Y^{in} + A^{ni} \sum_{h \neq n, i}^N B^{hn} Y^{ih} + A^{ni} B^{in} Y^{ii} \right] \\
 FVA &= (V^n B^{in})' * Y^{ni} + \left[\left(\sum_{h \neq n, i}^N V^h B^{ih} \right)' * Y^{ni} \right] \\
 & +(V^n B^{in})' * (A^{ni} L^{nn} Y^{nn}) + \left(\sum_{h \neq n, i}^N V^h B^{ih} \right)' * (A^{ni} L^{nn} Y^{nn}) \\
 PDC &= (V^i L^{ii})' * \left(A^{ni} B^{in} \sum_{h \neq n, i}^N Y^{hi} \right) + \left(V^i L^{ii} \sum_{h \neq n, i}^N A^{hi} B^{ih} \right)' * (A^{ni} X^n) \\
 & +(V^n B^{in})' * (A^{ni} L^{nn} E^{n*}) + \left(\sum_{h \neq n, i}^N V^h B^{ih} \right)' * (A^{ni} L^{nn} E^{n*})
 \end{aligned}$$

where E is exports to country n from country i, with a star indicating a country total across all other partners; Y is final demand for country i's output in country n; and DVA, FVA, and PDC are domestic value added, foreign value added, and pure double counting, respectively. A is an input-output matrix, with superscripts used to define sub-matrices by country pair. B is the global Leontief inverse based on A, with superscripts again indicating sub-matrices. V is the matrix of value added shares, calculated directly from A. Y is the matrix of final demand. X is the vector of gross output by country. L is the local Leontief inverse, defined as follows for the three country case (n, i, and k):

$$L = \begin{bmatrix} B_{11}^{nn} & B_{12}^{nn} & 0 & 0 & 0 & 0 \\ B_{21}^{nn} & B_{22}^{nn} & 0 & 0 & 0 & 0 \\ 0 & 0 & B_{11}^{ii} & B_{12}^{ii} & 0 & 0 \\ 0 & 0 & B_{21}^{ii} & B_{22}^{ii} & 0 & 0 \\ 0 & 0 & 0 & 0 & B_{11}^{kk} & B_{12}^{kk} \\ 0 & 0 & 0 & 0 & B_{21}^{kk} & B_{22}^{kk} \end{bmatrix}$$

The above presentation is at the country pair level for simplicity, but Wang et al. (2013) show that it can be extended to the sectoral level. The decomposition can therefore show DVA, FVA, and PDC in, for example, China's exports of electrical equipment to the United States. The sum of FVA and PDC is typically understood as a measure of production sharing, and we adopt that interpretation here.

Our approach to analyzing value added trade is straightforward. The Wang et al. (2013) decomposition for the baseline case can be calculated directly from the observed input-output table. We then use A' as calculated above to conduct a second decomposition for the counterfactual input-output table. The difference between the two shows the extent of changes in GVC trade as a result of the change in trade costs assumed for the counterfactual.

Data

Tariff data come from TRAINS, for baseline year 2021. The remaining data come from the Eora MRIO Table. Trade elasticities come from Egger et al. (2018), concorded to Eora sectors. Elasticities of bilateral trade with respect to trade facilitation performance come from Shepherd (2022).

Appendix C

Table C1: Growth in national supply and international demand for products exported by Armenia in 2022

Product name	Net exporter	Annual growth in % (2018-2022)	Annual growth of world imports in % (2018-2022)	Share in world exports (%)
Precious metals and stones	yes	23	11	0.1
Commodities not elsewhere specified	yes	4	6	0.1
Electrical machinery and equipment	no	96	7	0
Beverages, spirits, and vinegar	yes	9	5	0.2
Tobacco and manufactured tobacco substitutes	yes	4	-2	0.9
Vehicles, and parts and accessories thereof	no	77	1	0
Iron and steel	yes	19	10	0
Ores, slag, and ash	yes	122	14	0.1
Machinery and mechanical appliances	no	55	4	0
Aluminum and articles thereof	no	12	10	0.1
Apparels, not knitted or crocheted	yes	-2	1	0.1
Fresh fish	yes	50	4	0.1
Optical or surgical instruments	no	30	4	0
Vegetable preparations	yes	32	5	0.1
Edible vegetables and tubers	yes	26	5	0.1
Edible fruit and nuts	no	29	4	0
Apparels, knitted or crocheted	no	2	5	0
Plastics and articles thereof	no	29	7	0
Dairy produce, birds' eggs, natural honey	no	36	6	0
Pharmaceutical products	no	5	11	0
Prepared animal fodder	no	413	10	0
Miscellaneous edible preparations	no	59	9	0
Rubber and articles thereof	no	85	6	0
Coffee, tea, mate, and spices	no	47	9	0
Cocoa and cocoa preparations	no	6	4	0
Glass and glassware	no	16	5	0
Copper and articles thereof	yes	20	11	0
Furniture	no	-3	5	0
Live animals	yes	70	2	0.1
Live trees, cut flowers	no	13	5	0.1

Source: International Trade Centre.

