



Measuring servicification and impacts of services trade and policy

Technical cooperation outcome



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This publication has not been formally edited.

UNCTAD/TCS/DITC/INF/2026/8

Acknowledgements

This report was prepared, under the guidance of Luz Maria de la Mora, Director of the UNCTAD Division on International Trade and Commodities, by a team comprising Dong Wu, Katalin Bokor, Peter Lunenborg and Hugo Poichotte (intern). Anu Peltola and Graham Mott provided valuable inputs and feedback.

UNCTAD gratefully acknowledges the contributions of Bernard Hoekman, Professor and Director, Global Economics, Robert Schuman Centre for Advanced Studies, European University Institute, and Ben Shepherd, independent consultant.

UNCTAD further gratefully acknowledges comments and feedback on the draft from external reviewers, including Mahinthan J. Mariasingham (Asian Development Bank), Benjamin Kwasi Addom (Commonwealth Secretariat), Romina Gayá (Inter-American Development Bank) and Ingo Borchert (University of Sussex Business School).

Cover design and desktop publishing were undertaken by the UNCTAD Communication and External Relations Section.

UNCTAD extends its appreciation to China for the financial support provided.



Abbreviations and acronyms

BaTIS	Balanced Trade in Services dataset (WTO-OECD)
BOP	balance of payments
CIT	corporate income tax
DESTA	Design of Trade Agreements database
DTRI	digital trade restrictiveness index
DTIP	Digital Trade Integration Project
EBOPS	extended balance of payments services classification
FATS	foreign affiliate trade in services
FDI	foreign direct investment
GATS	General Agreement on Trade in Services
GDP	gross domestic product
GVC	global value chain
ICT	information and communications technologies
IMF	International Monetary Fund
IPUMS	Integrated Public Use Microdata Series
ISIC	International Standard Industrial Classification
ITPD-E	International Trade and Production Database for Estimation
LDCs	least developed countries
MNE	multinational enterprise
NSO	national statistical office
OECD	Organisation for Economic Co-operation and Development
SIDS	small island developing States
STPD	Services Trade Policy Database (World Bank and WTO)
STRI	services trade restrictions indicator
TISMOS	Trade in Services by Mode of Supply dataset (WTO)
TiVA	trade in value added
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
VAT	value added tax
WBES	World Bank Enterprise Surveys
WTO	World Trade Organization



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Executive summary

Services trade and the wider services economy play an increasingly important role in employment creation, economic diversification and growth. Governments concerned with policies that support employment creation and economic growth need to understand the impact of services trade policies and domestic regulation on firm-, sector- and economy-wide economic performance. This calls for data on pertinent policies and on outcome variables of interest – such as investment, trade, value added and employment. The core challenge addressed by this paper is how developing countries can identify, access and use existing national data sources, including administrative data, to assess the role of services and services trade in their economies and inform policy decisions.

The paper complements the 2025 UNCTAD *Primer on data for trade in services and development policies*, which provides a guide to international sources of information on trade in services. Building on that, this report discusses complementarities between international and national data sources, with a specific focus on using national sources, including administrative data, to assess the role of services and services trade in developing economies.

This report's key message is that, despite data and capacity constraints, national administrative datasets often exist and can be used for policy-relevant analysis. For many types of policy analysis, international statistics on trade in services must be complemented with national economic information and administrative microdata. These data sources permit analysis of more granular development-related indicators of interest to policymakers.

Although data availability remains a serious constraint for research on services trade and policy, and the services economy, stakeholders involved in trade in services data production, analysis and policy could do more to exploit existing national data sources. Censuses, business surveys and tax records increasingly provide information on services firms, wider economic links, and sectoral trajectories.

This report makes several recommendations for governments and development partners to enhance the use of national data sources for trade in services research. As an initial step, countries are encouraged to conduct an audit of extant data sources that potentially cover or relate to services firms and services activity. The purpose of the audits is to help countries identify opportunities to improve data collection from services firms covered by existing instruments, and develop new instruments based on best practice in other countries.

To allow existing datasets to be used by analysts, access to existing administrative datasets should be facilitated to the maximum extent possible, while managing confidentiality concerns. Services research can often be strengthened by linking datasets using common identifiers, with anonymization to preserve privacy or commercially sensitive information.

Developing countries face significant technical and administrative constraints, including capacity to undertake data anonymization, link datasets, establish data-sharing arrangements, and provide access to analysts. However, these constraints can be surmounted, as illustrated by Rwanda and Uganda which have put in place data interconnectivity enabling policy-relevant research.

Development partners can support national initiatives to build capacity in statistics related to services firms and trade in services. This can include governance frameworks for data-sharing, and manuals of best practice for managing national data sources that relate to services firms and services trade. South-South exchanges and stronger protocols for data access, privacy and confidentiality can help countries establish a more open ecosystem for microdata-based research on trade in services.





Chapter I

Introduction





Introduction

Services account for an increasing share of Gross Domestic Product (GDP) and employment in both developed and developing economies. A key feature of this phenomenon, sometimes termed servicification, is that it cuts across all the sectors conventionally defined in the national accounts, including agriculture, natural resource extraction and processing, manufacturing, commercial services and government activities. At the level of the firm, servicification is reflected in increasing use of services as inputs into production as well as a rising share of services in total sales.

Servicification is being accelerated by the rapid development and application of digital technologies such as artificial intelligence, machine learning, automated software and data analytics, with digital innovations and accompanying changes in business models changing how value is generated in the economy. In the process, technology is blurring the boundaries between goods and services.¹ These trends are influenced by trade and regulatory policies that affect the operation of services sectors and the ability and costs for firms, workers and households to access and provide services to each other and to trade services, whether directly or indirectly. Such policies include the regulatory regime that applies to domestic provision of services, inward foreign direct investment and to cross-border trade.

Designing policies that support employment creation and economic growth requires a clear understanding of the impact of services trade policies and domestic regulation on firm-, sector- and economy-wide economic performance.

This calls for data on pertinent policies and on outcome variables of interest – such as investment, sales, value added and employment of firms across different sectors. The latter may include levels and growth in gross exports and foreign exchange earnings, diversification of trade, entry and exit of firms. They may also include trade in intermediate products and participation in global value chains (GVCs), flows of inward foreign direct investment (FDI), forward and backward linkages between domestic firms and foreign-owned firms, domestic value added in exports. A further set of outcome variables of interest relates to employment by sector, skill composition of the workforce employed in firms or sectors, real wages, labour productivity and value added per worker. All these measures will affect economy-wide growth performance.

This paper examines how services-related policies and performance can be analysed using different data sources, with a particular focus on the role of national data in informing policy decisions. This paper briefly revisits the role of services in the economy and economic development, and discusses existing research that analyses services-related performance metrics and the effects of applied policies on a range of outcomes that are of interest from a development perspective. The paper complements discussions at UNCTAD's informal working group on data for services, trade and development policies² and the *Primer on data for trade in services and development policies*, which focuses on international services data sources.

¹ Servicification is distinct from a process that is sometimes called servitization, which is used to describe a bundling of goods and services in the sales (revenues) of companies. The business strategy literature defines servitization as the incorporation of services in goods and a shift to more service-centric business models, making the value of a manufactured product a function of accompanying bundled services.

² See UNCTAD, 2025, Report of the informal working group on data for services, trade and development policies, available at https://unctad.org/system/files/information-document/tsce-wg2024-4_report_en.pdf

This paper looks at complementarities between international and national sources, and discusses how to make the best use of data that already exist, as well as collecting new data at the national level.

To this end, this paper provides a selective discussion and presentation of analysis and ongoing research to illustrate how different data sources – both international and national – can be used to assess the effects of policy and policy changes for a given country. Such data sources include national balance of payments – payments for current transactions and for foreign investment; national accounts, input-output tables, multi-regional input-output datasets; sectoral measures of services input intensity, indirect services exports, trade in value added; national census data, firm-level information (sales, sector of activity, location), and household-level information (employment, gender, location); national foreign direct investment data; enterprise surveys; labour market surveys; geo-localized data for economic actors and activity; corporate income tax data and transactions between firms operating in the economy derived from indirect taxation (value added taxes or VAT).

Cross-country comparable information on services trade-related policies has been compiled by the World Bank, the World Trade Organization (WTO) and the Organisation for Economic Co-operation and Development (OECD). This has been complemented by initiatives to compile information on policies affecting digital trade, measures of FDI policy and the content of preferential and multilateral trade and investment agreements. Combined with data on outcomes of policy interest, such as domestic value added, employment and productivity, these datasets permit empirical analysis of the effects of policies and, more generally, of the role of services.

The paper is organized as follows. Section 2 briefly reviews the role of services in economic development. Section 3 reviews the channels through which trade in services can affect economic performance. Section 4 summarizes recent international efforts to develop datasets with information on applied services trade policies. Section 5 discusses national data sources that can be used to analyse services-related performance and the effects of policies. While not all these types of data may be available for a given country, in many countries national datasets can be used for trade analysis, complementing analysis of country-level trade performance based on the international data sources discussed in the UNCTAD *Primer on data for trade in services and development policies* (UNCTAD, 2025). Section 6 presents examples of research that used national datasets, highlighting their utility from the perspective of informing policy. Section 7 concludes.

The paper is intended to provide both ideas and resources for researchers and analysts, and to support policymakers and administrators in ongoing efforts to make better use of existing data. There are synergies between these two objectives. In many countries, data quality and quantity remain a serious constraint on policy research, but it may also be the case that there is much more analysts could do with national administrative datasets if these are made available for research purposes.





Chapter II

Services, trade, and economic development





Services, trade, and economic development

Services are central to economic activity, employment and productivity, both as an output and as an input into every other sector, including agriculture and manufacturing. Services already account for more than half of economic activity in developing economies, and for more than half of both economic activity and employment in small island developing States. Trade in services, and trade in digitally deliverable services have been growing faster than trade in goods in the last decade. Services also account for more than 75 per cent of total outward FDI in countries with available data, reflecting the close link between services trade and investment.

This section provides the context for the remainder of the paper by tracing the links between services and economic development. It then moves on to look at trade specifically.

As per capita incomes increase, demand shifts in relative terms towards services, producing a positive correlation between the level of economic development and both the share of services in GDP and in total employment. This structural change involves the movement of people and resources out of agriculture and into both commercial services and manufacturing. The tendency for economic activity and employment to shift towards services as countries develop is well documented empirically since Kuznets (1957). In developed economies, services sectors account for roughly 70 per cent of GDP and a similar share of total employment. Services already account for more than half of economic activity in developing economies and more than half for both economic activity and employment in small island developing States (SIDS) (Figure 1).

The economic significance of services goes well beyond their directly measured share of output and employment. Many services sectors (finance, insurance, telecommunications, transport, and logistics) function as inputs into production in every other sector of the economy. Some play a central coordinating role in complex production arrangements, including the operation of cross-border supply chains. Others, such as consulting and accounting services, serve as channels for the dissemination of knowledge about new techniques and best practices (Francois and Hoekman, 2010). Services account for 30-35 per cent of value added in industry and 20 per cent in agriculture, based on OECD trade in value added (TiVA) estimates according to latest data. As a result, the performance of services sectors is a major determinant of competitiveness and productivity in the rest of the economy, not only in services themselves (e.g., Nayyar, Hallward-Driemeier and Davies, 2021).

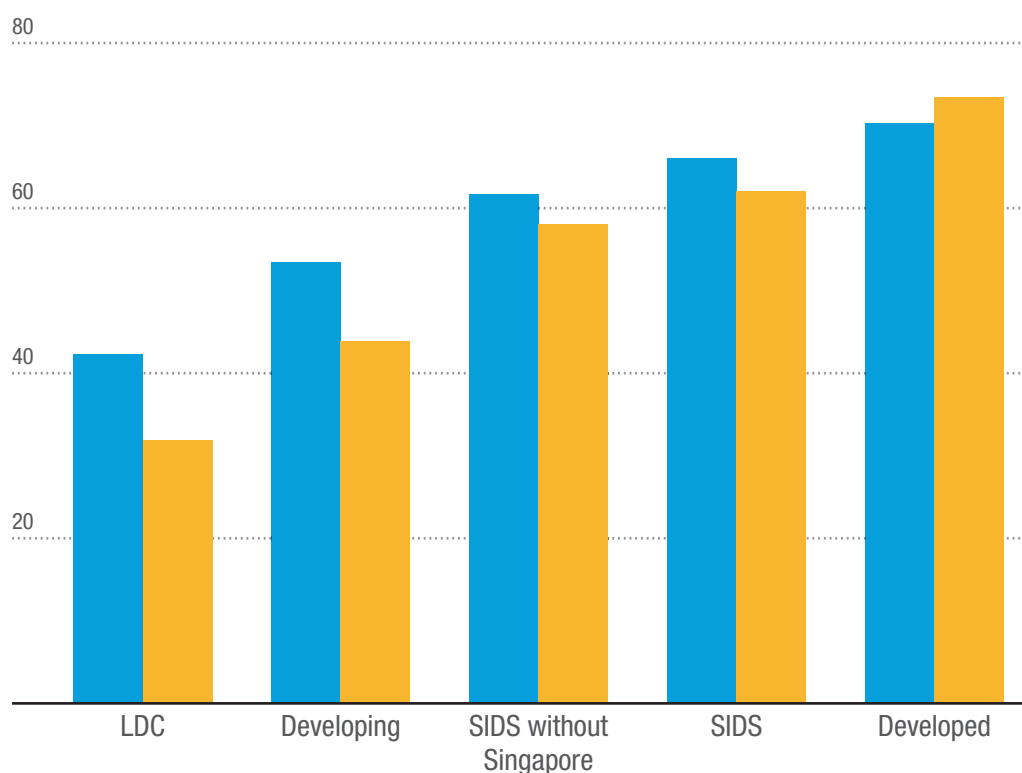


**Figure 1**

Services already account for more than half of economic activity in developing countries, and almost half of employment

Economic importance of services by country groups, per cent of total, 2021

■ Value added (% of GDP) ■ Employment (% of total)



Source: UNCTAD based on World Development Indicators. Country groupings are based on UNCTAD classifications.

Note: 2021 is the latest available year with data for all categories.

Services are traded both directly and indirectly. Direct trade takes place through the four modes of supply identified in the WTO General Agreement on Trade in Services (GATS): pure cross-border supply (Mode 1), temporary movement of the consumer to the location of the supplier (Mode 2), establishment of a commercial presence in the importing country through a foreign affiliate (Mode 3), and temporary movement of the service provider to the location of the consumer (Mode 4). The relative importance of these modes of

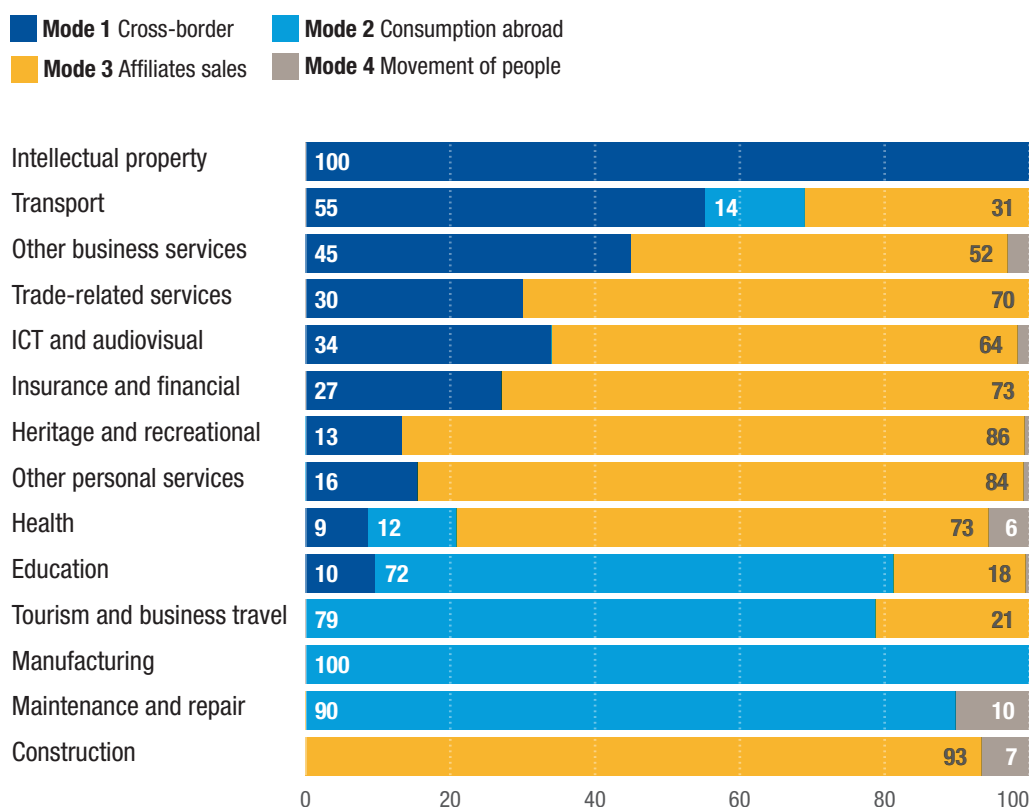
supply varies significantly across types of services (Figure 2). Before the GATS entered into force, economists commonly treated most services as non-tradable—unable to be exchanged across borders. The GATS framework made clear that virtually all services are tradable in principle through at least one mode of supply. A service may be infrequently traded because the cost of doing so is high relative to the value of the service, but that implies small trade values, not necessarily zero trade.



**Figure 2**

The relative importance of modes of supply varies significantly across services categories

Modes of supply by services category, 2022



Source: UNCTAD based on Trade in Services by Mode of Supply dataset (WTO TISMOS).

In addition to direct trade, services are also traded indirectly, embodied as inputs in traded goods and other services.³ In a world of global value chains, production is fragmented across firms and countries, combining goods and services components at each stage. As a result, every traded good embodies services value added—from design and engineering to logistics and quality assurance—that is indirectly exported by services sectors.

The large and growing role of services in economic activity implies that the agenda for raising national productivity and creating employment opportunities is now in large part a services agenda. The quantitative significance of this relationship is clear from

firm-level evidence: importing intermediate services has been found to account for a meaningful share of total labour productivity growth over multi-year periods (e.g., Amiti and Wei, 2009). The mechanism operates through the availability of higher-quality and lower-cost service inputs that improve the efficiency of downstream production.

The contribution of services to economy-wide productivity extends well beyond this direct channel, because many services sectors are strongly linked to other parts of the economy, particularly at the local level through industrial clusters (Gorg and Jabbour, 2016). Firm-level research demonstrates that productivity spillovers occur from services to other sectors,

³ The importance of indirect trade in services, where services are embodied in goods, has been emphasized in the economic policy literature for many years. See e.g., Grubel (1987).



including manufacturing (Hoekman and Shepherd, 2017). These inter-sectoral linkages imply that improvements in services sector productivity translate into productivity gains across the wider economy. The direct contribution of services to aggregate productivity is therefore a lower bound on the true contribution once spillovers are taken into account.

The importance of services to long-run productivity growth has deep roots in economic theory. The canonical endogenous growth model (Romer, 1990) identifies an innovation-producing sector—one that generates the knowledge and plans on which output growth depends—as the engine of long-run productivity advancement. If this model is overlaid on real-world industry classifications, the innovation-producing sector corresponds directly to services activities: research and development, engineering, consulting, and related knowledge-intensive functions.⁴ This framework, which forms an important strand of economic thinking about long-run growth, implicitly assigns a central productivity-enhancing role to services, even without naming the sector as such.⁵

Figure 3 traces the recent history of services labour productivity by country groups between 2000 and 2024. The figure shows a steady increase in services productivity in developing economies, contributing to a gradual narrowing of the gap with developed economies. However, developed economies continue to record substantially higher productivity levels throughout the period. Among SIDS, excluding Singapore, services productivity remained broadly stable for most of the period before increasing more markedly in recent years. The persistently low productivity levels observed in LDCs, together with their limited gains over

time, suggest that structural factors are at play. Sectoral specialization is perhaps part of the explanation, but there is likely also a set of causative factors in areas like regulation, market structure, trade integration, and worker characteristics. The figure highlights the need for a turnaround in LDCs, in light of the stronger services productivity gains recorded by developing economies over the same period.

There is also evidence of a link between openness in goods trade and the expansion of productivity-enhancing services activity. Trade liberalization in manufacturing has been found to induce firms to shift resources from goods production into services, and this shift is associated with a higher firm-level stock of research and development investment (Breinlich et al., 2018). This suggests that the research and development mechanism at the centre of endogenous growth models may be reinforced by trade liberalization, which creates a further channel through which openness supports long-run productivity growth.

Quantitative modelling confirms the scale of these effects. Blank et al. (2022) simulate the withdrawal of preferential market access in services. This produces large reductions in real consumption, on the order of several percentage points on average, with corresponding declines in real wages. In part this reflects spillover effects on manufacturing from restrictions on services trade.⁶ These findings underscore that the gains from services sector development and trade openness are not confined to services themselves but propagate through the economy via inter-sectoral linkages. Similarly, Reverdy (2023) finds that partial liberalization of services trade would increase real income by 4.8 per cent on average globally.

⁴ It should be noted, that research and development, engineering, consulting, and related knowledge-intensive functions are also activities within industrial firms, classified into manufacturing and measured as manufacturing output. While some of the research and innovation is done in the services sector, a large part is not classified there.

⁵ Hofmeister, Kanbach and Hogleve (2024) provide a recent review of research on service productivity.

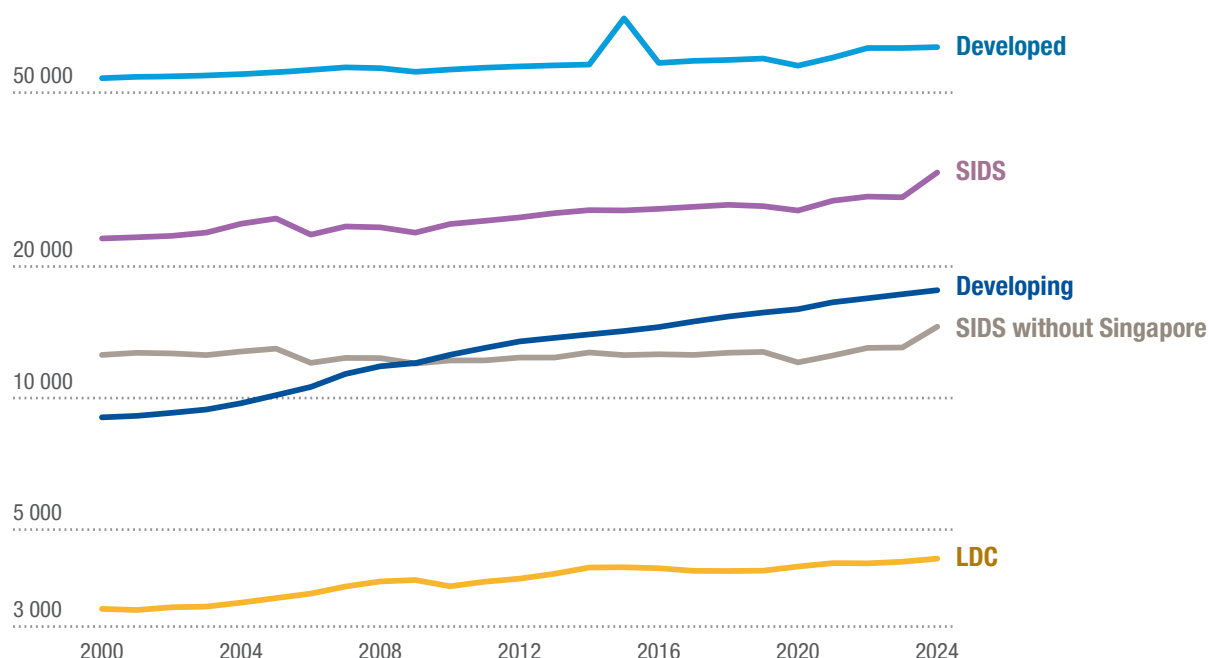
⁶ There is an extensive research literature on the effects of services policies on industries and firms that rely on services as inputs into production. This is discussed in Section 6.



**Figure 3**

There has been a steady increase in services sector labour productivity in developing countries, contributing to a gradual narrowing of the gap with developed countries

Services sector labour productivity, constant 2015 US\$ per worker, 2000-2024



Source: UNCTAD based on World Development Indicators. Country groupings are based on UNCTAD classifications.

This tendency towards growth in stand-alone services sectors is associated with deeper integration of services activities into all parts of the economy. This integration is captured by two related trends: servicification and servitization. Servicification refers to the rising share of services in GDP and in the input mix across all sectors, including agriculture, mining, and manufacturing, reflecting the increasing use of services tasks in all types of production (Miroudot, 2017). Servitization refers to the adoption of service-centred business models within firms that were previously focused on goods, including the bundling of services with products and the shift towards selling the services that products provide rather than the products themselves (Vendrell-Herrero and Bustinza, 2020). Both processes have been intensifying across countries at different stages of development

and are being accelerated by digitalization and associated changes in business models.

Digitalization has implications for services trade and its links with economic development. The term refers broadly to the use of digital technologies to change how productive activities and business models operate, and as such captures an important underlying trend in the global economy over recent decades. On the one hand, a shift of physical activities towards digital transactions suggests that services trade may increase at a more rapid rate than goods trade given economic and growth fundamentals. Indeed, UNCTAD⁷ estimates that digitally delivered services grew by 7 per cent annually in value terms between 2015 and 2024, outpacing goods trade, which recorded a compound annual growth rate of 4 per cent over the same period.

⁷ UNCTAD estimates based on UNCTADstat.



A complicating issue in the narrative is that digitalization also involves increasing use of digital technologies to produce goods and trade them across borders. Capturing this process is difficult, as trade in value added data only capture arm's length transactions between firms, not intra-firm use of services or the inputs provision of labour in services-related tasks. The rise of artificial intelligence in the last five years could further intensify this set of processes, though it is too early to reach conclusions on the links between specific recent technological changes and economic outcomes in terms of trade and growth.

Trade and development strategies have given considerable attention to manufacturing. This reflects a set of characteristics thought to distinguish manufacturing from other economic activities: the ability to absorb large numbers of unskilled workers, economies of scale, backward and forward linkages to the rest of the economy, prospects for innovation and productivity growth, and tradability (Kaldor, 1967).⁸ These properties were important to sustain growth, structural change, and development. At the same time, services were accorded less attention in development strategies, partly because they were seen as having to offer fewer prospects for sustained high productivity growth and less potential for scale economies and generation of 'good jobs' for unskilled workers at the levels needed than manufacturing did in the past.

An expanding body of evidence documents, nonetheless, that many types of services have experienced levels of productivity growth that are similar to, or exceed, that realized in agriculture and manufacturing. Most of the value added embodied in products – whether goods or services – reflects services inputs, whether provided through the market or within the firm. Moreover, because many services are

relatively labour-intensive, involve both lower and higher skilled activities, and often are less tradable than goods, there is the potential for job generation in services to be dispersed more widely across space (the territory of a given jurisdiction – locality, region, country) than manufacturing. Commercial services share key properties previously associated with manufacturing: scale economies, linkages with the rest of the economy, potential for innovation-driven productivity growth, and growing tradability as a result of technical change. Productivity-enhancing policy therefore cannot confine its attention to manufacturing alone but should accord comparable analytical and policy priority to services. There is, however, heterogeneity across services sectors in the degree to which these characteristics are present. Policy implications depend in part on which specific sectors are considered and on their relationships with the rest of the economy.⁹

Trade in services

The significance of these trends extends to statistical measurement. Conventional output and trade data, which classify firms by their primary product, understate the degree to which services activities pervade the economy. When productive activities are disaggregated into tasks, it is common to find a mix of goods-producing and service-producing tasks within individual industry clusters (Lanz, Nordas and Miroudot, 2011). Firm-level surveys in the Asia-Pacific region suggest that services tasks can account for as much as half of total production costs in manufacturing (Low and Pasadilla, 2016). Input-output tables, on which trade in value added estimates are based, capture only arms-length market transactions, and therefore miss the large volume of services activities that take place within firms classified as industrial.

⁸ See Di Meglio and Gallego (2022) for a recent analysis applying Kaldor's framework.

⁹ Rodrik and Sandhu (2025) discuss and provide evidence for four broad strategies that developing countries can pursue in this regard: (a) incentivizing large, productive firms to expand their employment; (b) enhancing productive capabilities of smaller firms through the provision of public inputs; (c) providing workers or firms access to technologies that complement low-skill labour; and (d) vocational training with "wrap-around" services to enhance job seekers' employability, job retention, and eventual promotion.



The relative importance of services trade is further underestimated because firms often bundle services with the goods they export (Ariu et al., 2019; Bernard et al., 2019; Cadestin and Miroudot, 2020).

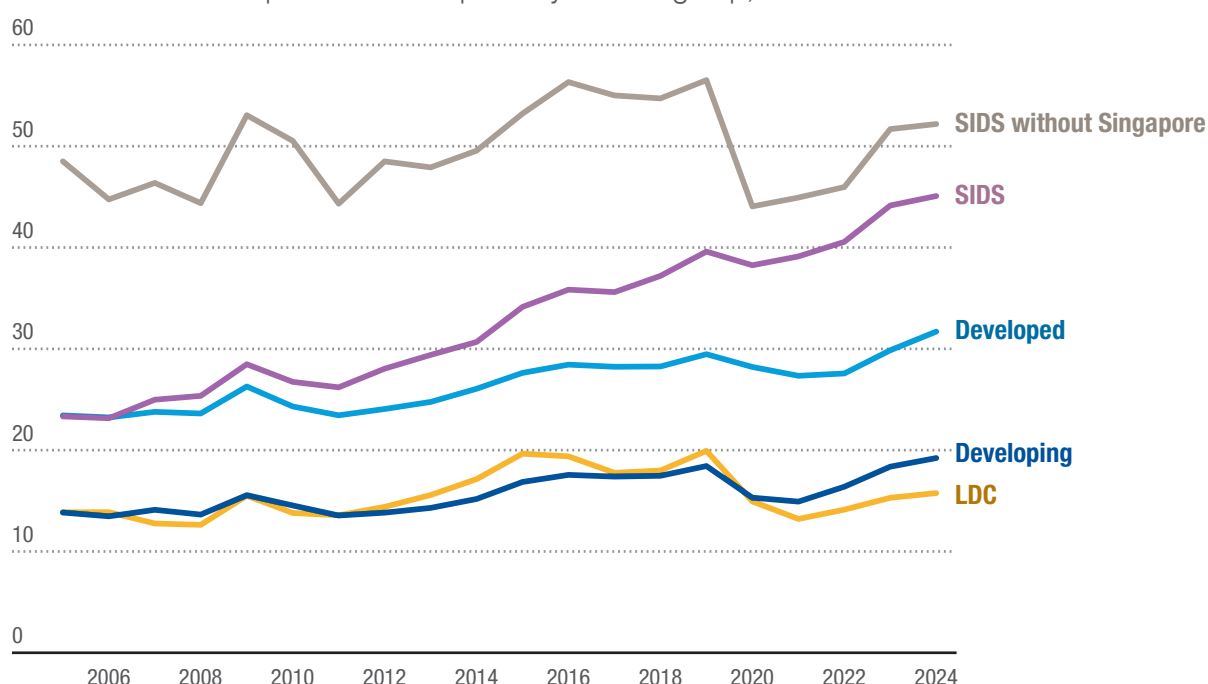
Using the balance of payments definition of services trade, Figure 4 shows that the share of services exports in total exports increased over time in both developed and developing economies. The rise is particularly marked for SIDS, which record the highest services export share among the groups considered.

SIDS without Singapore still display a high services export share, but the series is more volatile and does not show the same clear upward trend. LDCs and developing economies remain at lower levels, although both record gradual increases over the period. While Figure 4 uses the balance-of-payments definition of services exports, measuring exchanges between residents and non-residents, a substantial share of international services is supplied through commercial presence (GATS Mode 3).

Figure 4

The share of services exports in total exports increased over time in both developed and developing countries

Share of services exports in total exports by income group, 2005-2024



Source: UNCTAD-WTO TiS dataset.

Services trade is directly linked to foreign direct investment through GATS Mode 3, under which a foreign service supplier establishes a commercial presence in the host country, typically through the creation of a subsidiary or affiliate (Francois and Hoekman, 2010). Mode 3 is in practice the dominant means of market entry across most services sectors: even as digital technologies have expanded the scope for cross-border delivery without physical

presence, the characteristics of many services—including the need for proximity to customers, the requirement for local regulatory compliance, and the value placed by customers on face-to-face interaction—continue to make commercial establishment the primary route to market. Mode 3 trade therefore differs from goods trade in that the quantitative dominance of the primary mode of supply corresponds to a form of capital flow as well as a commercial transaction.

Because Mode 3 service supply generally takes place through commercial presence, typically established through FDI and foreign affiliate activity, it has the potential to generate the productivity spillovers and inter-sectoral linkages associated with transfers of technology, organizational knowledge, and managerial best practices to the host economy. Backward and forward linkages to domestic suppliers and competitors can raise their productivity (Hoekman and Shepherd, 2017). The quantitative dominance of Mode 3 in services trade in many sectors means that these spillover channels are potentially of substantial economic significance, particularly for host economies at earlier stages of development.

Unlike balance-of-payments statistics, Mode 3 estimates are based on the sales of foreign affiliates rather than on cross-border transactions. FDI measures the initial investment value. But the linkage between services trade and FDI is intimate because of this conceptual linkage, and the fact that many services benefit from geographical closeness between purchaser and seller. Figure 5 shows that this dynamic is reflected in standard FDI data, where the measurement concept is transaction value, not subsequent sales. The figure uses

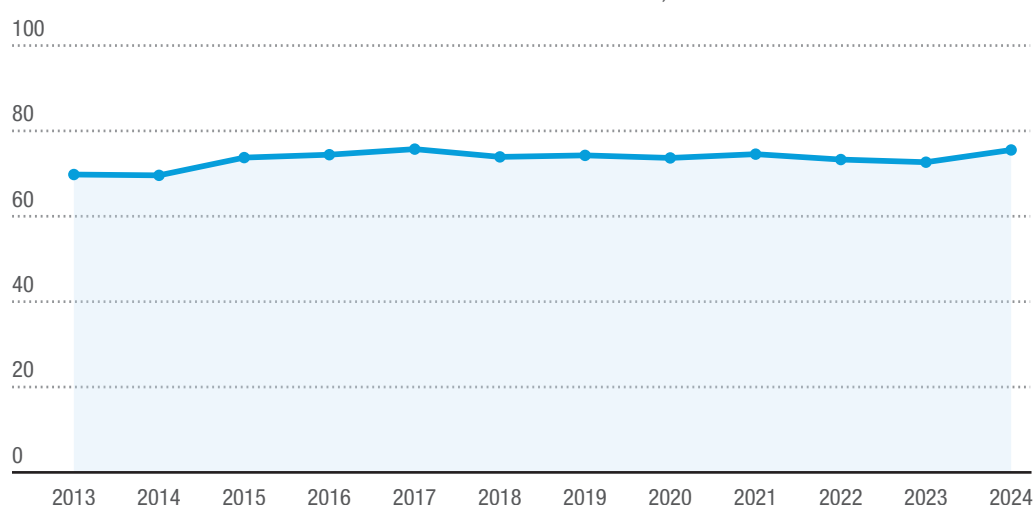
stocks rather than flows to avoid issues associated with negative transaction values in individual years. It shows that services account for the bulk of outward FDI in all sample years, with a slight upwards trend over time. In total, services account for more than 75 per cent of total outward FDI in the country sample covered by the OECD data, which includes member countries only; however, OECD members together account for a large share of total world outward FDI.

From the perspective of development and structural change, the FDI linkage with services trade is particularly important. There is extensive empirical evidence that inward FDI generates spillover effects for the domestic economy through vertical linkages as well as horizontal effects. For example, Iacovone et al. (2015) find that Walmart's entry into the Mexican market led to productivity upgrading and innovation among local manufacturers of consumer goods. In this case, the spillovers were cross-sectoral: market entry by a services firm led to productive upgrading in manufacturing sectors, thereby showing the close linkage between these two major economic aggregates in terms of productivity and innovation effects, as discussed above.



Figure 5

Services account for the bulk of outward FDI with a slight upwards trend
Share of services sectors in total outward FDI stock, 2013-2024



Source: UNCTAD based on OECD.

Note: Total is total outward FDI of OECD member countries.



Whereas global data on goods trade are highly complete in terms of country, temporal, and sectoral coverage, the same is not true for FDI data. Trade in services by mode of supply data are unavailable for all but a small number of countries, concentrated in the European Union. For other countries, WTO estimates based on statistical completion to fill in missing data are the best information currently available. For FDI, UNCTAD is the principal global source. UNCTADstat provides annual data on inward and outward FDI flows and stocks by economy and region, with limited sector-level FDI data. OECD mirror data are therefore often the best proxy available when the analysis requires more disaggregated information on inward flows. The same applies specifically to

Mode 3 trade data, where OECD member countries maintain foreign affiliates sales data that can be used to derive commercial-presence service imports, but not exports, for partner countries.

Because of the link between trade and FDI in services sectors, the policy dimension also needs to address impediments to investment transactions. The next section deals with that point in more detail. Policies that make it harder for multinational firms to invest in host countries tend to fall disproportionately on services, because services account for the majority of global FDI stocks and commercial presence remains a key mode of supply. In addition, they have spillover effects to trade because of Mode 3.





Chapter III

Measuring economic outcomes linked to services trade





Measuring economic outcomes linked to services trade

Services trade follows the same economic mechanisms as goods trade, including comparative advantage and the selection and reallocation of resources towards more productive firms, but its full scale is understated by balance of payments statistics. Indirect services trade, embodied as inputs in traded goods and services rather than delivered directly to final consumers, accounts for approximately one third of the total value of global goods trade, reflecting the growing role of services in global value chains. Trade in services statistics, based on direct cross-border flows, do not capture this embedded value or within-firm use of services inputs. As a result, official figures understate the true contribution of services to trade, productivity and export performance.

Services trade has economic impacts comparable to those of goods trade. At the most basic level, trade in services and trade in goods can be understood within the same analytical framework: both involve the purchase of economic output from across a national border, and both are subject to the same fundamental economic mechanisms. An early observation in the services trade literature captures this point: the conceptual apparatus of comparative cost theory applies to services just as it does to any other traded commodity (Hindley and Smith, 1984; Deardorff, 1985). Economists use the same structural models to analyse goods and services trade empirically, and there is compelling evidence that economic gravity—the regularity that bilateral trade flows reflect the sizes of the economies involved and the costs of trading between them—applies to services just as it does to goods (Anderson et al., 2018). Geographical distance remains an important determinant of services trade (Federico and Tosti, 2017), and modern quantitative trade models routinely incorporate services alongside goods (Costinot and Rodriguez-Clare, 2014).

The economic mechanisms through which services trade generate gains are well understood. As trade costs fall, countries specialize according to comparative advantage, shifting resources towards activities where relative costs are lower and away from activities where they are higher. Comparative advantage in services, as in goods, reflects a variety of underlying sources including resource endowments (Romalis, 2004) and technology (Costinot et al., 2012). The primary source of welfare gains from trade—across a broad class of widely used models—is on the consumption side: access to a wider range of imported goods and services at lower prices (Costinot and Rodriguez-Clare, 2014). This consumption-side gain captures both price reductions on existing varieties and access to new varieties not available domestically.

A further implication of the same analytical framework is the Lerner Symmetry result: policies that restrict service imports also tend to restrict service exports, because they incentivize the reallocation of resources from export-oriented activities towards



import-competing ones (Francois and Manchin, 2013). In other words, the domestic economy pays for restrictions on service imports not only through higher input costs and reduced consumer choice but also through forgone export earnings. The costs of services trade restrictions are therefore economy-wide in their incidence, falling not only on consumers of services but on the export sector as a whole.

The employment implications of services trade are also comparable to those documented for goods trade. Firm-level evidence shows that services trade has a positive effect on employment across different categories of workers, with the employment effect being particularly strong in firms that make intensive use of services inputs (Bamieh et al., 2022). Importing intermediate services does not appear to reduce local employment; on the contrary, demand-increasing effects dominate, so that employment tends to rise alongside intermediate services imports (Hijzen et al., 2011). Services sectors also tend to employ women workers more intensively than manufacturing (Lan and Shepherd, 2019; UNCTAD, 2024), which implies that expansion of services trade activity is likely to generate employment gains that are proportionally larger for women, with corresponding implications for gender equity, depending on the sectoral composition of growth and labour-market conditions as they vary across countries. Measuring inclusivity in trade outcomes is an important area, but one in which data are relatively scarce, even in developed countries. UNCTAD's gender and trade dataset is an important initiative to address this data gap.¹⁰ Available evidence suggests that expansion of services sectors could be positive for women's labour market outcomes. From a firm-size perspective, more work is required on the issue of scale in services trade, but the available evidence suggests that services firms that trade are, like goods firms, larger and more productive than those that serve the domestic market

(Shepherd, 2014). Under standard trade theory, lowering the barriers to export market entry tends to draw smaller firms into trading relationships, and there is evidence in goods markets that digital technologies can facilitate this process (Lendle et al., 2016).

Like goods trade, services trade is associated with productivity effects. Greater competitive pressure from trade leads to a reallocation of labour and capital away from less productive firms and towards more productive ones, and from sectors of comparative disadvantage towards sectors of comparative advantage (Melitz, 2003; Chaney, 2008; Pavcnik, 2002). This reallocation mechanism operates because increased import competition raises the productivity threshold required for firms to survive in the market, forcing low-productivity producers to exit or contract while resources flow to higher-productivity firms.

Empirical evidence confirms that this mechanism is at work in services trade (Morikawa, 2019). Services exporters display the characteristics associated with productivity-based self-selection: they are larger and more productive on average than non-exporters in the same sector (Breinlich and Criscuolo, 2011), consistent with the prediction that only the most productive firms are able to cover the fixed costs of entering export markets. These patterns in services are analogous to those documented for goods exporters. Standard trade models incorporating comparative advantage fit services sector data well (Van Der Marel, 2011). Heterogeneous firm models, which explain firm-level variation in export participation through productivity differences, can account for important features of services trade data in the same way as they do for goods (Yama et al., 2013). The aggregate result of the selection and reallocation process is an upward shift in the productivity distribution of the sector, raising overall sectoral productivity.

¹⁰ See UNCTADstat, Gender and trade, available at <https://unctadstat.unctad.org/datacentre/>.

Productivity effects in services trade also operate through the channel of importing intermediate service inputs. Firms that source services inputs from abroad gain access to a broader range of specialized inputs at lower cost, and the resulting improvement in the quality and efficiency of production is reflected in measured productivity. The link between services input imports and productivity at the firm level is well established quantitatively, with services offshoring found to account for a non-trivial share of aggregate labour productivity growth over extended periods (Amiti and Wei, 2009).

Trade openness in a world of global value chains also leads to expansion in trade in intermediate inputs—both goods and services—which can be measured as backward and forward linkages in the GVC literature. Services are particularly important in this context. Capturing these relationships requires the trade in value added methodology (Johnson and Noguera, 2012), which uses multi-region input-output tables to attribute the value added in traded output to its sector and country of origin. This approach reveals the services content of all exported goods and services, making visible the contribution of services sectors—including those that export little or nothing directly—to the overall export performance of the economy. The services value added embodied in traded goods reflects the increasing servicification of production: as digital technologies and changing business models lead firms across all sectors to integrate more services tasks into their production processes, the services content of traded goods rises (Miroudot and Cadestin, 2017).

Servicification in trade and its impact on export and economy-wide performance can be observed using multi-regional input-output data at the sector level to capture indirect exports of purchased services and firm level analysis, allowing

to capture the value of services that are produced in house and the role of bundling goods and services in exports. Research has found that manufacturing firms that bundle are more productive and have higher export intensities and that servicification is associated with better export performance and GVC participation.

Indirect services trade—services embodied as inputs in traded goods and services rather than delivered directly to final consumers—accounts for approximately one third of the total value of global goods trade (Figure 6). The share of services value added embodied in total goods trade is approximately one third, based on global data from the OECD Trade in Value Added database. Firm-level surveys suggest that internal use of services in manufacturing industries can amount to as much as half of total costs (Low and Pasadilla, 2016), much higher than would be inferred from conventional trade statistics. Estimates of services value added in global trade are therefore at the low end of the true contribution services make to the integrating world economy, as they only reflect transactions that take place in the market: they do not consider within-firm use of services. The upshot is that the majority of services that cross borders do so not as final products but as intermediate inputs that are used in the production of other traded output. Measured trade statistics based on direct cross-border flows therefore substantially understate the total contribution of services to international trade.¹¹

Beyond their role as embedded inputs, direct services trade—in particular logistics and communications services—enables and facilitates the establishment and smooth functioning of global value chains themselves (Debaere et al., 2013). Reductions in the cost and improvement in the quality of logistics, transport, and communications services are preconditions for the fragmentation and coordination of

¹¹ There is an extensive literature quantifying the share of value added attributable to embodied services and assessing the effects of policies that restrict access to intermediate services inputs (Francois, Manchin and Tomberger, 2015; Miroudot and Cadestin, 2017; Heuser and Mattoo, 2017; Miroudot, 2019).



production across borders that is a core feature of the GVC model. Services are therefore both a quantitatively important component of the value added in traded goods and an enabling condition for the structure of production and trade itself. This dual role makes services policy

particularly consequential: restrictions on services trade raise costs not only for services consumers but for all firms whose production and export performance depends on access to efficient, affordable services inputs and logistical support.

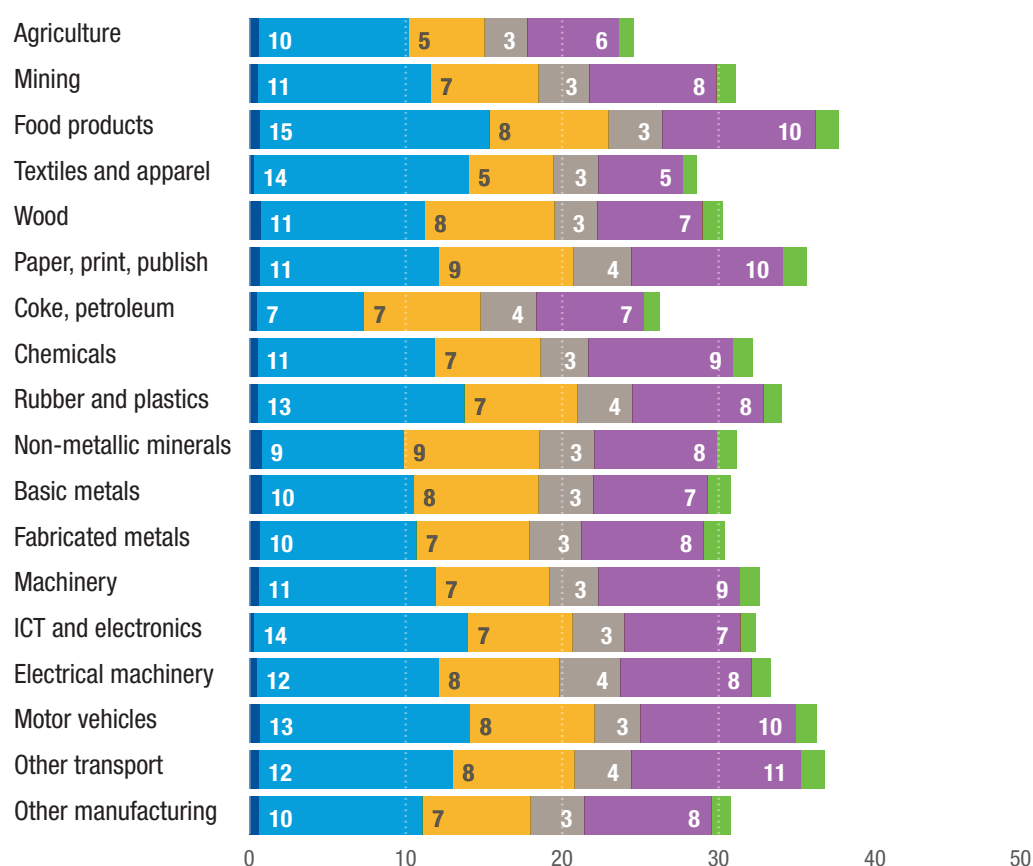


Figure 6

Indirect services trade accounts for one third of the total value of global goods trade

Share of services value added embodied in goods trade, by sector and services category, 2022

Construction Wholesale, retail and hotels Transport and telecoms Finance and insurance
Business services Other services



Source: UNCTAD based on OECD-WTO Trade in Value Added Database





Chapter IV

Measuring services policies



Measuring services policies

Services trade has no direct equivalent of the tariff, so services trade restrictiveness must be inferred from bundles of domestic regulatory measures. Two major projects, the OECD Services Trade Restrictiveness Index (STRI) and the World Bank-WTO STRI, show that services policies are slow moving, with little change recorded in the past decade, except for a few services categories. Non-discriminatory domestic regulation, which affects all firms and not only foreign suppliers, tends to have the largest economic effects. On digital trade, data from the Digital Trade Integration Project shows that restrictive measures outnumbered enabling measures across all regions in 2022-2023, suggesting that the policy environment for digital trade is becoming more restrictive.

This section discusses approaches to measuring policies that affect cross-border trade in services. It introduces common methodologies and discusses results.

Unlike goods trade, services trade has no direct equivalent of the tariff—a transparent, border-applied, discriminatory tax on imports whose level can be read from a published schedule and expressed as a single number per product. This absence has fundamental implications for the measurement and analysis of services trade policy. The policy stance of a country towards service imports cannot be assessed by consulting a tariff schedule; instead, it must be inferred from an examination of the domestic regulatory framework across individual service activities. Services trade policies take the form of bundles of regulatory measures that must be catalogued, quantified, and aggregated before any overall indicator of restrictiveness can be produced. The analogy in goods trade is with non-tariff measures (NTMs), which similarly require systematic collection and analysis before they can be summarized into a policy indicator.

Services trade policies are commonly classified in multilateral trade discussions as discriminatory and non-discriminatory. Discriminatory policies favour domestic suppliers over foreign competitors; examples include caps on the number of foreign service providers permitted in a market, limits on the total value of service transactions, restrictions on the number of natural persons that may be employed, requirements on the legal form of the entity through which services must be supplied, and ceilings on foreign equity participation in service enterprises. Non-discriminatory policies raise costs for all suppliers in a market, regardless of origin, and are commonly grouped under the heading of domestic regulation; examples include licensing and qualification requirements, technical standards and certification procedures, local presence requirements, and obligations relating to transparency and procedural fairness.

Non-discriminatory domestic regulations are particularly important in services contexts because they are often numerically dominant in the overall regulatory environment and because they tend to have the largest economic effects. Unlike discriminatory



restrictions, which raise costs only for foreign suppliers and therefore create a wedge between domestic and foreign costs of provision, non-discriminatory measures affect all firms in the market, including domestic incumbents. Reforms that reduce non-discriminatory barriers therefore promote competition and efficiency in the domestic market, generating gains that extend beyond the purely trade-related effects. The distinction between the two categories of measure is therefore analytically important for assessing where the largest gains from reform are likely to be found (e.g., Dee, 2007).

Two major international projects have systematically addressed the measurement challenge by collecting and processing regulatory information to produce Services Trade Restrictiveness Indices (STRIs):

one maintained by the OECD, and one developed jointly by the World Bank and the WTO (see Box 1). Both projects have made their underlying regulatory databases publicly available, allowing users to look up specific restrictions in individual sectors and trace them back to their sources in national laws and administrative procedures. This transparency is an important feature of both projects, since it allows the STRIs to serve not only as summary indicators of restrictiveness but also as a basis for identifying specific measures that may warrant reform. These indices measure relative regulatory restrictiveness rather than tariff-equivalent trade costs. The objective of both projects is to catalogue and quantify the most important barriers to services trade.



Box 1 Coverage of STRI projects

The OECD STRI covers 22 sectors in 51 countries, primarily OECD member states. It is updated annually, covering the period 2014-2025. All data are publicly available. In addition, the project website makes tools such as a policy simulator freely available. Detailed regulatory data from the project are also publicly available.

The WTO/World Bank STRI covers 144 economies and 34 sectors, in all world regions. However, not all countries are updated annually, so the dataset does not include time-consistent cross-sections of all countries and sectors. As with the OECD project, all relevant data are publicly available.

The choice between the two databases is largely driven by issues of coverage. Although methodologies differ, the contrasts are generally of secondary importance to coverage in analytical work. UNCTAD's *Primer on data for trade in services and development policies* provides further discussion of these different databases.

The construction of an STRI (Figure 7) begins with a detailed regulatory questionnaire, designed at the level of the individual service sector, which asks a series of specific questions about the rules that apply to foreign service suppliers under national law. Questionnaires typically cover several hundred data points per sector, including many cross-cutting questions that apply across multiple sectors—for example, questions about visa requirements for the temporary

movement of service providers. The questionnaires are completed by lawyers and sectoral specialists with knowledge of the specific regulatory environment. Answers to binary questions (permitted or not permitted) are converted to numerical values, and answers to quantitative questions—such as the percentage ceiling on foreign equity participation—are carried across directly. The result is a rich database of regulatory measures for each sector and country covered.



To produce summary indices, the raw numerical answers are weighted and aggregated. Both the OECD and the World Bank/WTO projects apply their own weighting methodologies to produce an overall STRI score, where higher values indicate greater restrictiveness on a scale running from zero (fully open economy) to one (fully restricted economy). Beyond the overall score, the indices can be broken down by mode of supply—allowing identification of whether barriers are concentrated in cross-border delivery, commercial establishment, or the movement of persons—and by type of policy restriction, distinguishing between market access limitations and domestic regulatory requirements.

The WB-WTO STRI differs from the OECD one in that its approach to quantification distinguishes between 3 principal steps.

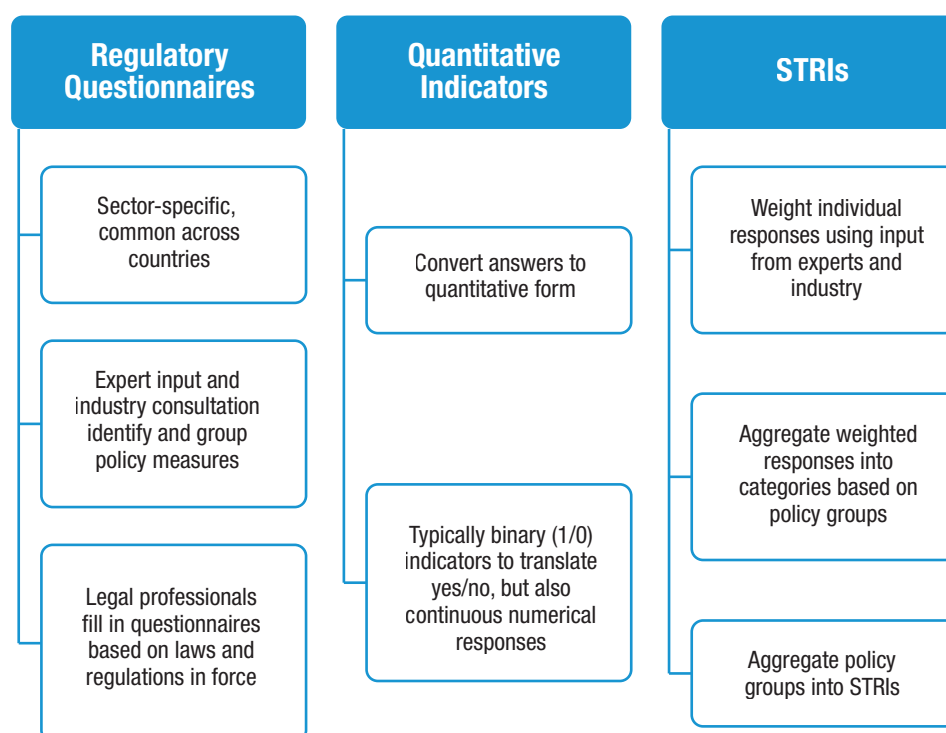
- i. selection of measures to be scored and scoring these policies at the measure level (the OECD does not do this);
- ii. combining scores into an STRI using a specific function that renders the impact of an individual policy on restrictiveness context dependent. This is a major differentiating feature of the WB-WTO approach; and
- iii. aggregating the resulting restrictiveness indicators using a methodology that is consistent with that used to calculate sub-indices.¹²



Figure 7

The construction of the services trade restrictiveness index involves several steps to collect and process regulatory information

STRI flowchart (left to right)



Source: UNCTAD.

¹² For technical details on the methodology used, see World Bank-WTO (2026, Table 2.2).

Services trade costs can also arise from regulatory heterogeneity between trading partners: even where both the exporting and importing country maintain relatively liberal regulatory regimes in absolute terms, differences between them can impose compliance costs when service providers enter new markets. The OECD addresses this through bilateral regulatory heterogeneity indices, constructed from the underlying regulatory databases, which allow the cost implications of divergent regulatory frameworks to be assessed for specific country pairs. This bilateral dimension is relevant to the design of mutual recognition arrangements and regulatory cooperation agreements, which can reduce heterogeneity costs without necessarily requiring full harmonization of national regulations.

The methodologies of the two projects differ in detail, and their index values are not directly comparable, but their broad interpretation is similar. The principal trade-off between the two major STRI projects is one of coverage. The World Bank/WTO database covers a broader range of countries, making it better suited to analysis of developing countries. The OECD, by contrast, produces annual observations rather than periodic partial cross-sections, making it better suited to analysis of policy changes over time. One implication of the OECD's time-series coverage is that it permits assessment of whether and how fast services policies are changing—a question of some importance, since available evidence suggests that services policies tend not to change rapidly. STRIs can be

used in both static applications—comparing restrictiveness across sectors or across countries at a point in time—and dynamic applications that track policy evolution. A static application can identify which sectors or country groups face the highest barriers and can link high-level scores back to the specific regulatory measures driving them, informing reform prioritization.

Summary statistics for sectoral STRIs by region and aggregate STRIs by country group over time are reported in Figures 8 and 9, respectively.¹³ Figure 10 reports sectoral STRIs for selected LDCs for which data are available. The figures illustrate that developed countries are relatively less restrictive compared to developing ones. There is less variation in the median level of restrictiveness across sectors/regions, with professional services often the most restrictive. There is much greater variation for a given sectoral STRI within regions (Figure 8). Similarly, Figure 10 reveals significant heterogeneity in sectoral STRI levels across the selected LDCs. STRIs are slow-moving, demonstrating little change between 2016 and 2020-25 (Figure 9), with a few notable exceptions. Professional services, for example, became considerably less restrictive, while communications services become considerably more restrictive. As firms in all sectors increasingly rely on services inputs, services trade policies increasingly affect not only service providers but also manufacturers and agricultural producers. Higher STRI levels constrain firms from benefiting from servicification.

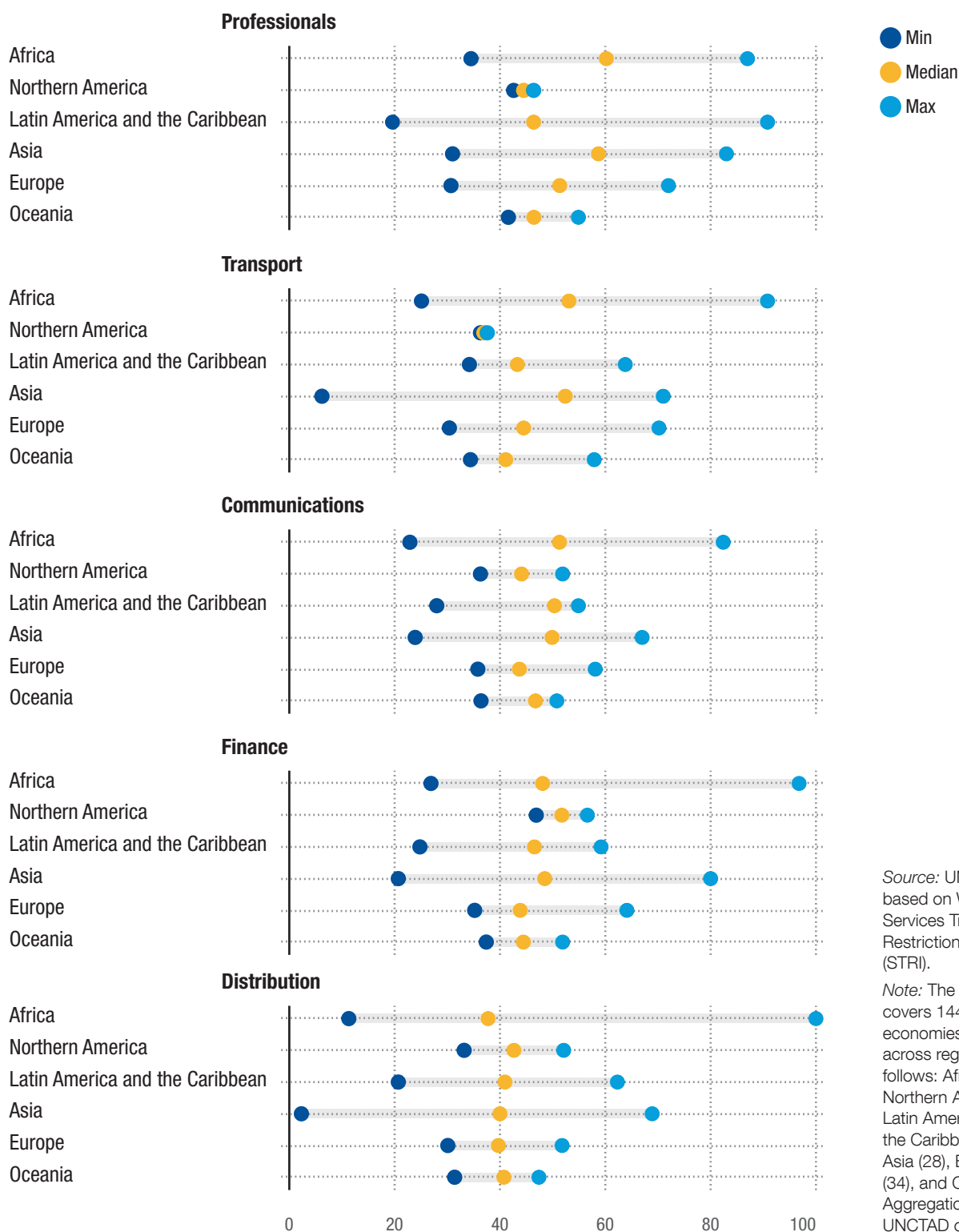
¹³ Baiker et al. (2023) discuss services trade policies in Africa; Baiker et al. (2025) do so for a large panel of countries.



**Figure 8**

There is significant heterogeneity in sectoral STRI levels across regions, with professional services often the most restrictive

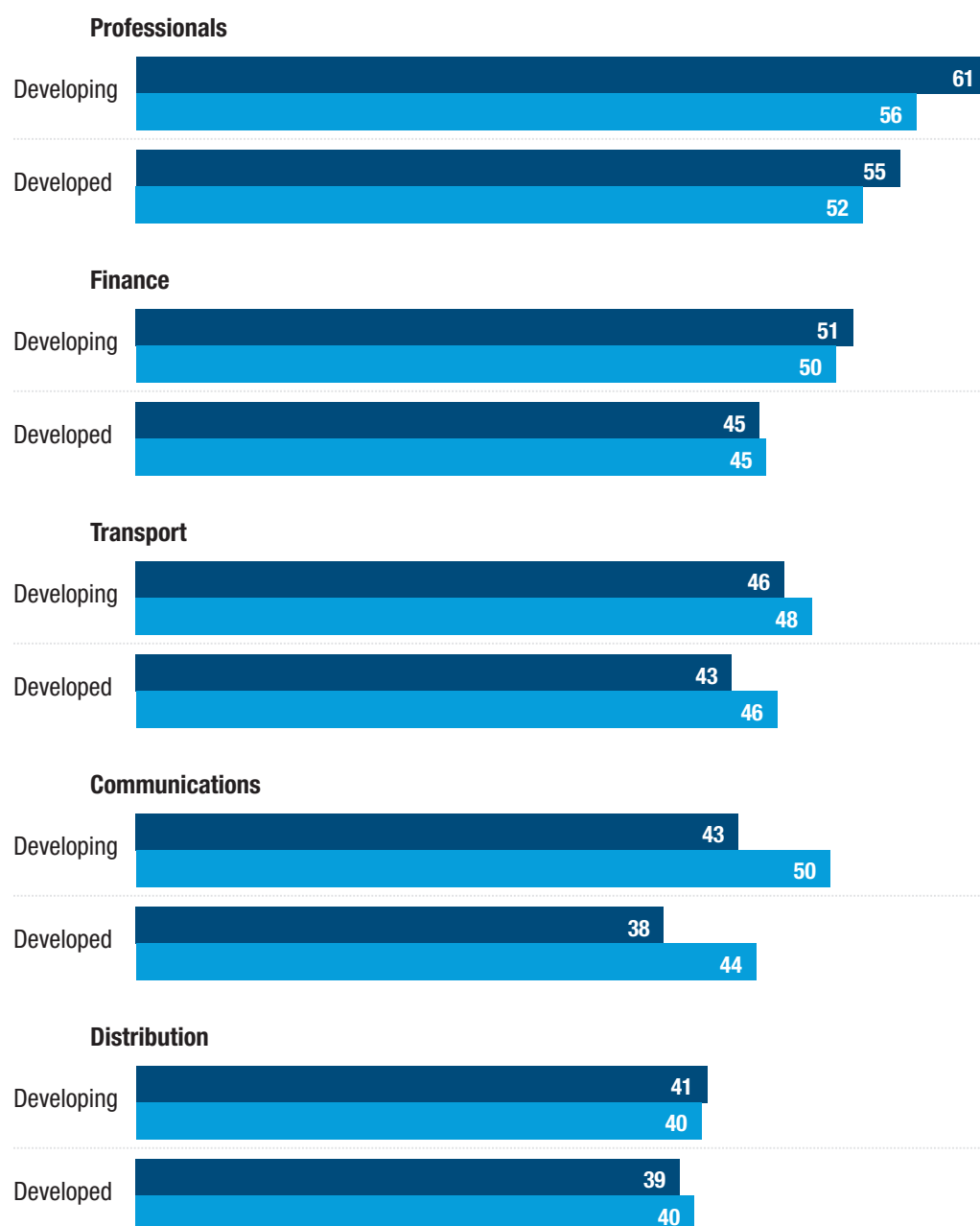
Services trade restrictiveness index by country group and sector, range and median, latest available year



**Figure 9**
Developed countries are less restrictive and services trade restrictiveness indexes are slow-moving – with few exceptions

Services trade restrictiveness index by country group and sector, average, 2016 vs 2020-2025

■ STRI 2016 ■ STRI 2020-2025



Source: UNCTAD based on WB-WTO Services Trade Restrictions Index (STRI).

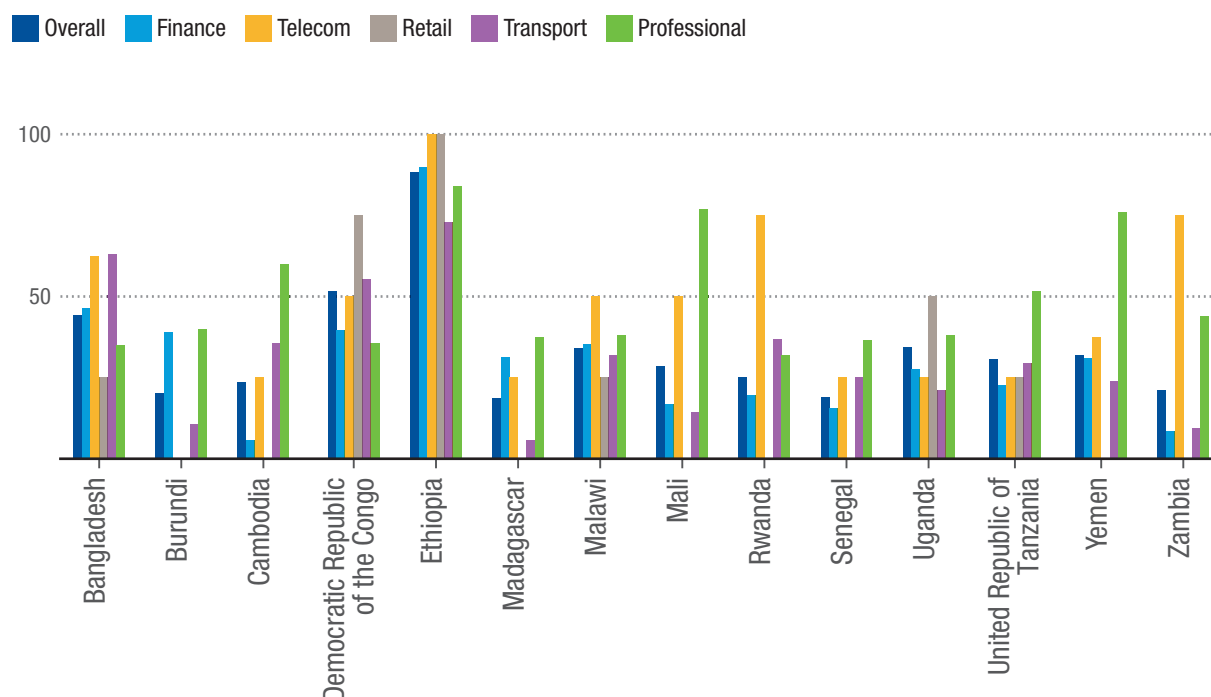
Note: We compare the STRI values for the same set of countries that have available data for the selected sector in both 2016 and during the 2020–2025 period. For each country, we retain the 2016 value and the most recent available value between 2020 and 2025 for comparison. The dataset covers 69 economies that meet these criteria, including 34 developing economies and 35 developed economies. Aggregation based on UNCTAD classification.



**Figure 10**

There is much variation in sectoral services trade restrictiveness indexes within LDCs

Services trade restrictiveness index by sector, selected least developed countries, latest available year



Source: UNCTAD based on WB-WTO Services Trade Restrictions Index (STRI) database.

There is a growing but still limited body of work using STRIs in econometric and computational models of services trade (e.g. Reverdy, 2025). Econometric estimation of the effects of services policies faces a particular challenge: because policies change little over time, it is difficult to obtain high-quality estimates of their trade and welfare effects from variation in the data alone. For use in computational (computable general equilibrium) models, STRIs cannot be incorporated directly as policy variables in the way that goods tariffs can; they must first be translated into ad valorem equivalents—estimates of the tariff rate that would produce an equivalent level of trade costs—through an econometric first stage. Despite these technical challenges, available evidence from modelling work suggests that reforms of non-discriminatory regulatory measures produce the largest economic gains, and that the knock-on

effects of liberalizing services policies are substantial because services are used as inputs across many sectors of the economy.

Digitalization has fundamentally altered the way services are produced, delivered and traded, underscoring the increasing importance of policies affecting digital transactions and data flows. Two major international projects have collected data on policies relevant to digital trade, the OECD's Digital Trade Restrictiveness Index (DTRI) and the Digital Trade Integration Project (DTIP). The latter has broader country coverage, so it is helpful to focus on it to provide descriptive statistics. The DTIP tracks restricting and enabling measures for 147 countries (including the European Union both as individual member states and as an aggregate entity). It looks at 12 pillars ranging from goods-related issues (tariffs and trade



defence measures on ICT imports) to public procurement, FDI, intellectual property rights, data-specific policies, and telecom infrastructure and competition. The DTIP maintains counts of measures, not individual estimates of economic impact, which may differ from one measure to another.

Figure 11 shows data from the 2025 version of the DTIP database, which records information from 2022-2023. Each bar represents the average number of measures per country in each region. It should be noted that some measures may be economically minor while others are more impactful, a distinction this count does not capture. In all cases, the balance is strongly tilted towards restrictions. Although there are also significant numbers of enabling measures, the current landscape globally is towards a more restrictive policy environment for digital trade. This finding is consistent with information in the OECD DTRI. While there is heterogeneity across regions in terms of the overall balance between restrictions and enabling measures, the pattern is consistent.

The policy picture that emerges from Figure 11 contrasts with the increasing importance of digital transactions in the world economy. Digital trade integration is of key relevance to services traded by Mode 1, but it also has relevance for goods trade, as ongoing discussions over the WTO e-commerce moratorium show. Although the prevalence of digital trade is growing as new technologies proliferate in all world regions, the policy environment is overall becoming more restrictive, which will likely have implications for the future transformative potential of digital trade in developing countries.

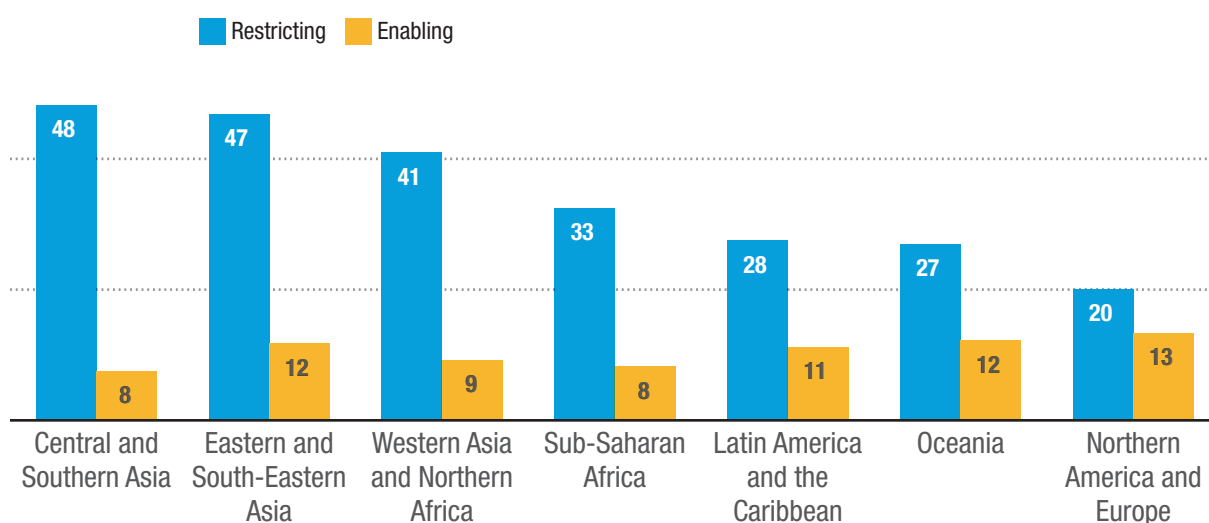
With limited exceptions, STRIs and DTRIs focus on applied services policies at a most-favoured nation level. But preferential agreements are also increasingly important in services. In addition to the STRI databases, sources such as the Deep Trade Agreements database and the Design of Trade Agreements database (DESTA) contain information on services policy commitments in regional and preferential trade agreements. These sources document the specific policy settings that countries have agreed to bind or improve in the context of bilateral or regional negotiations.



Figure 11

Restrictive digital trade measures outnumbered enabling measures in 2022-2023

Average number of restricting and enabling measures, UNCTAD regions, 2022-2023



Source: UNCTAD based on the Digital Trade Integration Project (<https://dti.eui.eu/>).

Note: Values refer to the average number of measures per country from a region.





Chapter V

Complementing international sources with national data





Complementing international sources with national data

International statistics on trade in services allow analysis of national and sectoral performance but do not permit analysis of more granular outcomes, such as firm productivity or employment, that are of interest to policymakers. A first step is to review what administrative data is being collected, by whom, and who owns it, starting with the national statistical office and extending to finance ministries, customs, labour ministries and investment promotion bodies. National statistical offices can often provide access to linked, anonymized datasets for approved research, though approaches vary across countries. The binding constraint is often a lack of interoperability across data sources. Unique business identifiers, used consistently across VAT, tax, payroll and customs systems, can help address this challenge.

This section turns the focus to national data sources, and highlights their complementary role to data compiled by international agencies as discussed in previous sections.

For many types of policy analysis, international statistics on trade in services must be complemented with national economic information and administrative microdata. The global baseline sources that can be used to analyse cross border trade in services questions are described in UNCTAD (2025). They comprise balance of payments data (IMF), trade in services datasets (OECD and UNCTAD-WTO), WTO foreign affiliate trade in services (FATS) statistics, the International Trade and Production Database for estimation and simulation (ITPD-E and ITPD-S), the Balanced Trade in Services dataset (BaTIS), the Trade in Services by Mode of Supply dataset (TISMOS), and the OECD TiVA and other multi-region input-output datasets.¹⁴ These data sources permit national and sectoral services trade performance to be analysed, both from the perspective of a country's absolute performance at a point in time and across time, and in

relationship to comparator countries, income groups, regions or the world as a whole. They do not, however, allow analysis of more granular development-related outcome indicators that are of interest to national policymakers – such as firm productivity or employment dynamics.

More granular statistics on services trade are provided by many national statistical offices (NSOs), and they often have mechanisms to allow researchers' access to anonymized microdata for specific research purposes. Such individual level data can provide information on the operations of firms, e.g., revenues (sales), size, age, workforce, location, sourcing patterns, participation in trade (imports and exports), linkages between domestic and foreign companies that have established local affiliates, the sectoral and regional distribution of employment, wages earned by workers, their gender, sector of employment, education attainment, skills and geographic location, especially in countries with comprehensive and interoperable administrative registers that can be used for statistical production.

¹⁴ These are discussed in UNCTAD (2025) and we refer the reader to that document.





Box 2 Typology and overview of national data sources

National statistical offices (NSOs) typically compile large amounts of data that are relevant to the performance of services firms, and potentially their trade integration and the outcomes associated with it. However, researchers' access to anonymized datasets varies across countries. In many cases, the richness of national data sources in developing countries is under-estimated, and leading researchers tend to focus unduly on those few countries known to have good data availability.

The types of data typically housed by national authorities that can be used in services research include:

- Business surveys and censuses, and establishment, household, and labour market surveys.
- External trade statistics at the transaction level.
- Corporate income and value added tax records.
- Administrative business registers.
- Investment data from promotion agencies (in some countries).

This section elaborates on these various types of data, and discusses the challenges in getting them to work together, and facilitating access for researchers.

As explained in Box 2, some of this information can be found in datasets compiled by national statistical offices and government agencies, as part of their mandate, that are used as the basis for national statistics. These include population and sometimes business censuses, and business, establishment, household and labour market surveys. For example, on its website, the national statistical office of Rwanda lists available censuses, surveys and administrative data. These include the Establishment Census, a Foreign Private Capital Census, and the Population and Housing Census; the Demographic and Health Survey and an Enterprise Survey; an Integrated Business Enterprise Survey, the Labor Force Survey; and a Travel Expenditure Survey. These products provide information on matters such as the number, size and sector of activity of enterprises, the total population living in the country and how this is distributed across the territory of the nation, their employment status, education, gender, health and other characteristics.

Population and business censuses are designed to be comprehensive in coverage, and household, labour, establishment and firm-level surveys provide a statistically representative sample of the target group.

The population census generally is the basis for a nation's official statistics on households and individuals. The same applies to censuses of firms (establishments).

Censuses provide the basis (sampling frame) for smaller, more frequent, surveys of workers and enterprises. The latter are much less costly to administer than a census, which consequently are much less frequent than surveys, often being undertaken at 10-year intervals.¹⁵ Because they are less costly, surveys can employ more comprehensive (detailed) questionnaires and cover more issues than a census. Countries are also increasingly moving towards using administrative data sources, quality allowing, instead of full censuses.

Business surveys provide information on the ownership, size, age and operations of sampled firms or establishments, as

¹⁵ IPUMS International is a widely used source of census data. It brings together and distributes population and household census microdata from around the world. See <https://international.ipums.org/international-action/variables/group>. The Demographic and Health Surveys (DHS) Program provides a similar service, bringing together national survey data for a large number of developing countries. See <https://dhsprogram.com/>.



well as data on wages paid and number of workers employed. Some of these data may also be sourced from administrative sources, if available. Informal enterprises cannot often be covered in business surveys as they are based on business registers for sampling and tax records and surveys. Attempts are made in household surveys, labour force surveys, and national accounts to adjust for exhaustiveness. Labour force statistics make particular efforts to cover informal employment. For practical reasons, monthly and quarterly business surveys may focus on ensuring the coverage of larger businesses. Li and Rama (2015) note, for example, that gross job creation in lower income countries comes from micro- and small enterprises. Surveys that do not span such firms may therefore provide a biased picture of economic activity. In some countries, efforts are made to survey smaller firms by rotating samples, or estimate their impact based on value added tax data. Limiting response burden and reusing data once collected in government are a major consideration in data collection for official statistics.

Bento and Restuccia (2017) document this problem by using economic censuses and enterprise surveys that utilize comprehensive business registries as their sampling frame to compile a dataset that includes micro-enterprises and informal firms for 124 countries between 2000 and 2012. The correlation between the average establishment sizes in their dataset and the World Bank Enterprise Survey database is only 0.22. Even within a given country context, care must be taken in using census data. Kerr and McDougall (2020) use data from four Ghanaian firm censuses as well as several other African countries conducted at different points in time. They find that the coverage of a census in different time periods can be very different, making comparisons over time fraught. Understanding if and how the coverage of firm censuses vary over time is important

to be able to adjust for changes that may otherwise bias inference. This problem can affect the external validity of survey-based analysis, but the salience of the issue will depend on the policy question of interest. As most trade involves formal firms, enterprise surveys are a valuable source of information on enterprise performance and for analysis of the productivity effects of policy.

Complementary administrative datasets

In most developing countries official statistical data – from censuses and surveys – can be supplemented by administrative microdata. Administrative data are created and maintained for specific purposes, often compliance-related, and not for statistical purposes. National statistical offices increasingly have access to administrative data to complement direct surveying to produce official statistics. This means there is no need for investment in new efforts to collect data, or additional burden for businesses.¹⁶

Sources of administrative data often include transactions-level information on merchandise trade collected by customs authorities as part of the clearance of consignments; national immigration authorities, accommodation statistics and visitor surveys collected by statistical authorities; the population census typically led by the national statistical office; tax data collected by the tax authorities, both direct (income) and indirect (consumption taxes); employment-related statistics (ministry of labour, social security administration and the national statistical office). Statistical business registries are an important registry of key business characteristics information that can source data from all sources of business information serving as a sampling frame and key information source on businesses. An important requirement for interoperability is a unique business identifier.

¹⁶ UNECE (2011) and UNDESA (2021) provide guidance on good practices in the use of administrative data sources.



To pay their annual corporate income tax (CIT) firms must compile and report data on their turnover, costs of operations and profits. More specifically, the CIT generates data on company ownership, total gross income, sales, operating expenses, cost of goods sold, asset depreciation/amortization, capital gains and non-taxable or tax-exempt income, gross taxable profit, and applicable tax credits and incentives. The CIT is a valuable source of information to assess firm-level performance, including changes in revenues (turnover), exports, and labour productivity (output per worker). CIT payments will span (be limited to) registered firms, with most revenue paid by medium and large firms, including foreign investors.

A complementary source of useful administrative data that is pertinent to understanding the effects of policy on access to services and firm performance is information on inward flows of FDI. Investment promotion agencies (although they do not exist in all countries), often act as an interface for foreign investors and maintain databases on the foreign firms that invest, in part because of incentive programs that are used to attract FDI. Combined with CIT data, granular FDI data allows analysis of the economic impact of FDI in a country, including FDI in services sectors or the provision of services by foreign investors.

Of particular interest from a services trade perspective are indirect taxes, i.e., VAT filings, as VAT-paying firms must report their transactions – both purchases from and sales to – other tax-registered firms. Indirect taxes that are collected through a VAT system require firms to track purchases from and sales to other firms to limit their tax burden to the value they have added in production of goods or services. As a result, VAT systems generate information on the dynamics of firm-to-firm transactions and the network of suppliers and buyers across firms in the economy. Data are available as the total value of sales by tax rate for each firm and month/quarter or year depending on the reporting requirement. Nevertheless, it is not possible to identify who is trading

with whom. International trade can only be distinguished from domestic trade if it has a different tax regime.

Most developing countries have adopted VAT systems, while some maintain a Goods and Services Tax (GST) regime. As a result, in principle there is comprehensive information on VAT paid for many countries. As is the case for enterprise surveys, VAT is limited in coverage to firms that operate in the formal sector. Such firms generally account for the majority of total imports and exports by value, i.e., these are also the firms that participate in formal international trade. As VAT data span multiple years they provide information on entry and exit of firms. When combined with CIT and/or FDI and/or statistical business register or establishment census data, it is also possible to distinguish between foreign-owned and domestic firms, thus permitting assessment of how foreign firms (FDI) interact with domestic firms and the associated supply chain dynamics.

Tax fraud or behaviours adjusted to specific VAT regimes may affect the quality of data and resulting analysis. To reduce their tax liabilities, firms might misclassify goods and services as VAT exempt and inflate claims for VAT paid for the purchase of their inputs (Almunia et al. 2022; Kotsogiannis et al. 2024). Tax systems may also alter the incentives firms have to trade with each other (Fajgelbaum et al. 2019). In developing countries, many firms do not pay VAT, either because they pay taxes under a simplified regime or because they are in the informal sector. This implies that using VAT data to measure the economy and relationships between domestic enterprises and international partners (and if identifiable exports and imports) will capture only a part of the supply chain networks and linkages in the economy. While traditionally VAT reports include total sales and VAT for the reference period, in some countries VAT or GST systems incorporate invoice-level reporting or e-invoicing, when tax authorities can observe transactions between identified buyers and sellers, making it possible to



construct firm-to-firm trading networks. Gadenne et al. (2019) investigate how the design of the VAT in India affects firm-to-firm trade. Using administrative tax data covering 180,000 firms in the Indian state of West Bengal to map who trades with whom, they document that firms' tax status (VAT-registered or not) strongly predicts their trading partners. VAT-paying firms mostly trade with each other, while non-VAT firms stick to the informal network, effectively segmenting supply chains.

As in the case of the CIT, the extent to which the coverage of VAT is a problem for analysis and inference depends on the policy question of interest. Given that firms that are in the VAT system account for a (very) large share of total turnover by value in the economy, for purposes of trade analysis the truncated nature of the VAT may not be problematic. Using VAT data will provide information on the formal part of the economy, including on entry of new firms into the system over time and the level of economic activity undertaken by such firms.

However, it is worth noting that administrative data are not without limitations. Such sources are often scarce, fragmented and of uneven quality, which can constrain their robustness for analytical and policymaking purposes. Technical and financial capacity to make effective use of available information remains limited in many public institutions, and legal and institutional frameworks do not always facilitate data sharing across agencies. These challenges underscore the importance of capacity-building support and the value of guidelines and shared protocols.

Leveraging national data sources for services trade analysis

A first step in assessing the availability of administrative data for a country is to understand what data are being collected by different entities that could be relevant for analysis of services-related policy questions. This involves inventorying what exists, who has collected the associated data and which entity "owns" the datasets concerned. This should start with engagement with the national statistical office of the country as they would typically use all available and accessible official sources, but it could also extend beyond this to include finance ministries, customs authorities, labour ministries and investment promotion bodies, and particularly to potential privately held data sources.¹⁷

Typically, the national statistical office links data from various sources, and there may be a possibility to access a linked dataset, either anonymized or under a confidentiality agreement, for research purposes approved by the statistical authority.¹⁸ Approaches and mechanisms vary considerably across countries, while such research access is recommended in existing international guidance on statistical legislation.¹⁹

The binding constraint is often a lack of interoperability and connectivity across different sources of administrative data and the ability of researchers to access the data and use it. Connecting datasets requires the use of unique identifiers that are common to and consistently applied across different datasets. For example, a firm registered in the VAT system should have the same

¹⁷ Many of the administrative datasets that are compiled by national government agencies may not be mentioned on the websites of national statistical agencies. To come back to the example of Rwanda, the CIT, VAT, PAYE datasets are not listed, nor is the information on FDI compiled by the Rwanda Development Board, which includes investment promotion in its mandate. The RDB which maintains a registry of investment projects (\$2.62 billion across 799 projects in 2025) that includes export revenue generated (\$3.6 billion). Registering with the RDB provides companies with a Certificate of Incorporation and Tax Identification Number.

¹⁸ Harron et al. (2017) discuss some of the challenges in the appropriate research use of linked administrative data. A central one concerns the need to link datasets. To ensure confidentiality, it will often be necessary to separate the process of matching or linking data from analysis. In most cases, this implies that tax and other compliance-related data will need to be processed by a government entity – often the national statistical office – to undertake the task of linking/matching based on anonymized identifiers.

¹⁹ See: <https://unece.org/statistics/publications/guidance-modernizing-statistical-legislation>



identifier as is used in the corporate income tax system, as well as for its employment/ payroll reporting or its international trade (customs) transactions. In principle this will be greatly facilitated if unique business identifiers are used for enterprises across different administrative data sources.

Using a unique business identifier is subject to substantially less error than other approaches to link datasets such as matching based on the name of firms or entities. Linking datasets and enabling their use for research purposes is generally a significant challenge because of confidentiality of individual data, lack of technical capacity, siloed work across government, and lack of transparency in the required administrative processes. The national statistical office can act in this regard as it is guided by the national statistical law which often regulates research access. Regardless, statistical authorities may lack resources to provide safe technical environments, or to link and anonymize their datasets for researchers. The valuable research findings should be made visible to draw attention of government and society to the importance of access to data for research, as a public good for development. International organizations can support national authorities in enhancing their technical and statistical capacity to provide research datasets, but a necessary condition is commitment at a high level in government to enable such research.

Frameworks for dataset interconnectivity and linking different sources of administrative data have been developed for specific sectors and can serve as a case study for national initiatives to connect services-relevant databases and support research. Rivas and Crowley (2018) provide several examples of initiatives in developing countries. These include an initiative among a group of Pacific Island countries based on a memorandum of understanding between the tax administration and the statistics office to link tax and official sources of national data; an initiative to use VAT turnover data to produce the monthly index of industrial production in Uganda;²⁰ and a similar exercise under which the Rwanda Revenue Authority shares VAT and CIT submissions with the National Institute of Statistics of Rwanda (NISR) in a standard format.²¹ A more recent Rwandan initiative is the National Data Sharing Policy, which aims to govern data sharing among public agencies and facilitates collaboration while ensuring data privacy and security.²² Another example is the National Agricultural Data Infrastructure (NAgDI), a Commonwealth initiative.²³ This initiative supports governments to connect existing national data sources, improve coordination between data collecting agencies and set rules to govern data access, ownership and use (Commonwealth Secretariat, 2025).

²⁰ This involved cooperation between the Uganda Bureau of Statistics (UBoS) and the Uganda Revenue Authority (URA) based on a MoU that governs transfer of data, their format and how they will be used for specific purposes of interest to both UBoS and URA. Designated Contact Officers manage the exchange of data and a Liaison Committee oversees day-to-day technical coordination

²¹ This is linked to a NISR maintained register of firms and the triennial Establishment Census and annual Integrated Business Enterprise Survey. The National Bank of Rwanda provides administrative support and funding.

²² See: https://www.minict.gov.rw/fileadmin/user_upload/minict_user_upload/Documents/Policies/The_National_Data_Sharing_Policy_-_Final.pdf.

²³ See <https://thecommonwealth.org/national-agricultural-data-infrastructure>.





Chapter VI

Research using national data for services policy analysis





Research using national data for services policy analysis

A growing but still limited body of research shows that linking existing administrative data, rather than new data collection, can generate policy-relevant evidence even where resources are constrained. Studies using linked tax, customs and survey data from Ecuador, Rwanda, Uganda, Uruguay and other developing countries have produced concrete policy-relevant findings. This research remains sparser than the equivalent literature on trade in goods, mainly because of continuing constraints on the availability and access to administrative data, pointing to substantial scope for further analysis as microdata become available.

This section discusses examples of research on developing countries using national data sources to complement international trade in services data. These examples illustrate how different types of datasets can be used to inform trade policy design and potential reforms, analyse patterns of services production and use in the economy, firm export performance, employment in services, forward and backward linkages with FDI, and policy effectiveness. It is organized around recent examples of research that illustrate how national data sources can be applied to inform policy design and reforms. The description and discussion of research papers are selective in the sense of prioritizing work that uses administrative data. The research literature on services trade-related questions using micro data is still limited because of limited access to administrative data, lack of comprehensive or sufficiently detailed administrative data, and the inability to link datasets. Most research on developing countries' services trade and policy uses sector level information as opposed to firm-level or

transactions-level data. Consequently, the discussion also references examples of analysis done using sector-level data as well as several instances of research for developed countries that could in principle be replicated for developing countries if they have similar sources of data.²⁴

There are many policy questions that are of potential interest to developing country decision makers. For example, who works in services, where, and how is that changing? Which firms export services and what determines their competitiveness? What firms depend on services inputs most intensively? Do firms have access to the services they need to be competitive? Is FDI a means of enhancing access to services inputs for domestic firms and/or a source of demand for local services that are embodied in exports? Does FDI increase local employment and foster upgrading of services in GVCs? What patterns increase the positive effects of FDI, including through backward and forward linkages with local firms? How do services and digital trade-related policies

²⁴ A comprehensive bibliographical Annex to this paper provides a compilation of over 400 trade in services-related research papers produced in the last 15 years.



and regulation affect services export performance, access to services inputs, and indirect services exports that are embedded in supply chains? Have policy reforms had the desired effects? Where would reforms have the greatest potential impact?

The feasibility of answering such questions will depend on access to available data. In practice, a pragmatic path is to tailor questions to those that can be answered with data that already exists in a country

(Box 3). While this will leave some questions unanswered, if governments consider these to be important, they can motivate efforts to collect the necessary information. However, data collection takes time and resources. The premise of this paper is that governments should start with datasets that already have been compiled and invest resources to link these and enable their secure use for authorized research.



Box 3 Methodologies for services research

This paper's argument is that data is the binding constraint on services sector research in developing countries. This reflects the lack of resources and capacity of national statistical authorities to provide granular, internationally comparable services trade statistics and data. From a methodological standpoint, researchers could apply many techniques from the goods literature to services, subject to resolving issues of data quality and availability.

The structural gravity model is the workhorse of empirical international trade. It is well-suited to answering questions about policy effects, based on observed historical connections among variables. The recent literature (Nagengast and Yotov, 2025) has merged gravity with the causal inference literature, to produce an approach to analysing trade policy questions that is both robust from a theoretical point of view and meaningful in an econometric sense beyond simple correlations or associations. For instance, the new structural gravity literature makes it possible to conduct an event analysis of a discrete policy change in a fully rigorous way.

There is also a long literature using micro-econometric techniques to understand the firm-level determinants of trade, and the impacts of policy changes on detailed behavioural variables. Again, data availability has pushed this research in the direction of goods, but there are also key examples for services (e.g., Breinlich and Criscuolo, 2011).

Although structural gravity can also be used for ex ante analysis of trade policy changes, it is more common to use multi-sector quantitative models. Historically, those models were from the computable general equilibrium model family, typified by the Global Trade Analysis Project. More recently, the academic literature has shifted decisively in favour of a new generation of quantitative trade models that has a closer link to now-standard theory and incorporates structural gravity to explain bilateral flows. A benchmark quantitative trade model like Caliendo and Parro (2015) includes data on services, but sets trade values to zero. Services are therefore untraded in the scenario examined in the paper. But there is no impediment to including tradable services in the model, other than obtaining suitable data (and parameter estimates).

The trade literature is now at a particularly strong point in terms of empirical modelling of trade flows, and linkages to downstream economic variables such as real income, wages, and prices. Research applying these tools to services lags behind not because the tools are inapplicable, but primarily because of the data constraints.



Services trade

A large body of research exists investigating the services trade of countries over time and the determinants of national services trade competitiveness. Most of this is at a limited level of disaggregation, distinguishing between sectors as opposed to detailed product-level analysis and use of firm level data that has become the norm in analysis of trade in goods. As discussed in UNCTAD (2025) this reflects data availability and the absence of customs tariffs for services imports. Administrative data may help address some services trade analysis needs, depending on the country. Researchers have employed different strategies to do so in the lack of granular statistical data on services trade.

One is to combine tax and customs transactions microdata to compile firm-level data on services exports. This has been done for many OECD countries²⁵ but is much less prevalent for developing country contexts. Marra de Artiñano and Volpe Martincus (2023) provide an example for the case of Uruguay. They combine microdata from Uruguay's CIT and customs agencies which generates information on firm-level characteristics (including sector of activity, year of establishment, sales, purchases, number of employees, sales akin to exports, administrative expenses, and input costs). They combine these data with a census of foreign affiliates of multinational firm from Uruguay's national trade and investment promotion agency and a list of these affiliates from Dun and Bradstreet WorldBase to identify foreign-owned firms in the population of Uruguay's formal firms. Administrative tax records, including VAT information that identifies buyer-seller relationships, were used to construct firm-to-firm transaction networks. Finally, information on transaction-level goods exports and

imports over the period 2013-2016 were obtained from the Customs authorities.

The resulting dataset does not directly provide information on firm-level exports of services as this is not measured by Customs. Instead, Marra de Artiñano and Volpe Martincus compute a proxy for services exports for each firm using a variable "Sales Akin to Exports" from the tax forms that must be filed by all firms paying VAT and CIT. Given that this variable includes sales of both goods and services, they subtract firms' goods exports as computed from the transaction-level customs export data from "Sales Akin to Exports" to obtain an indirect measure of firm-level services exports. They find that there are significantly more exporters of services than exporters of goods and that the median exporter of services is smaller than median exporter of goods. Moreover, they find that firm size and linkages with foreign affiliates are positively associated with exporting both services and goods. The accuracy of the resulting estimate of services exports depends on how closely the "Sales Akin to Exports" variable corresponds to total exports and how completely goods exports are captured by Customs.

In a companion analysis, Marra de Artiñano and Volpe Martincus (2023) use firm-level administrative tax data from 2010-18 for Ecuador to investigate the effects on firms starting to export services and whether selling services domestically to a firm that exports services is associated with an increase in the probability of a firm becoming an exporter of services. They use firm-year level data from Ecuador, where all firms must report their total exports and imports of services when filing their CIT declarations. These data are aggregated in the sense that they only cover total sales and do not provide information on the type of services provided

²⁵ E.g., Belgium (Ariu, 2016; Ariu and Mion, 2017; Ariu et al., 2019; and Ariu et al., 2020), Finland (Damijan et al., 2015; Ariu et al., 2019), France (Gaulier et al., 2011; Damijan et al., 2015), Germany (Kelle and Kleinert, 2010), Italy (Federico and Tosti, 2017; Bripi et al., 2020), Japan (Morikawa, 2015), Poland (Matuszczak, Michałek and Woźniak, 2025), United Kingdom (Breinlich and Criscuolo, 2011; Breinlich et al, 2018; Breinlich and Magli, 2024) and the United States (Bruner and Grimm, 2019).



or the destination of sales. However, a key feature of the data is that they can be matched with administrative data from other sources, permitting analysis of the participation of multinational enterprises in trade in services, and they measure services trade directly. It is also important to note that even small changes in tax reporting forms can dramatically improve detection of services trade, and support national statistical authorities in compiling granular, high quality services trade statistics.

The CIT data include information on the universe of domestic firms – their location, sector of activity, starting year, employment, purchases, sales and capital assets – and include annual exports and imports of goods and services. These data are linked to data on sales and purchases as computed from VAT declaration submitted to the Tax Agency and a Census of Multinational Firms which identifies all active and inactive multinational firm affiliates in Ecuador. Estimation results indicate that when a firm begins exporting services, it experiences a significant increase in size, productivity, and propensity to import goods. Furthermore, a local firm that begins to sell domestically to an establishment that is a service exporter is associated with an increase in the probability that the firm will in turn start to export services. In Ecuador, multinational affiliates account for a very large share of total exports and imports of services, 57 and 68 per cent, respectively, well above their shares of total goods exports.

An alternative approach is to use firm- and transactions level information for a large importing country and analyse patterns of foreign sourcing of goods. Alvarez and Blyde (2025) use finely disaggregated data on United States of America import transactions to characterize different metrics of firm-to-firm relationships. They show how Latin American exporters compare with exporters from other regions, finding that trade costs negatively affect the formation and duration of firm-to-firm networks and help explain Latin America's performance. This analysis is limited to explaining the

performance of goods exporters, but the approach could also be used (provided that similar data existed for services) to assess the impact of access to services and services trade policy in exporting countries as a determinant of trade-related costs affecting goods export performance.

Dincer and Tekin-Koru (2016) focus on Türkiye, using the Annual Industry and Service Statistics database. This is based on an annual survey of all enterprises in the industry and services sectors carried out by the national statistical office (TURKSTAT). This covers all firms exporting services with at least 20 employees, as a legal requirement. The database includes information on employment, wages, investment, value added, sales, foreign ownership (greater than 10 per cent of the equity) and the number of domestic plants owned by a company. The survey asks firms to indicate the value of services exports as distinct from merchandise exports. This general business survey does not collect information on trade by destination or the specific types of services traded, unlike specific services trade surveys. One finding of the analysis for Türkiye is that services exports are rare (fewer than 2 per cent of firms export services) and that services exports occur for firms in both manufacturing and services sectors. Services exports are strongly correlated with MNEs.

Foster-McGregor, Isaksson and Kaulich (2015) use data compiled by the Africa Investor Survey of the United Nations Industrial Development Organization (UNIDO) to estimate the association between productivity and exporting, importing and two-way trade for services firms in sub-Saharan Africa. A weakness of the Africa Investor Survey data is that they span a cross-section of countries but only for one time period (2010-2011). The analysis covers some 2300 firms in the agriculture, manufacturing and services sectors in 19 African countries. The authors show that service firms that are engaged in international trade



perform significantly better across several performance measures than firms that sell and purchase in the domestic market only, a well-established feature of the empirical firm-level trade literature. Two-way traders tend to perform better than firms that only import or only export.

Regarding FDI measurement, the Africa Investor Survey provides detailed information on foreign investors' choices concerning local sourcing and the transfer of knowledge and other key resources to local suppliers. Amendolagine et al. (2019) use the Africa Investor Survey data to analyse the role of foreign direct investment and global value chain participation on local sourcing, finding that more intense GVC participation and upstream specialization is associated to a higher share of inputs sourced locally by foreign investors. Hoekman and Sanfilippo (2020) use the Africa Investor Survey to explore the participation of African firms in public procurement, differentiating between foreign-owned and local firms, and sales of goods v. services. They document that foreign owned firms often dominate in terms of the share of services provided to government (i.e., in public procurement) and that there is no evidence that selling services to the government is associated with an increase in performance (productivity), in contrast to sales of goods. Hoekman et al. (2026) use administrative microdata, including information from VAT records, to analyse how participation in public procurement by firms in Uganda affects their performance. As is true in most countries, public procurement contracts are concentrated in services activities. They find there is a crowding out effect, with firms obtaining public contracts diverting sales away from private sector buyers.

Firm-level data can also be used to assess the relationship between access to financial services and services exports. Focusing on Italy, Bripi, Loschiavo and Revelli (2020) combine Company Accounts Data Service providing detailed balance sheet data for a large sample of non-financial incorporated firms in Italy with survey data on firm-level

business and personal services exports by value and destination—excluding travel and tourism—collected quarterly by the Bank of Italy. These data are merged with bank data on bank-borrower (firm) relationships and supervisory data on banks' balance sheets. They find that credit supply has a significant impact on services exports at the firm level. A change in bank credit of 1 per cent is associated with an increase in services exports between 0.28 per cent and 0.41 per cent. Credit access is more important when firms export services to destinations with weaker institutions and greater contractual risks.

Servicification

Pattnayak and Chadha (2022) study the impact of servicification on exports of chemicals, pharmaceuticals, electrical and electronics industries by Indian firms using data for the period 2001-2016. They find that higher service intensities in the manufacturing process are positively associated with export intensity, after controlling for other firm productivity and characteristics such as firm size, exporter status and foreign ownership. Pant and Chakraborty (2024) similarly focus on India and analyze the impact of servicification of manufacturing during the 2000-2019 period – defined by the ratio of services inputs to total inputs used in production. They follow the literature (e.g., Arnold et al. 2016; Hoekman and Shepherd, 2017) to define services input intensity and document a pattern of rising services input intensity in Indian manufacturing. Firm-level data are sourced from the CMIE–Prowess dataset, which is compiled based on balance sheet information, audited annual reports and account statements of all listed and many unlisted Indian firms. They focus on both the intensive and extensive margin of exports as a function of service input intensities and show these become significant explanatory variables in more recent years. A policy implication of these papers is that policymakers should recognize the role played by services in manufacturing



export competitiveness and consider how policy affects access to services and incentives to pursue servicification.²⁶

Hoekman, Sanfilippo, Santi and Ticku (2025) focus on Uganda, asking whether firms that participate in international trade become more productive and analysing the role of services input intensity as a determinant of export performance. They use administrative microdata for Ugandan firms, combining VAT-based information with matched information on imports, exports, destinations/origins and employment, enabling buyer-seller linkages. They find that firms that engage in international trade – especially importers – show a productivity premium. This is as expected. More surprisingly, they find that firms with higher services-input intensity do not perform better, and that firms that are most dependent on services inputs do worse, suggesting services-quality constraints.²⁷

Employment

Another use of microdata is to assess the employment implications of structural transformation and servicification. Baccini, Fiorini, Hoekman and Sanfilippo (2023), for example, use population censuses to analyse how African labour markets have been shifting toward services, and which service activities are most associated with development. They use administrative-unit employment census data sourced from IPUMS-International for 13 African economies and link these data to local economic development using geo-located per-capita nightlight luminosity as a proxy to identify where services-led transformation is happening. Country selection is determined by the availability of at least two population censuses for a country. The authors find structural transformation toward services and service-related occupations has been occurring across all the countries in the sample, and that this is observed at the administrative unit level within each

country. High-skill services are strongly associated with economic development, but there is substantial heterogeneity within the services sector. Women, workers with more education and “white collar” occupations benefit disproportionately from the shift towards services.

Coskun and Sengul (2026) use IPUMS data for the United States and European Union labour force survey data to explore how services growth affects female labour market participation and outcomes. Structural change is associated with increasing female employment, reflecting in part that women may have a comparative advantage in service-oriented occupations. But the composition of the services sector also matters. Coskun and Sengul find that service sector growth is more effective in drawing women into the workforce in countries with a smaller public sector size and a higher female share in business services. The relationship between female share within business services is shown to depend on the size of the food and accommodation services. While this study focuses on developed countries, this is analysis that can readily be undertaken for developing countries using census data.

Li, Jing and Yan (2026) use Chinese firm-level microdata to investigate the effect of staggered implementation of China's Service Trade Innovation Development pilot zones starting in 2016. They show that policy change is associated with increases in the labour income shares of firms, reflecting an alleviation of financing constraints for firms and induced changes in firms' employment behaviour. Opening up to greater services trade in the zones incentivized firms bolster research and innovation activities, invest in skills and strengthen employee training. Impacts are concentrated among firms with initial low service orientation, low productivity, and labour-intensive operations.

²⁶ Mulyukova (2025) also uses firm-level panel data from India, finding that financial services liberalization significantly increased firms' product portfolios by relaxing firm credit-constraints.

²⁷ Breinlich, Leromain and Magli (2026) find a similar result for the United Kingdom trade post-Brexit.



Di Iorio and Volpe Martincus (2025) link 2010–2018 administrative panel data covering the universe of formal firms in Ecuador with tax records on employment and firm characteristics to firm-year information on exports and imports of goods and services. Because services trade is not reported by category, they identify digital-services exporters by combining positive services exports with an extended balance of payments services classification (EBOPS) – International Standard Industrial Classification (ISIC) mapping of digitally deliverable activities. Difference-in-differences estimates show that exporting digital services is associated with about 21 per cent higher employment. In a sample of firms that were non-exporters prior to entry, starting to export digital services increases employment by about 23–26 per cent in the entry year and by about 12–14 per cent in the following year. These effects exceed those for exporting other services and are robust to alternative fixed effects and controls for import status.

Luo (2025) studies the effect of manufacturing enterprise servitization on employment in China using the Chinese Industrial Enterprises Database. This provides information on firm income, number of employees, wage bill, fixed assets, sales value, new products introduced, liabilities, total profits, operating costs, and export values. Luo finds that servicification promotes employment growth in manufacturing firms, increasing both employment of skilled workers and total employment.

Effects of services and digital trade policies

A relatively large literature has developed analysing the effects of services trade and regulatory policies on the performance of

either the services sector or “downstream” sectors that use services as inputs into production. As mentioned previously, much of this research focuses on developed countries. There are studies analysing the performance of specific service sectors (financial, business, professional services) and many papers focusing on the effects of services sector performance on manufacturing activities and, to a lesser extent, agricultural firms and sectors. The bulk of the literature – see the Annex to this paper – uses sector-level data, either applied to a single country (e.g., Arnold et al., 2016) or to a cross-section of countries over a period of time that is determined by data availability (e.g., Beverelli et al. 2017; Su et al., 2020; Liu et al., 2020; Fiorini et al. 2025). This strand of research documents the importance of services inputs and policies affecting the cost or quality of such inputs for the performance of the industries that use services relatively intensively.

Research using firm-level data is sparser, and often relies on the World Bank Enterprise Survey (WBES) database as this is a readily accessible data source of information that also has a time dimension.²⁸ The lack of other more granular information reflects the statistical capacity gaps of countries to measure services trade with data identifying trading partners and types of services. There is scope to undertake country-specific analysis using administrative datasets that build on this research addressing research questions that go beyond downstream effects. This is beginning to emerge for countries that have microdata and made it available to analysts. For example, Mao and Xie (2025) use Chinese firm-level panel data to investigate how services liberalization in China increased the imports by firms of intermediate and capital goods. These effects were driven by liberalizing finance, distribution, and

²⁸ See e.g., Fu, Wang and Yang (2023) for an analysis using the STRI and WBES data for China. Hoekman and Shepherd (2017) use a large multi-country panel of WBES data to analyse the relationship between services and manufacturing firm productivity performance, focusing on the indirect impact of services productivity on the export performance of firms in the manufacturing sector. Consistent with what has been found in country-specific studies, the linkage between services productivity and manufacturing productivity is stronger for firms that use services inputs more intensively.



transportation services. Import growth in turn spurred firm performance indicators.

Another example is provided by Amodio, Chiovelli and Frache (2025), who leverage micro data for Uruguay, combining Customs transactions data, administrative tax records characterizing domestic intra-firm transactions, matched employer-employee data, and company balance sheet information. They use these linked datasets to analyse how growth in beef exports affect domestic suppliers through production networks. They find that domestic firms that supply inputs to beef producers that export experience significant sales growth, with the largest effects arising in the service sector, generating increases in employment, wages, and sales per worker. These positive impacts extend beyond direct suppliers to beef exporters, amplifying economic activity in the services further up the value chain. Using a network-based accounting framework, the authors estimate that beef exports to China increased Uruguayan aggregate input sales by 1.8 per cent, with one-third of this accounted for by indirect linkages. Over time, the service sector became more tightly integrated with beef exporters, enhancing the ability of Uruguayan producers to benefit from growth in trade with China.

As mentioned earlier in this paper, a significant effort has been made in the 15 years or so to compile cross-country, comparable information on applied services trade-related policies, including more recently policies and regulation affecting digital trade. Much of the research using the resulting STRIs or DTRIs as variables in analysis assessing the effects of changes in services policies does not use administrative or microdata but uses aggregate or sectoral BOP data or GVC/TiVA input-output data. For example, Taguchi and Lar (2026) use 2025 TiVA data and the OECD STRIs for five service sectors—trade, transport, I&C, finance, and professional services – to estimate the relationship between services trade restrictions and GVC servicification across Asian economies. They conclude that GVC servicification

remains relatively underdeveloped and that services trade restrictions significantly and negatively affect servicification. The bibliographic annex lists many papers that undertake similar analyses.

Much of the extant research that applies firm-level data to analyse the impacts of STRIs and DTRIs is applied to OECD member countries. There is little analysis of developing country reforms to STRIs or DTRIs that focus on services and use microdata. There is therefore substantial scope to do so in settings where microdata exist. Furthermore, it is important to invest in national capacities to collect granular data on services trade to enable such analysis. An example is Wang et al. (2026) who analyse the effects of banking services trade liberalization (using the OECD STRI for commercial banking services) on manufacturing firms' total factor productivity for a sample of 330,000 manufacturing firms across 43 countries between 2014 and 2021. They find that banking services trade liberalization boosts manufacturing firm productivity. The effect is primarily driven by liberalization of restrictions on market entry, barriers to competition, and other discriminatory measures. The positive association is stronger for LDCs, industries with low dependence on external finance, and large firms.

Foreign direct investment

As discussed previously, FDI is an important channel for supplying services through commercial presence and can facilitate domestic firms' access to a broader range of services inputs. It can also create opportunities for local firms to supply goods and services to multinational enterprises. There is an extensive research literature on the drivers and impacts of inward FDI into developing countries but most of the extant analyses do not focus on services. Instead, research has focused on competitive spillover effects and backward linkages, i.e., domestic firms benefitting from FDI by becoming suppliers of intermediate inputs (goods) to



foreign-owned firms that establish in their country. There are few papers exploiting linked administrative data that combine data on FDI with population censuses or labour surveys to assess employment effects of FDI in services activities.

An exception is Hoekman, Sanfilippo and Tambussi (2025), who analyse the effects of inward FDI on local labour markets and structural transformation in African economies. The authors use delocalized data on greenfield FDI (i.e., new investment projects as opposed to acquisitions of domestic companies) that are matched with a labour market data spanning cohorts of workers in 24 African countries at subnational level. Greenfield FDI projects, drawn from the fDiMarkets database, are found to increase employment and to shift workers toward modern industries and higher-skill occupations. They also use geo-localized WBES data to evaluate spillover effects from FDI projects in locations that are nearby to domestic firm. They find that such spillovers appear to be part of the mechanism driving structural transformation.

Jungmittag and Marschinski (2023) similarly use fDiMarkets to analyse the effects of OECD STRIs on bilateral greenfield FDI projects in four business services sectors, 43 destination countries and up to 41 source countries during the 2014–2020 period. STRIs are found to represent a significant barrier for greenfield FDI. They simulate that reducing relevant restrictions by 50 per cent is associated with increases in FDI across the destination countries ranging from 20 per cent to 100 per cent.

Prosi et al. (2026) focus on the effects of inward FDI in Rwanda. They estimate backward and forward linkages between local firms and foreign investors (backward linkages involve sales of inputs while forward linkages reflect purchases from multinationals). They employ administrative data for the universe of formal firms in Rwanda (2013–2022), combining CIT, payroll, and firm-to-firm transaction records from VAT filings. They find that forward linkage effects are substantially greater than

backward linkages: domestic firms that buy from foreign-owned firms achieve higher value added, employment, and productivity, with especially important effects arising through purchases of services inputs.

Another question of policy interest concerns the effects of liberalizing restrictive FDI policies. There is much research on this question, most of which uses sector-level information. A recent example is Fiorini, Hoekman and Quinn (2023; 2025) who analyse the effects of liberalizing international payments for cross-border trade in services and capital investment (FDI) on productivity of manufacturing sectors in a sample of African economies (2023) and across all developing countries (2025). They combine services trade policy measures drawn from the IMF data sources and sector-level performance measures. The use of IMF data on BOP restrictions is an example of administrative data – this information is compiled by the IMF under its surveillance mandate and has been collected and reported going back to the 1960s. Lower services trade restrictions are associated with better manufacturing-sector performance; the gains rise with services input intensity and are stronger where governance quality is better.

Li, Zhao and Yang (2024) study the relationship between liberalization of FDI in services in China and productivity of high-tech manufacturing firms. Liberalization improves high-tech firms' TFP, with the effect being greater for firms with a higher degree of service dependence and located in regions with better institutional environments. Following the liberalization, high-tech firms outsource more services and spend less on intermediate inputs.





Chapter VII

Conclusions and recommendations





Conclusions and recommendations

Data and statistical capacity gaps remain an important constraint for research and evidence-based policy for services trade, particularly in developing countries. At the same time, national censuses, business surveys and tax records increasingly cover services firms and are not yet fully exploited by stakeholders involved in producing, analysing and using services trade data. The report recommends national-level action, including systematic audits of existing data sources, disaggregated data collection by partner and sector, and better researcher access through anonymization and data linkage, complemented by international support for statistical capacity building and South-South exchanges of best practices.

This paper provides a comprehensive overview of key issues in the research agenda surrounding services trade. Its emphasis has been on data and research findings, with the introductory sections setting the scene by discussing linkages from economic fundamentals to trade, and from trade to economic and social outcomes of importance. In doing so, it seeks to provide analysts with additional resources and ideas, complemented by an exhaustive bibliographical annex as an additional product. At the same time, it provides information and resources for policymakers and administrators relating both to the development of new data resources, and improvements in interoperability and use of existing resources.

The economic dynamics underlying services trade and its links with economic and social outcomes are in many cases familiar from analysis of goods sectors. Comparative advantage and the Lerner symmetry, for example, apply with equal force to services as they do to goods. However, there are also important differences between goods and services that affect both the questions researchers ask, and the tools they use

to answer them. For instance, even in an environment of rapid digitalization, co-location of purchaser and seller remains important in many services sectors. As such, GATS Mode 3 remains the central way in which foreign enterprises contest local services markets. Because of this dynamic, investment-related issues loom larger in work on services than in goods, and all the more so in an environment of widespread GVC participation in both goods and services sectors, with strong linkages between the two.

A key finding from the review is that data and statistical capacity gaps remain a serious constraint—arguably the binding constraint—for research and evidence-based policy on services trade, and the services economy more generally. Among academic researchers, goods sectors continue to receive the bulk of research attention in areas like quantitative modelling, largely because trade flow data are of high quality and easily available, and policies are summarized by simple ad valorem tariffs. Although there is more quantitative work, including modelling, that covers services, constraints both on underlying flow data



and the policies that affect them mean that this research agenda remains severely hampered relative to goods. The point is particularly acute in developing countries.

A second finding, however, is that there is more that stakeholders involved in trade in services data production, analysis and policy could do to exploit the sources of data that are currently available. National data sources such as censuses and enterprise surveys increasingly cover firms operating in the services sector. Similarly, tax records can be informative about relationships between services firms and other parts of the economy, as well as providing highly detailed and reliable information on sectoral trajectories. Just as researchers have learned much about the dynamics of goods trade from using micro-data of different types, it seems likely that as information on these data sources is disseminated, there will be an increasingly important body of research exploiting them for a better understanding of services sectors and their trade dynamics.

These findings point to priorities at both the national and international level, broadly in line with the recommendations of UNCTAD's informal working group on data for services, trade and development policies and the Primer, with particular emphasis on how existing and improved data can be put to better use for policy.

At the national level, a priority is the collection of fully disaggregated services trade data – by partner and by sector – in line with the Manual on Statistics on International Trade in Services and the Balance of Payments Manual (BPM7), alongside investment in the statistical capacity required to measure trade by mode of supply. One tool for developing countries is UNCTAD's TISSTAT, a trade in services statistics information system, that helps national statistical authorities to collect granular and internationally comparable data on services trade from businesses with a modern tool to provide details on trading partner and mode of supply.

Furthermore, constructed datasets such as BaTIS and TISMOS are most effective when national data collection provides the direct observations that underpin them.

A systematic audit or review of existing national data sources (like trade data, tax records, and enterprise surveys) could help target direct data collection from businesses and combine these data with existing data instruments, as well as potential new instruments based on best practice in other countries. Facilitating access to granular data for researchers, through appropriate anonymization and data linkage across datasets, would further strengthen the evidence base for services trade policy.

At the international level, technical assistance and capacity-building have a key role to play in addressing the gaps identified in this report, specifically in the area of statistics related to services firms and trade in services. Supporting national statistical offices in developing countries (financially, with digital tools, through the provision of expertise, and in global, regional and national partnerships) is central to advancing the national-level priorities above. Guidelines on best practices for managing national data sources for services trade, including through South-South exchanges, could support efforts to upgrade access to data and services-related policy analysis. The international community can also contribute by working with national statistical offices to enhance efficient collection of granular services trade data, develop protocols for data access for scientific research and manage data confidentiality, to enable rich research and evidence-based policy also for the many developing countries that currently lack these data.



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Annex

Bibliography on services trade, productivity and economic development²⁹

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²⁹ This bibliography is mostly limited to research published after 2010. For a survey of pre-2010 research on services trade and policy, see Francois and Hoekman (2010).

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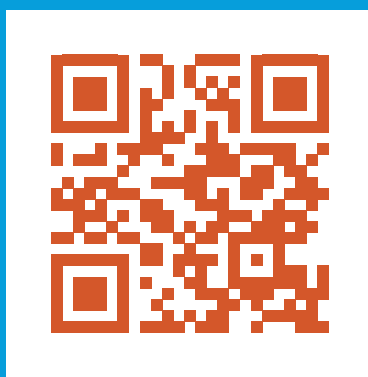
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