WORLD TRADE ORGANIZATION

WORLD TRADE REPORT 2019

The future of services trade

What is the World Trade Report?

The World Trade Report is an annual publication that aims to deepen understanding about trends in trade, trade policy issues and the multilateral trading system.

What is the 2019 Report about?

The 2019 World Trade Report examines how trade in services is likely to evolve in response to some major trends, such as demographic changes and the impact of digital technologies.

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Contents

Acknowledgements and Disclaimer **3**

Foreword by the WTO Director-General **4**

Key facts and findings **6**

Executive summary **7**

A. Introduction **12**

1. Globalization of services 14
2. Digitalized services: the non-tradable becomes hyper-tradable 14
3. The evolution of trade: from agriculture to manufacturing to services 15
4. More complex services trade requires more coherent policies 17
5. Why it matters 17
6. Structure of the report 18

B. Services trade in numbers **20**

1. Trends in trade in services 22
2. Global trade in services through all modes of supply is worth US$ 13.3 trillion 22
3. Who trades services? 31
4. What is the role of services in global value chains? 44

C. Why services trade matters **50**

1. The gains from services trade 52
2. Services trade boosts firms' competitiveness 65
3. How services trade affects employment and inclusiveness 69
4. Concluding observations 80

D. Services trade in the future **82**

1. Trade costs 84
2. Major trends that will affect trade in services 100
3. Quantifying services trade in the future 122
4. Concluding observations 134

E. What role for international cooperation on services trade policy? **152**

1. Introduction 154
2. Why governments cooperate on services trade policy 154
3. How countries collaborate in the services sphere 165
4. Prospects for future cooperation 184
5. Concluding observations 193

F. Conclusions **198**

Opinion pieces

Alan Beattie, "The case of the missing services" 23

Sonja Grater, Ali Parry and Wilma Viviers, "MSMEs and services trade: A pathway to inclusive growth in developing economies?" 42

Matteo Fiorini and Bernard Hoekman, "Services trade policy and the United Nations Sustainable Development Goals (SDGs)" 66

Rupa Chanda, "Ensuring inclusive services trade: role of complementary domestic policies" 78

Richard Baldwin, "Digital technology and telemigration" 126

Natallie Rochester, "The potential of trade in services for developing countries" 166

Jane Drake-Brockman, "Why regulatory cooperation matters for business" 188

Bibliography	**200**
Technical notes	**213**
Abbreviations and symbols	**218**
List of figures, tables and boxes	**219**
WTO members	**225**
Previous World Trade Reports	**226**

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Foreword by the WTO Director-General

Services are often largely overlooked in discussions on global trade, yet they account for the majority of trade in many developed economies and are growing rapidly in many developing economies as well. This is perhaps because services are less tangible and the issues surrounding services trade are often more complex. This report therefore sets out to demystify trade in services. It aims to shed new light on this essential part of global trade, provide a detailed picture of trade in services today and consider how it might evolve in the coming years, particularly as new technologies make some services increasingly tradeable.

The Report deepens our understanding in a number of ways, including through presenting new data. By looking more closely at services delivered by a company that has an office or subsidiary in a foreign country, we have found that trade in services is significantly larger than previously thought. In fact, when this "commercial presence" is accounted for, trade in services was actually worth US$ 13.3 trillion in 2017 – therefore accounting for a share of overall global trade 20 percentage points higher than traditionally estimated. On average services trade has grown 5.4 per cent per year since 2005, which is faster than trade in goods, at 4.6 per cent on average. Distribution services and financial services are the most traded services globally, accounting for almost one-fifth of trade in services each, followed by telecommunications, audio-visual and computer services, which together account for 13.2 per cent. Trade in other sectors, such as educational, health, and environmental services, although currently relatively small, is rising rapidly.

Developing countries' share of global services trade has grown by more than 10 percentage points since 2005, reaching 25 per cent of world services exports and 34.4 per cent of world services imports in 2017. However, services trade is concentrated, with the same five developing economies ranking both as leading services exporters and importers. Together these five economies accounted for more than 50 per cent of developing countries' services trade. Least-developed countries accounted for 0.3 per cent of world services exports and 0.9 per cent of world services imports in 2017, although this does represent an increase since 2005.

One key message from the report is that services trade is evolving fast. Digital technologies, demographic changes, rising per capita incomes and climate change will all act as disruptors, potentially reducing trade costs, creating shifts in demand, and creating new markets, for example in environmental services. Digital technologies are likely to have a particularly significant impact as they change the ways that companies do business, allowing them to access a global marketplace and creating new channels through which to deliver services which were once provided face-to-face.

Digital technologies can be a driver of inclusivity in services trade, by dramatically cutting costs and lowering barriers to entry. This is true for developing countries, and it is true for smaller businesses. Micro, small and medium-sized enterprises (MSMEs) that offer services are on average two years younger when they start exporting as compared to manufacturing MSMEs. New technologies have facilitated this faster access to international markets as MSMEs' participation in services trade is frequently in digitizable services, such as professional and scientific activities. There is also a potential opportunity here to support women's economic empowerment, as services play a prominent role in women's employment. However, so far women are under-represented in the most traded service sectors. Groups of WTO members recently launched discussions on leveraging trade to support MSMEs and women's economic empowerment. Services trade is clearly relevant in both cases.

Services exports support a huge number of jobs around the world, but there is tremendous untapped potential. A further expansion of services trade will be reliant on a number of factors. The quality of institutions in the importing country is particularly significant. Driving new services trade reforms through trade agreements is also important, although progress in this area has often proved difficult. WTO

members continue to pursue multilateral negotiations on services trade, and a group of members recently launched an initiative towards greater cooperation on domestic regulation of services. How these efforts – and those in other fora, such as regional trade agreements – evolve, only time will tell.

What is clear is that services represent a highly significant part of global trade – one which will be increasingly important in determining economic growth, development and job creation around the world. This report is a crucial step in increasing our understanding of this vitally important part of global trade – and therefore I want to thank the authors and contributors for their excellent work. Building on the contribution made by this report, the WTO will continue to improve its services data and is launching a biannual Services Trade Barometer to provide a real-time indicator of the strength of services trade globally. It is time that services took its rightful place front and centre in the global trade debate.

Roberto Azevêdo
Director-General

Key facts and findings

- Trade in services has expanded faster than trade in goods between 2005 and 2017, at 5.4 per cent per year on average.
- When commercial presence in another country (mode 3) is accounted for, trade in services was worth US$ 13.3 trillion in 2017.
- Commercial presence is the dominant mode of supply for trading services globally, representing almost 60 per cent of trade in services in 2017.
- Distribution and financial services are the services most traded globally, each accounting for almost one-fifth of trade in services. The share of other services, such as education, health or environmental services, is rising rapidly, but currently accounts for a negligible proportion of overall trade in services.
- The contribution of developing economies to trade in services grew by more than 10 percentage points between 2005 and 2017, but is mainly concentrated in five economies. The share of least-developed countries remains small, although it has increased significantly since 2005.
- In developing economies, micro, small and medium-sized enterprises trading in services start exporting more quickly than manufacturing firms. However, they export less than 5 per cent of total sales, a share three times lower than large services firms.
- Firms owned by women are under-represented in services exports, although less so than in manufacturing.
- Services value-added accounts for close to half of the value of international goods and services trade.
- Trade in services creates welfare gains for society through a more efficient allocation of resources, greater economies of scale, and an increase in the variety of services on offer.
- In addition, some service sectors, such as infrastructural services, play a critical role in the functioning of the entire economy while others affect the productivity of the economy's factors of production.
- An important avenue through which services trade benefits societies is the improvement in firms' competitiveness, both in the services and manufacturing sectors.
- Because services providers must often be present in the area where the service is delivered, the quality of institutions in importing countries is of greater importance in services trade than in goods trade.
- A large number of jobs is supported by services exports, but the effect of services trade on the level and structure of employment has so far been minimal. Services trade may help to reduce economic inequality for women and for micro, small and medium-sized enterprises.
- Trade costs in services are almost double those in goods, but they fell by 9 per cent between 2000 and 2017 thanks to the spread of digital technologies, the lowering of policy barriers, and investment in infrastructure.
- Four major trends will affect services trade in the future: digital technologies, demographic changes, rising incomes, and the impact of climate change. These trends will create new types of services trade, affect the demand for services, and disrupt trade in some services while creating new markets in areas such as environmental services.
- According to the WTO Global Trade Model, the share in global trade of the services sector could increase by 50 per cent by 2040. If developing countries are able to adopt digital technologies, their share in global services trade could increase by about 15 per cent.
- Despite the reforms that most economies have undertaken over the past few decades, trade in services remains subject to higher barriers than trade in goods.
- Driving new services trade reforms via trade agreements has proven difficult.
- Accompanying market-opening negotiations with greater international cooperation focused on domestic regulatory measures may be one way to harness the potential of services trade.

Executive summary

A. Introduction

Services have become the backbone of the global economy and the most dynamic component of international trade.

Trade in services has been expanding rapidly, at a faster pace than trade in goods since 2011. Services currently account for around three quarters of GDP in developed economies, up from 40 per cent in 1950, and many developing economies are becoming increasingly services-based. In some cases, this is occurring even more rapidly than in developed economies.

Technology is making it easier to trade services.

Much services trade until recently required producers and consumers to be in physical proximity. But in the current services economy, it is becoming significantly easier to trade in services, thanks in large part to digitalization. The growing cross-border tradability of services is opening new opportunities for national economies and individuals.

Fulfilling the potential offered by the internationalization of services requires finding new pathways to advance international trade cooperation.

While technology plays an instrumental role in expanding services trade, it is not sufficient. Various obstacles continue to hinder trade in services. Finding new ways to overcome these obstacles may be necessary if governments are to realize the full potential offered by the growing internationalization of services.

B. Services trade in numbers

World trade in services has been growing faster than trade in goods, reaching US$ 13.3 trillion in 2017.

Traditional statistics on trade in services do not cover all four of the modes of services supply, as defined by the General Agreement on Trade in Services (GATS). However, a new WTO experimental dataset includes GATS mode 3 – commercial presence in another country – for the first time, thereby capturing the total value of services trade. Using these new estimates, trade in services was worth US$ 13.3 trillion in 2017. Services trade grew 5.4 per cent annually on average from 2005 to 2017, faster than goods trade.

Distribution and financial services are the most traded services globally.

Distribution and financial services each account for almost one-fifth of trade in services, while trade in computer services and research and development have recorded the most rapid average annual growth from 2005 to 2017 (above 10 per cent). Some services, such as education, health or environmental services, account for a negligible share of trade at present but are rising rapidly.

Commercial presence (GATS mode 3) is the dominant mode for trading services globally.

Commercial presence, i.e. the supply of services through foreign affiliates (GATS mode 3) accounted for 58.9 per cent of services trade in 2017, followed by cross-border services transactions (mode 1), at close to 30 per cent. Commercial presence represents an even more important share of trade in the finance and distribution sectors. However, increased digitalization is reshaping business models, opening more possibilities for cross-border supply in these sectors too.

Developing economies have increased their share in services trade, albeit unevenly; the share of least-developed countries remains small, but has increased significantly since 2005.

The share of world services trade by developing economies has grown by more than 10 percentage points since 2005, reaching 25 per cent of world services exports and 34.4 per cent of world services imports in 2017. However, services trade is very concentrated, with the same five developing economies ranking both as leading services exporters and importers, accounting together for more than 50 per cent of the developing group's services trade in 2017. Least-developed countries accounted for 0.3 per cent of world services exports and 0.9 per cent of world services imports in 2017. While these shares are small, they are significantly higher than in 2005.

The participation of micro, small and medium-sized enterprises (MSMEs) in services trade has been facilitated by new technologies.

In developing economies, MSMEs operating in the services sector are less internationalized than MSMEs operating in manufacturing. The trade participation of services-based MSMEs in developed economies varies across countries. However, starting

to export is easier in the services sector: services-based MSMEs are on average two years younger than manufacturing-based MSMEs when they start exporting. Technological progress and the spread of the internet appear to have played a key role in giving services-based MSMEs faster access to international markets. The type of services trade in which MSMEs frequently participate is digitizable services, such as professional and scientific activities.

There is much potential for women to benefit from services trade, but so far they are under-represented in the most traded services sectors.

Services have played a prominent role in steadily increasing women's participation in the workforce. However, except for wholesale and retail trade, women's employment is concentrated in the least traded sectors, such as education, health and social services. Firms owned by women are also underrepresented in services exports, although less so than in manufacturing.

Services represent an important source of value-added in total trade.

Measuring the role of services in international trade has become more complex as global value chains and technological change have blurred the distinction between services and goods activities. Statistics based on trade in value-added capture the importance of services as inputs to all sectors in the economy, revealing that services play a bigger role in international trade than gross statistics suggest. Services value-added accounts for close to half of the value of international goods and services trade.

C. Why services trade matters

Trade in services can help economies achieve more rapid growth, enhance domestic firms' competitiveness, and promote inclusiveness in terms of skills, gender and the location of economic activity.

As with trade in goods, trade in services creates welfare gains for society. Trade in services promotes a more efficient allocation of resources and greater economies of scale. It can lead to an increase in the variety of services available to consumers and producers, and it can set in motion processes by which the more productive services firms can expand and grow.

Beyond these usual sources of gains, some services sectors have special or unique features that may amplify how an economy can benefit from trade in services. For example, transport, telecommunications, finance, and water and electricity distribution, generally known as infrastructural or producer services, play critical roles in the functioning of the entire economy. Other services sectors have an outsized impact on factors of production, like labour. For example, the productivity of an economy's labour force depends on how educated, skilled and healthy it is, attributes which hinge crucially on the quality of that economy's educational and health systems.

Allowing greater access to foreign services is one way to improve efficiency, with potentially large payoffs for the economy.

The available empirical evidence from the literature shows that increased openness in a number of economies and in sectors such as financial services, telecommunications, electricity distribution, transport and healthcare have led to a variety of positive outcomes – better quality services at a lower cost, greater efficiency, and faster GDP growth rates. The survey of the empirical evidence included in Section C is complemented with country case studies of successful developmental outcomes as a result of an expansion of trade in services. These studies show that trade in services can have a significant impact on employment, wages and economic growth.

Increased trade in services can affect the welfare of the average consumer.

The report shows the meaningful contribution of trade in services to the economic welfare of many economies. The computable general equilibrium (CGE) modelling literature suggests that welfare gains from opening up trade in services range between 2 and 7 per cent. For the period 2000 to 2014, one method suggests that trade in services led to an average 6.3 per cent increase in GDP per capita for some 148 economies, with some of the biggest gains in developing and least-developed countries.

One important way in which services trade benefits economies is the improvement in firms' competitiveness.

An increase in firms' competitiveness manifests itself in three ways. Firstly, the competition engendered by services trade increases the productivity of services firms. A second and indirect way is by increasing the productivity of manufacturing firms and other services firms that employ services as production inputs. Finally, product differentiation also helps to increase competitiveness, for instance by bundling the provision of services with a manufactured product.

The quality of institutions in the importing country is of greater importance to services trade than to goods trade.

The primary reason for the amplified role of institutions in the importing country is that services providers must often be present in the area where the service is delivered; this consideration is of less importance in goods trade. Consequently, the quality of local institutions affects a services exporter's decision as to whether or not to operate in a particular economy, and impacts the gains from trade if this decision is made.

The growing importance of services shows itself not only in trade statistics but also in labour market statistics.

As services trade has come to be a major part of the export mix of various economies, a large number of jobs is supported by services exports. For instance, the information and communications technology sector in India employs around 3.5 million workers.

However, the effect of services trade on the level and structure of employment has been small so far.

Most evidence suggests that total employment and average wages have not been significantly affected by services trade, although some studies report positive effects. In contrast, services trade has affected the composition of the workforce, with several studies suggesting that high-skilled workers in cities tend to be the main beneficiaries in both developed and developing countries. Nevertheless, these effects have been quantitatively small.

Services trade can help to reduce economic inequality.

Services trade may also benefit women in the labour market, as services sectors are more balanced in terms of gender than manufacturing or mining. Services may also help to level the playing field for micro, small and medium-sized enterprises (MSMEs), as services exhibit smaller fixed costs of production. For instance, relatively lower physical investments necessary to run a business in services imply that a reduced access to finance is less limiting to MSMEs in the services sector than to MSMEs in manufacturing. Through these channels, services trade can contribute to reducing inequalities.

D. Services trade in the future

Predicting how services trade is likely to evolve in the future is not an easy task.

Various factors affect how trade patterns may change. Technology, factors of production and consumer preferences are key drivers of trade. In addition, both firms and individuals may leverage comparative advantage of the host country if they are trading services through a commercial presence abroad (GATS mode 3) or through the temporary movement abroad (GATS mode 4).

Trade costs are key to determining whether an economy trades and how much it trades.

This report uses a novel approach to estimate trade costs and breaks them down into their components: information and transaction costs, governance quality, trade policy and regulatory differences, and technology and transport costs.

Trade costs in services are almost double those in goods, but they fell by 9 per cent between 2000 and 2017.

Trade in services has traditionally faced higher costs compared to trade in goods, largely due to the "proximity burden" of services trade (i.e. the necessity for suppliers and consumers of services to be in close physical contact), and of more complex policy regimes than those applied to the goods trade. Declining trade costs are allowing more services to be traded through cross-border supply (GATS mode 1), in particular, a trend that can be particularly benefitting developing countries and MSMEs.

Several factors have contributed to the fall in services trade costs.

Technology is one of the factors that has led to a decline in trade costs in services. A key effect is that global exports of services enabled by information and communications technology have more than doubled between 2005 and 2018. A second factor is policy reforms that, on average, have reduced barriers, although new trade restrictions in some sectors, especially in digitally-enabled services, have emerged. The third factor is investment in physical and digital infrastructures and policies to enhance competition, including foreign participation, which has helped to bring down transport costs and increase connectivity.

Digital technologies will affect services trade even further in the future.

First, by enabling cross-border trade for services that have traditionally needed face-to-face interaction, digital technologies are likely to reduce the cost of trading in services. Second, digital technologies will blur the distinction between goods and services activities. Third,

they will allow firms to reach larger numbers of digitally connected customers across the globe and to facilitate the outsourcing of activities. These trends will increase the importance of data flows, intellectual property and investment in digital infrastructure.

Demographic changes will play a key role in affecting the composition of the future demand for services and the patterns of specialization.

A population's age structure is a key factor in determining the composition of demand for services and patterns of specialization: an ageing population in developed countries will demand more health services and a growing young population in developing countries will demand education and digital services. Trade in services will be key to satisfying these demands. Digital technologies may facilitate the imports of education services into developing countries, with potentially positive development effects.

Demographic changes will increase the demand for online services.

Millennials (those born between 1980 and 1996) and Generation Z (those born between 1997 and 2012) represent an increasing share of the world's population. These two groups currently constitute more than 50 per cent of major users of social media platforms, and spend more than two and a half hours per day on social media, on average, compared to one hour a day for Baby Boomers (those born between 1945 and 1964). This demand is providing new opportunities, especially for certain types of services providers, such as creative industries in developing countries.

Convergence in incomes per capita between developed and developing countries will change patterns of trade in services.

As the income of a country grows, richer consumers spend increasingly larger amounts on skills-intensive services, such as financial and insurance services, and richer countries tend to specialize in the production of these services. Therefore, if countries converge in income, a larger number of countries will participate in services trade.

Climate change will modify the nature of some services sectors.

Climate change is likely to disrupt some services and their trade. In tourism services, climate change is likely to make some destinations less appealing to tourists or more vulnerable to natural disasters. In terms of transportation, climate change is likely to disrupt some traditional routes, and may open new ones. For example, extreme weather conditions may lead to more frequent port closures, but warmer winters could reduce the amount of sea ice in many important shipping lanes, extending the shipping season. However, under the pressure from consumers, services industries are also adapting to become more environmentally friendly; for example, there is growing demand for ecotourism, especially from the Millennial generation.

Climate change will also increase the demand for trade in environmental services.

The market for environmental services is expected to grow significantly in the future (for example, project consultancy services for the construction of wind power systems, or the transportation and installation of materials required for its construction) as populations seek to adapt to and mitigate climate change.

The share of services in world trade is likely to grow by 50 per cent by 2040.

In order to get a sense of the potential quantitative impact of these major trends on services trade, this report uses the WTO CGE model and runs a number of simulations. It examines the combined impact of three trends: (i) generally lower services trade costs due to digital technological innovation; (ii) a reduced need for face-to-face interaction in services trade; and (iii) a lowering of the policy barriers to services trade. The simulations project that, under these scenarios, the services sector share of global trade will grow by 50 per cent by 2040. If developing countries are able to adopt digital technologies, their share in global services trade will increase by about 15 per cent.

E. What role for international cooperation on services trade policy?

Policy barriers to trade in services are much more complex than in goods trade.

Policy barriers in services trade are essentially regulatory in nature, rather than tariffs, as in goods trade. At the same time, in view of the pervasiveness of market failures in many services markets, most services regulation does not aim to restrict trade, but rather to pursue public policy objectives. For instance, education and training requirements are imposed on service providers to ensure their competence in instances where the complexity of the service being supplied makes it very difficult for consumers to appreciate quality or safety prior to

consumption (i.e. a market failure due to "asymmetric information").

Over the past three to four decades, most economies have embarked on far-reaching reforms targeted at opening up their services markets to competition, including from foreign suppliers.

Most reforms were not propelled by trade negotiations, with the notable exception of WTO accessions, but were undertaken by governments in an autonomous manner. Those transformations proved to be a driving force behind greater international cooperation in the services arena, which culminated, in 1995, in the entry into force of the GATS. The GATS provides rules-based, transparent and predictable conditions under which services firms can operate.

Opening services markets unilaterally does not allow economies to reap all the potential benefits.

First, there is a risk of policy reversals. Second, several trade barriers have proven impossible to remove based on purely domestic processes. Third, regulations set by countries independently of one another are likely to result in heterogeneity, and thereby to be a source of unintended trade costs for services suppliers. International cooperation on services trade policy enables countries to secure their unilateral reforms, and those of their trading partners, more fully, by binding them in trade agreements, thereby guaranteeing that global services markets will remain open, and may also contribute to regulatory convergence.

Economies have collaborated, both in the WTO and in regional trade agreements, on lowering services trade barriers and on regulatory measures.

Collaboration has not been fully exploited to deliver on its potential, however, as testified by the overall low levels of market openings committed in the WTO (except on the part of economies that acceded to the WTO after its creation) compared to the actual level of openness of services regimes. The generally modest state of WTO commitments stands in stark contrast to the breadth of the levels of access bound in regional trade agreements. Regional trade agreements have also made deeper inroads into establishing disciplines, in particular on GATS domestic regulation, services e-commerce, telecommunications services and the movement of individuals supplying services (GATS mode 4).

However, multilateral as well as bilateral/ regional services trade agreements have so far found it difficult to drive services trade reforms.

One likely explanation for the difficulty in driving services reforms is the pervasive role that regulation plays in services markets and the essential role that well-designed regulatory policies and appropriate domestic regulation play in delivering welfare-enhancing trade-opening. Nevertheless, the findings of this report point to a number of factors that might increasingly motivate governments not only to open up their services markets, but also to seek mutual openings on the part of their trading partners.

Accompanying market opening negotiations with greater international cooperation focused on domestic regulatory measures may be one avenue to harness the potential of services trade.

In most services sectors, market openings need to be supported and enhanced by adequate domestic regulatory measures, while strengthened regulatory measures and governance are a necessary condition for trade-openings to deliver on their potential economic benefits. Technical assistance and capacity-building would be crucial in this regard, enabling countries to respond to the challenges and opportunities brought about by technology and the ensuing changes in services trade patterns.

On-going deliberations in the WTO point to the areas where the members concerned feel that international cooperation is worth pursuing further.

Current services discussions in the WTO are focused mostly on regulatory aspects, and specifically on GATS domestic regulation, the services trade-related aspects of electronic commerce and the relevant elements of investment facilitation. The services component of the WTO Work Programme on Electronic Commerce remains active, particularly with respect to sharing of information and experiences. However, much of the discussion on the three topics is taking place in plurilateral groups of 70+ members, also known as Joint Statement Initiatives, in meetings open to all members. These Initiatives do not necessarily reflect the issues, or the only issues, where deeper collaboration would be desirable, but rather demonstrate a meeting of minds amongst the members concerned that WTO discussions on these topics can be valuable.

A Introduction

Services have become the most dynamic sector of world trade – but in ways that are not always recognized or understood. Just as services have come to dominate many national economies, they are playing a bigger role in the global economy as well. Many factors are driving this – including consumption, liberalization and investment – but the game-changer is technology. Services that were once difficult to trade, because they could only be delivered in person, are becoming far easier to trade, because they can be delivered digitally. The 2019 *World Trade Report* explores this globalization of services – why it is happening, how it is impacting economies, and where new policy approaches are needed.

Contents

1. Globalization of services 14

2. Digitalized services: the non-tradable becomes hyper-tradable 14

3. The evolution of trade: from agriculture to manufacturing to services 15

4. More complex services trade requires more coherent policies 17

5. Why it matters 17

6. Structure of the report 18

1. Globalization of services

The services sector is emerging as a key driver of global trade.

Services have already transformed national economies on a massive scale. Not only are services indispensable to running our increasingly complex and sophisticated industrial economies – from logistics, to finance, to informatics – but the services sector is the fastest growing economic segment in its own right – from business services, to healthcare, to entertainment. Services generate more than two-thirds of economic output, attract over two-thirds of foreign direct investment, and provide almost two-thirds of jobs in developing countries and four-fifths in developed ones.

Services now seem to be transforming international trade in similar ways. Although they still only account for one fifth of cross-border trade, they are the fastest growing sector (WTO, 2017). While the value of goods exports has increased at a modest 1 per cent annually since 2011, the value of commercial services exports has expanded at three times that rate, 3 per cent (see Figure A.1). The services share of world trade has grown from just 9 per cent in 1970 to over 20 per cent today – and this report forecasts that services could account for up to one-third of world trade by 2040.[1] This would represent a 50 per cent increase in the share of services in global trade in just two decades.

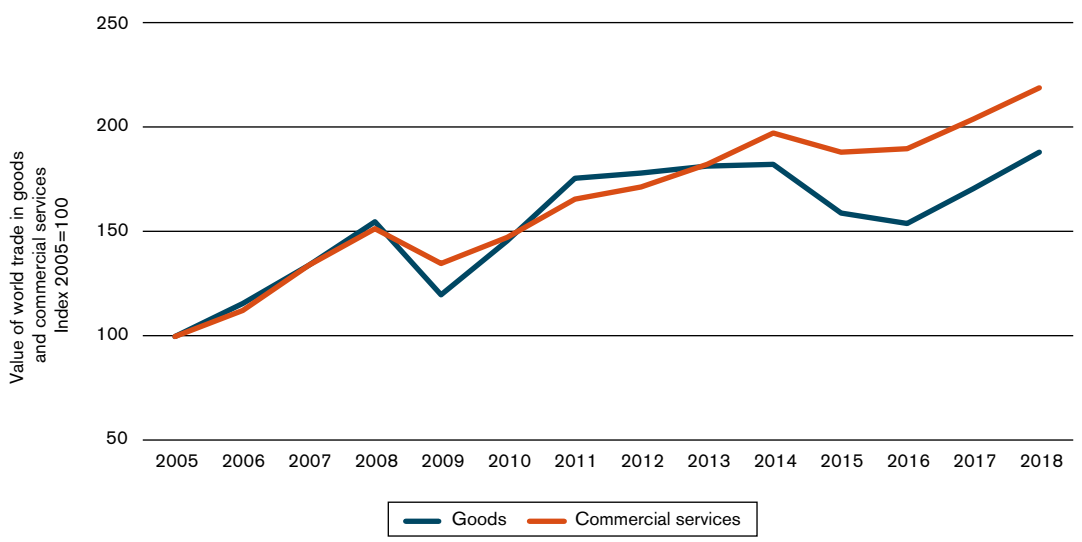
There is a common perception that globalization is slowing down. But if the growing wave of services trade is factored in – and not just the modest increases in merchandise trade – then globalization may be poised to speed up again.

2. Digitalized services: the non-tradable becomes hyper-tradable

The main driver of this shift is technological change. Thanks to digitalization, the internet and low-cost telecommunications, many services sectors that were once non-tradable – because they had to be delivered face-to-face in a fixed location – have become highly tradable – because they can now be delivered remotely over long distances.

Of course, some services, such as taxis, hotels or hair salons, will continue to be delivered locally and require a physical presence (although companies such as Uber and Airbnb demonstrate how even these sectors can be radically transformed by new internet-based business models). But other services, such as retailing, software development, or outsourced business processes, are now being "de-localized"

Figure A.1: Trade in goods has grown more slowly than trade in commercial services
Growth of world trade in goods and commercial services



Source: WTO-UNCTAD-ITC estimates.

Note: World trade is calculated as the average of world exports and world imports.

and "globalized" to an extent and on a scale that may surpass the even most globe-spanning multinational goods manufacturers.

Other services seem on the cusp of radical change. Not too long ago, most medical services were delivered by local doctors and hospitals to local patients. Accessibility was limited, competition was constrained, and quality could vary dramatically across countries, regions, or even neighbourhoods. Now, medical information is accessible to anyone with an internet connection anywhere in the world; medical procedures, such as diagnostics, analyses, and even some types of surgery, are increasingly performed remotely; and medical tourism is becoming more common, as increasing numbers of patients seek more affordable or advanced treatment abroad.

Similar trends can be seen in education, with the proliferation of e-learning platforms such as Moodle and Massive Open Online Courses (MOOCs), or in entertainment, with the spread of streaming services such as Netflix or Spotify. If services trade has yet to realize its full growth potential, it is partly because services industries are still catching up with the new global business possibilities that technology has created.[2]

This seismic shift is in turn exposing many services sectors to the same process of specialization, competition and scale economies that previously drove massive productivity gains in the manufacturing sector. This helps to explain why information, finance and telecommunications services have experienced such fast productivity growth in recent decades – faster even than many manufacturing industries.

In the process, the global economy itself is being transformed. Just as the transport and communications revolution in the latter half of the 20th century drove down the cost of trading tangible goods across borders, giving rise to globalized manufacturing, so too is the digital revolution in the early 21st century rapidly driving down the cost of trading services across border, giving rise to a globalized services market.

Indeed, the globalization of services could unfold even more rapidly than expected, as new technologies not only allow existing services increasingly to be traded across borders, but also help to drive the development and growth of new services sectors, as well as new ways of delivering services, that have yet to be imagined.

3. The evolution of trade: from agriculture to manufacturing to services

The way services are transforming the global economy is a delayed reflection of the way services have already transformed national economies. During the 19th century, agrarian economies gradually evolved into increasingly industrial economies, a transformation so profound that it is termed the "Industrial Revolution". Then, during the 20th century, industrial economies evolved into increasingly services-based economies: an equally profound – and even more rapid – transformation that could be termed the "Services Revolution". In the United States, for example, the services sector, which accounted for just 43 per cent of GDP in 1950, had grown to 61 per cent by 1990, and has reached almost 80 per cent today (BEA, 2019).

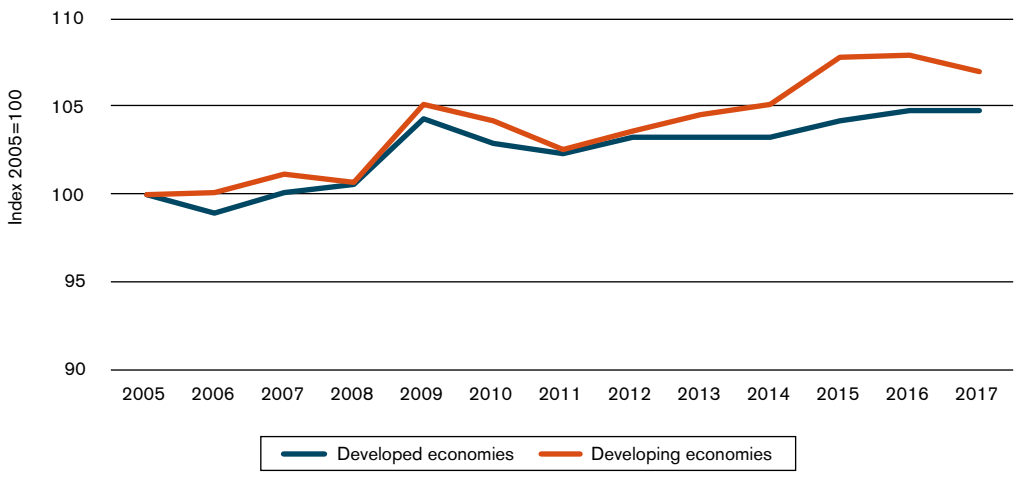
This progression from farms to factories to urban offices was driven largely by productivity-enhancing innovations, skills and technologies. As economies learned to produce more agricultural and industrial output with less labour, human resources were freed up to supply an expanding range of services – from improved healthcare, to better schooling, to more entertainment. Improved services, in turn, fuelled further productivity increases in farming and manufacturing – both through the services that enable production (such as finance, logistics, and retailing) and the services that are embedded in production (such as design or research and development).

Services already accounted for 76 per cent of GDP in advanced economies in 2015 – up from 61 per cent in 1980 – and this share seems likely to rise (UNCTAD, 2017). In Japan, for example, services represent 68 per cent of GDP; in New Zealand, 72 per cent; and in the US, almost 80 per cent (OECD, 2019).

Emerging economies, too, are becoming more services-based – in some cases, at an even faster pace than advanced ones (see Figure A.2). Despite emerging as the "world's factory" in recent decades, China's economy is shifting dramatically into services. Services now account for over 52 per cent of GDP – a higher share than manufacturing – up from 41 per cent in 2005. In India, services now make up almost 50 per cent of GDP, up from just 30 per cent in 1970. In Brazil, the share of services in GDP is even higher, at 63 per cent (World Bank, 2019). Between 1980 and 2015, the average share of services in GDP across all developing countries grew from 42 to 55 per cent (UNCTAD, 2017).

Some developing countries seem to have by-passed the industrialization phase altogether, leapfrogging

Figure A.2: Services account for an increasing share of GDP
Growth of value-added in services (% GDP)



Source: WTO calculations based on World Bank Development Indicators.

Note: In this report, the aggregate "developing economies" includes developing economies, least-developed countries (LDCs), and the Commonwealth of Independent States (CIS). Except for LDCs, this statistical grouping has no implications for any matter relating to the level of development of WTO members.

directly from agriculture to services. In the Bahamas, for example, manufacturing accounts for just 5 per cent of GDP while services – dominated by finance and tourism – account for over 85 per cent. Similar trends can be observed in economies as diverse as Bermuda and Sri Lanka. Services industries can offer many advantages for developing countries that manufacturing industries do not: they are generally less capital-intensive, more mobile, more accessible for female workers, and they can be up and running more quickly (The Economist, 2011).

Just because the services sector is playing a bigger role in national economies, this does not mean that the manufacturing sector is shrinking or declining. Many advanced economies are "post-industrial" only in the sense that a shrinking share of the workforce is engaged in manufacturing. Even in the world's most deindustrialized, services-dominated economies, manufacturing output continues to expand thanks to mechanization and automation, made possible in no small part by advanced services. For example, US manufacturing output tripled between 1970 and 2014 even though its share of employment fell from over 25 per cent to less than 10 per cent (Baily and Bosworth, 2014). The same pattern of rising industrial output and shrinking employment can be found in Germany, Japan and many other advanced economies.

This is because an economy's prosperity does not depend on the relative size of its manufacturing or services sectors but on the productivity of the economy as a whole – which in turn depends on efficiencies and innovations across all sectors, and the extent to which they are mutually reinforcing. Just as an efficient services sector helps to fuel manufacturing growth, so too does an efficient manufacturing sector help to fuel services growth. In essence, all economies, whether agrarian-, resource-, or manufacturing-based, are "service economies", to the extent that producing any good necessarily involves a service. What matters is how productively those services are applied.

This line between manufacturing and services activities, which is already difficult to distinguish clearly, is becoming even more blurred across many industries. Automakers, for example, are now also service providers, routinely offering financing, product customization, and post-sales care. Likewise, on-line retailers are now also manufacturers, producing not only the computer hardware required to access their services, but many of the goods they sell on-line. Meanwhile, new processes, like 3D printing, result in products that are difficult to classify as either goods or services and are instead a hybrid of the two. This creative intertwining of services and manufacturing is one key reason why productivity continues to grow.

4. More complex services trade requires more coherent policies

Although technology is driving the expansion of services trade, both within and among economies, it is not the only factor. More open and enabling national policies, as well as greater international regulatory cooperation, are critical as well. But while the world trading system has been highly successful in opening up goods trade – thereby helping to drive 20th century globalization – it has so far proved less successful at opening up (or keeping open) trade in services, the driver of 21st century globalization. Over six decades of bilateral, regional, and multilateral trade negotiations have thus resulted in a global economy in which trade in goods, broadly speaking, is more open than trade in services.

This imbalance partly reflects the importance of merchandise trade in the past, and the tendency of negotiators to focus many of their efforts on lowering barriers to agricultural and manufactured exports. But it also reflects the reality that the measures affecting the international supply of goods – such as tariffs, quotas, or technical standards – are generally simpler and easier to address than the equivalent measures affecting the international supply of services – such as professional standards, licensing requirements, investment restrictions, or work visas – which are more complex and politically sensitive, and are likely to be linked to other policy concerns besides trade. Arguably, no measures affecting services trade are more controversial today than those related to labour mobility; and yet none have a greater impact given the central role that human resources, talent, and ingenuity play in driving innovation and growth.

This need for new approaches to services trade – as well as for greater policy coherence – was recognized when the WTO's General Agreement on Trade in Services (GATS) was first negotiated during the Uruguay Round between 1986 and 1995. The GATS set out four ways (or "modes") in which a service can be supplied internationally: mode 1 describes "cross-border trade" (e.g. through the internet); mode 2 describes "consumption abroad" (e.g. through tourism); mode 3 describes "commercial presence" of an enterprise (e.g. through foreign direct investment); and mode 4 describes the "movement of natural persons" (e.g. through temporary labour mobility). This novel architecture clearly reflected the insight that opening services trade required a complex nexus of different but related policies and regulations.

The GATS represented a major step towards creating an open and secure global policy framework for services – especially in the context of the ground-breaking negotiations of the 1998 WTO Agreement on Basic Telecommunications Services and the 1999 WTO Financial Services Agreement, which helped to lay the groundwork for the global expansion of finance and telecommunications in recent decades. But these major advances in global services regulation took place over two decades ago, when the internet was in its infancy and Google had yet to be invented. There is a risk that multilateral rules are falling behind the fast-globalizing services market they helped to create, leading to uncertainty about future progress.

5. Why it matters

The globalization of services has the potential to scale up growth, deepen integration, and level the economic playing field in ways that go beyond the changes wrought by the globalization of manufacturing in recent decades.

It holds out the promise of a major expansion not just of trade, but of the essential enablers of trade, development, and economic growth, from transport, logistics and information technology, to finance, healthcare and education. Where services were once secondary to a country's industrial strength, they are now central determinants of productivity, competitiveness, and rising living standards. Services-led growth strategies are becoming as important as manufacturing-led growth strategies – indeed, they need to go hand-in-hand. The ability to access and export efficient, affordable, and innovative services will be a game-changer for development.

The globalization of services also holds out the promise of creating a truly global marketplace for skills, expertise and knowledge, irrespective of geography or distance. If the globalization of manufacturing created a level playing field for products, the globalization of services can create a level playing field for people. For developed countries, services trade will be key to retaining global competitiveness and building on their technological strengths. For developing countries, services trade offers an opportunity to leap-frog into more high-value-added exports and to diversify away from resources or manufacturing.

But with these new opportunities come new challenges. Not only is there a need to devote more energy and attention to services liberalization; there is also a need to develop new negotiating tools and approaches. If past negotiations to open up good trade were driven mainly by tariff bargaining – the exchange of one market access "concession" for another – future negotiations to liberalize services

trade will be driven more by regulatory cooperation – the effort to develop common standards, improve information exchanges, or advance shared policy objectives.

Goods-centred trade negotiations will need increasingly to become services-centred trade negotiations as well. And since services cross over into other policy areas beside trade, such as health, education and immigration, advancing services negotiations will also require deeper cooperation and more policy coherence with non-trade actors. This is particularly true in the area of investment, since over two-thirds of global foreign direct investment flows into services sectors.

The globalization of services raises domestic, as well as international, policy challenges. The same technological shifts that make it possible for services suppliers to reach global markets more easily, also leave previously protected services sectors more exposed to new competitive and adjustment pressures. There is a risk that, even as technology opens up and integrates services markets, government policies will restrict or fragment them. Equipping workers with the skills needed for a more services-oriented, knowledge-based global economy, while simultaneously helping existing services sectors to adjust to the coming wave of competition, will be important. Domestic reform will need to go hand-in-hand with global reform.

The core message in the *World Trade Report 2019* is that cross-border trade will increasingly involve services, not just goods, agricultural products or raw materials, and that it will transform the global economy in the process. Globalization is not slowing or stalling. Rather, it is evolving, driven by trade in human skills, knowledge and ingenuity. The report's other core message is that finding innovative ways to advance global trade cooperation will be key to realizing this potential – and to ensuring that trade remains an engine of global growth, development and poverty reduction.

6. Structure of the report

The World Trade Report 2019 discusses how services, and services trade in particular, have evolved since the establishment of the WTO in 1995 and the entry into force of the GATS, and how trade in services is likely to evolve further in the years to come. It also discusses the role of international cooperation on trade in services.

The report is divided into four main parts:

Section B reviews recent trends in services trade. It analyses the relative importance of the various modes of supply and examines the sectoral evolution of trade in services. It also discusses the participation of micro, small and medium-sized enterprises (MSMEs) and of women in services trade. Section B ends with a discussion of the content of services value-added in international trade.

Section C examines the role of trade in services in helping economies to achieve rapid and inclusive growth. It reviews and attempts to quantify how services trade benefits the economy and promotes growth, and it discusses the role trade in services plays in enhancing the competitiveness of domestic firms. Finally, it considers how services trade promotes inclusiveness, for example in terms of skills, gender and the location of economic activity.

Section D reviews recent trends in services trade costs and identifies the factors affecting these costs. It looks at major future trends in technology, demography, income and climate change to explain how these trends can affect the choice of services traded by economies, with whom they trade these services, and how. The section ends with a quantification of the potential impact that these trends have on trade in services, using the WTO Global Trade Model.

Section E discusses the motivations for international cooperation in services policy-making. It outlines the changing landscape of trade in services, the rationale for and the design of governments' interventions in services markets, and the reasons why governments may choose to collaborate on services trade policies. It examines how economies engage in international cooperation on services and describes how cooperation has evolved and is evolving, both within the WTO and in regional trade agreements. It also provides an overview of the regulatory cooperation activities of other international organizations that are most relevant to services trade, and it considers the prospects for further collaboration on services trade policy.

Endnotes

1 These figures are based on balance-of-payments data and account for services traded via only three of the four modes of supplying services (see Section B for further details).

2 It is important to note that WTO members' views differ as to whether or not certain downloadable products are services.

B Services trade in numbers

This section presents the importance of trade in services in the global economy by using an experimental dataset, developed by the WTO, called Trade in Services by Modes of Supply (TISMOS). This dataset captures services supplied through the four modes of supply categorized in the WTO General Agreement on Trade in Services (GATS); traditional services trade statistics cover only three of the GATS modes of supply. This section also discusses the participation of developing economies, including least-developed countries (LDCs), the importance of micro, small and medium-sized enterprises (MSMEs), and the role of women in services trade. Finally, the section explores the content of services value-added in international global value chains.

Contents

1. Trends in trade in services 22

2. Global trade in services through all modes of supply is worth US$ 13.3 trillion 22

3. Who trades services? 31

4. What is the role of services in global value chains? 44

Some key facts and findings

- Trade in services expanded faster than trade in goods between 2005 and 2017, at 5.4 per cent per year on average.
- Commercial presence in another country (mode 3) is the dominant mode of supply for trading services globally, representing almost 60 per cent of trade in services in 2017.
- The contribution of developing economies to trade in services grew by more than 10 percentage points between 2005 and 2017, but remains largely concentrated in five economies.
- Services MSMEs start exporting quicker than manufacturing MSMEs. Firms owned by women are under-represented in services exports, but less so than in manufacturing.
- Services value-added accounts for close to half of the value of international goods and services trade.

1. Trends in trade in services

International trade in services plays an increasingly large role in the world economy and in everyday life. However, the full extent of this trade is not always understood by market participants. When a consumer purchases a smartphone or a car that was manufactured in a country other than their own, there is no doubt that international trade is involved. It is less common for consumers to realize that they are taking part in international trade when eating in a restaurant while travelling abroad, or when using a foreign car-share service in their own country. The large number of services that go into the manufacture and distribution of consumer goods may be even less obvious to the users of these products. This difficulty in grasping services trade is also illustrated in the opinion piece by Alan Beattie (see page 23).

Some misperceptions about the importance of international trade in services are due to their intrinsic characteristics of intangibility and non-storability. However, new technologies are contributing to increasing services tradability.

There are many ways that services can be traded internationally, referred to as "modes of supply". The WTO General Agreement on Trade in Services (GATS) categorizes services trade according to four modes of supply:

- *Cross-border supply* (mode 1), in which services are supplied from the territory of one member (i.e. WTO member) into the territory of any other member, such as through the internet.
- *Consumption abroad* (mode 2), in which services are provided in the territory of one member to a consumer of any other member, such as tourism.
- *Commercial presence* (mode 3), in which services are delivered by a supplier of one member through commercial presence in the territory of any other member, such as establishing a controlled affiliate in a foreign country to serve the local market.
- *Presence of natural persons* (mode 4), in which a supplier of one member provides services through the presence of natural persons in the territory of another member, such as consultants.

The supply of services through cross-border trade is perhaps most easily recognized as international trade. Examples include consultancy services over the phone or legal services provided in one country to clients in other countries by e-mail or video. Spending by tourists in other economies and students studying abroad are two common examples of consumption abroad. Commercial presence is when a foreign-owned retailer or bank supplies services to local consumers. Finally, an architect or engineer moving abroad temporarily in order to provide their services is an example of services supplied through the presence of natural persons.

Statisticians face various challenges in categorizing and measuring international trade in services. In some cases, the distinction between goods and services trade is unclear. For example, the streaming of a film from a digital platform based in another country is counted as trade in services, but if the film is stored on an imported DVD, it is considered to be trade in goods.

Services can also enter manufacturing production processes, either as high-value inputs such as engineering services, or as lower-value inputs such as assembly – that is, they are inputs in an international transaction of goods. Trade statistics in value-added terms reveal the importance of services inputs in the international trade of goods and services.

2. Global trade in services through all modes of supply is worth US$ 13.3 trillion

According to TISMOS (see Box B.1), global trade in commercial services was worth US$ 13.3 trillion in 2017. These estimates present a comprehensive picture of services in world trade according to international treaties such as the GATS. Trade in services has expanded by 5.4 per cent per year on average since 2005, faster than the 4.6 per cent yearly expansion of trade in goods.

Figure B.1 shows the importance of the four modes of supply in services trade. With a value of US$ 7.8 trillion, sales[1] through the establishment of foreign-controlled affiliates worldwide (mode 3) are the dominant mode for trading services globally (58.9 per cent), in an unchanged pattern since 2005. Financial services and distribution services together account for around half of this value.

Cross-border services transactions (mode 1), including through electronic means, totalled US$ 3.7 trillion in 2017 with a 27.7 per cent share. Cross-border trade is widespread across different services sectors, including transport, professional and business services, distribution services and communications services, as well as computer services and related activities.

OPINION PIECE

By Alan Beattie,
European Editorial Writer, Financial Times

The case of the missing services

Whenever a newspaper needs to illustrate a story about trade, at least seven times out of ten the result is a photograph of 20-foot containers stacked on a cargo ship or resting on a quay. It is a natural tendency, generally reflecting a bias towards the writing itself, to focus on goods rather than services – and to use cases from manufacturing or agriculture to illustrate basic concepts about cross-border commerce. When writing about a broad issue like trade, readers like examples that they can see and touch.

For the media, the bias away from services trade goes beyond ease of comprehension and illustration, for several reasons.

One, journalism thrives on conflict, and there are rarely major trade disputes over services trade. Since China's accession to the WTO, for example, the most high-profile litigation with the European Union and United States has been over garments, solar panels, trade defence methodologies and non-market economy status. Even between the European Union and United States, two advanced economies where the proportion of bilateral trade taken by services has been trending higher, the big fights have been over aircraft subsidies and bananas rather than the alignment of accounting standards.

Two, services sector industries are often less well set up at lobbying and communications than manufacturers, and thus less likely to get coverage. The Brexit negotiations are a case in point. Much of the debate in the United Kingdom has been focused on car production, some of which is located in formerly depressed areas and which stands as a symbol for industrial regeneration reliant on the European Single Market. The car companies have been well organized, both collectively through the Society of Motor Manufacturers and Traders, and singly through individual companies like Nissan and Honda.

Farming and fishing, too, have featured heavily in the debates, from the threat of imports of the infamous chlorine-washed American chicken to the fate of Britain's beleaguered deep-sea fishing fleet. The tiny size of these in terms of UK GDP – Harrods almost certainly creates more value than Britain's entire fishing industry – is outweighed by symbolism and sentiment.

By contrast, although finance and associated sectors like business and legal services constitute a larger part of the economy than car manufacture, the industry itself has been split between different lobby groups. It has struggled to attract attention to the potentially serious loss of economic activity and jobs that leaving the European Single Market would entail. Banks and finance houses are more used to lobbying domestic regulators and established forums of international rules, such as the Basel Committee on Banking Supervision, than trade negotiations, which have traditionally had only weak coverage of financial services.

Three, as well as its relatively weak symbolism and underdeveloped skill at lobbying, the complexity of services deals also militates against media coverage. It is relatively easy, for example, to follow and describe arguments over agricultural tariffs and quotas than the traditional sector-by-sector request-offer process in services or free trade agreement annexes on regulatory cooperation over professional qualifications. The Trade in Services Agreement talks got relatively little coverage, partly because they were held in relative secrecy but also because it is hard to report on negotiations where dozens of sub-sectors with different forms of regulation are all being discussed at once.

There is no automatic solution to the under-covering of services in the media, except for companies and trade officials to get better at talking to journalists – including by generating easy-to-understand examples – and for journalists to make an effort to feature them. One way of raising their profile would be to have a huge transatlantic or transpacific trade war over a particular service industry. But that would seem a slightly excessive way of doing it.

Box B.1: What is TISMOS?

Due to a lack of comprehensive official data on trade in services by mode of supply, the WTO has produced an "experimental" dataset which is called TISMOS (i.e. Trade in Services by Mode of Supply). This dataset uses both official figures and estimates to cover services exports and imports of some 200 economies from 2005 to 2017. It features a breakdown by sector and the first-ever comprehensive estimate of how much services are traded through the four modes of supply as defined in the WTO's General Agreement on Trade in Services. TISMOS uses several assumptions and statistics are adjusted to meet the scope of trade in services in international or regional treaties such as the GATS. These are further explained at https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm#TISMOS

TISMOS is based on the 2010 edition of the *Manual on Statistics of International Trade in Services* (MSITS, 2010). This manual suggests two statistical frameworks to draw from for compiling international trade in services statistics: the balance of payments (BOP) and Foreign Affiliates Statistics (FATS).

An economy's balance of payments provides information on services transactions for cross-border supply (mode 1), consumption abroad (mode 2) and the presence of natural persons (mode 4), while Foreign Affiliates Statistics (FATS) offer information on trade via commercial presence (mode 3).[2]

TISMOS allocates services transactions recorded in an economy's balance of payments either to one dominant mode, or, where there is no single dominant mode, to the most significant mode of supply (known as a "simplified approach"). When possible, country studies are included to refine the default allocation (referred to as "enhanced simplified approach").

As mentioned above, the FATS framework is used to estimate trade through commercial presence. A worldwide dataset of FATS output, classified by activity (International Standard Industry Classification of Industries (ISIC)), has been built.

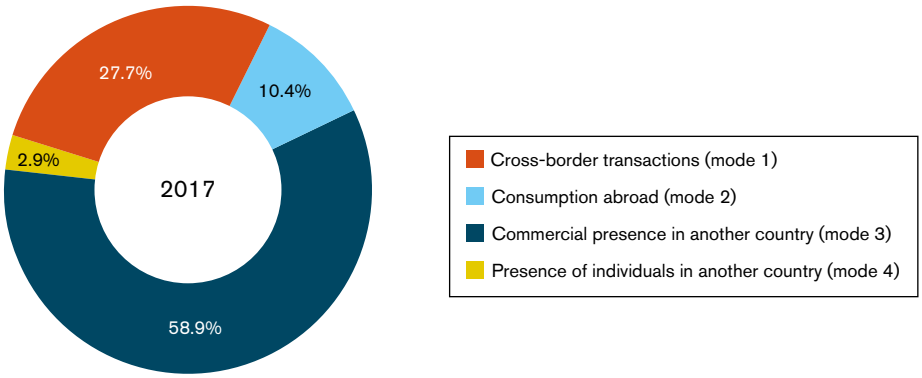
TISMOS combines both datasets through a correspondence table and estimates the relative importance of the modes of supply in the international trade in services at the level of individual economies. Sectoral and regional aggregates are obtained by aggregation.

TISMOS is an analytical and not a statistical dataset, since, as mentioned above, it includes assumptions and estimates. One of its main purposes is to produce information for monitoring, research and economic modelling.

Interlinkages of modes are somewhat reflected through the use of existing balance of payments and foreign affiliates statistics. It is hoped that TISMOS will develop over time into an international benchmark to which compilers and academics will be able to contribute. Once data compilers capture modes of supply in their data collection, TISMOS will be able to become a statistical dataset.

Figure B.1: Commercial presence is the most important mode in trade in services

World trade in commercial services by mode of supply, 2017



Source: WTO estimates (2019).

Note: World trade is calculated as the average of world exports and world imports.

Services consumed in other countries (mode 2) accounted for US$ 1.4 trillion and 10.4 per cent of total trade in services, with tourism accounting for more than 60 per cent of the value.

Only US$ 0.4 trillion, or 2.9 per cent, of services are traded worldwide through the presence of persons abroad (mode 4), but this share may vary for individual economies or sectors.

Figure B.2 shows developments in trade in services by sector. Computer services, research and development (R&D) services and health services recorded very rapid growth, at 10 per cent and above on average per year, since 2005, and a wide range of other services sectors followed closely.

Distribution services and financial services are the largest traded services globally, with US$ 2,634 billion and US$ 2,463 billion respectively, and they account for 19.9 per cent and 18.6 per cent of total services trade in 2017.

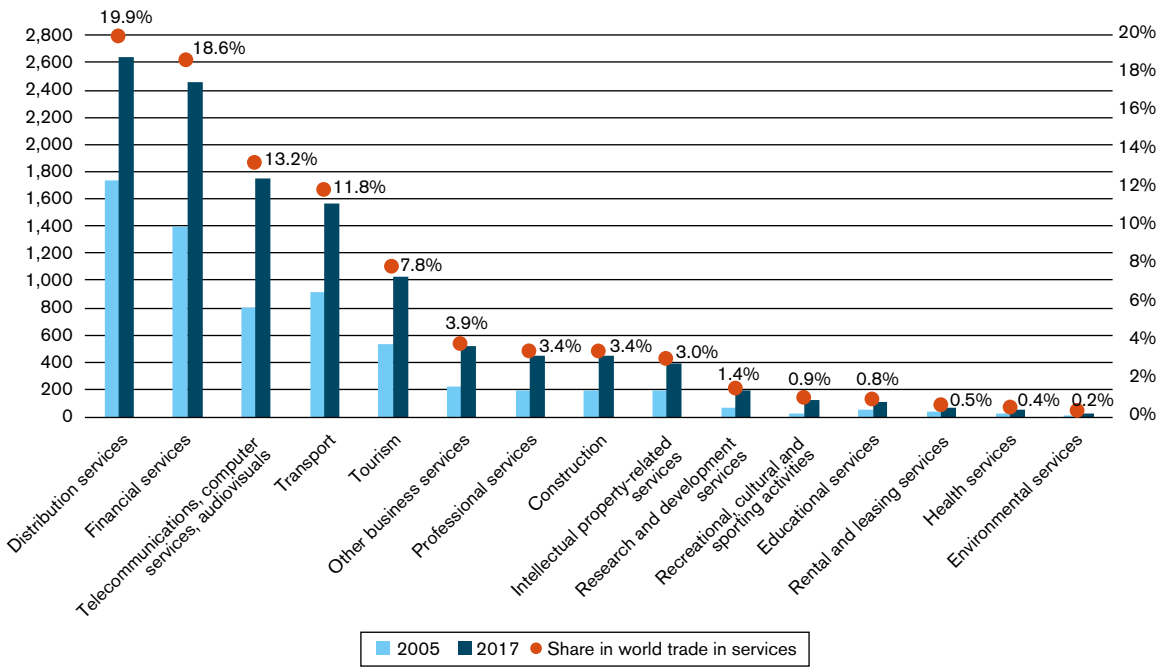
Wholesalers and retailers have a crucial role in international trade, connecting producers and consumers worldwide, thus ensuring consumers' access to a variety of goods at competitive prices. The financial sector is the backbone of the economy, and one of its key functions is to enable international transactions, facilitating the smooth exchange of goods and services between countries, while managing the risks associated with their flows.

According to estimates, world trade in financial services and in distribution services takes place predominantly by means of the establishment of a commercial presence in other countries (mode 3). In 2017, around 77 per cent of financial services, or some US$ 1,941 billion, and over 70 per cent of distribution services, some US$ 1,852 billion, were traded worldwide through foreign affiliates.

However, increased digitalization, e-banking, mobile banking and online sales are reshaping the business models for the finance and distribution sectors. Although banks and other financial services institutions maintain affiliates abroad for operations, they are adapting to changes in consumers' preferences by offering an increasing number of services online, from credit card transactions to finance management. Insurance companies are making it possible to underwrite and submit claims

Figure B.2: Distribution and financial services are the most traded services[3]

World trade in commercial services by sector, 2005 and 2017



Source: WTO estimates (2019).

Note: World trade is calculated as the average of world exports and world imports.

online. These are only a fraction of the online cross-border services that digitalization is expected to bring to the industry in the near future.

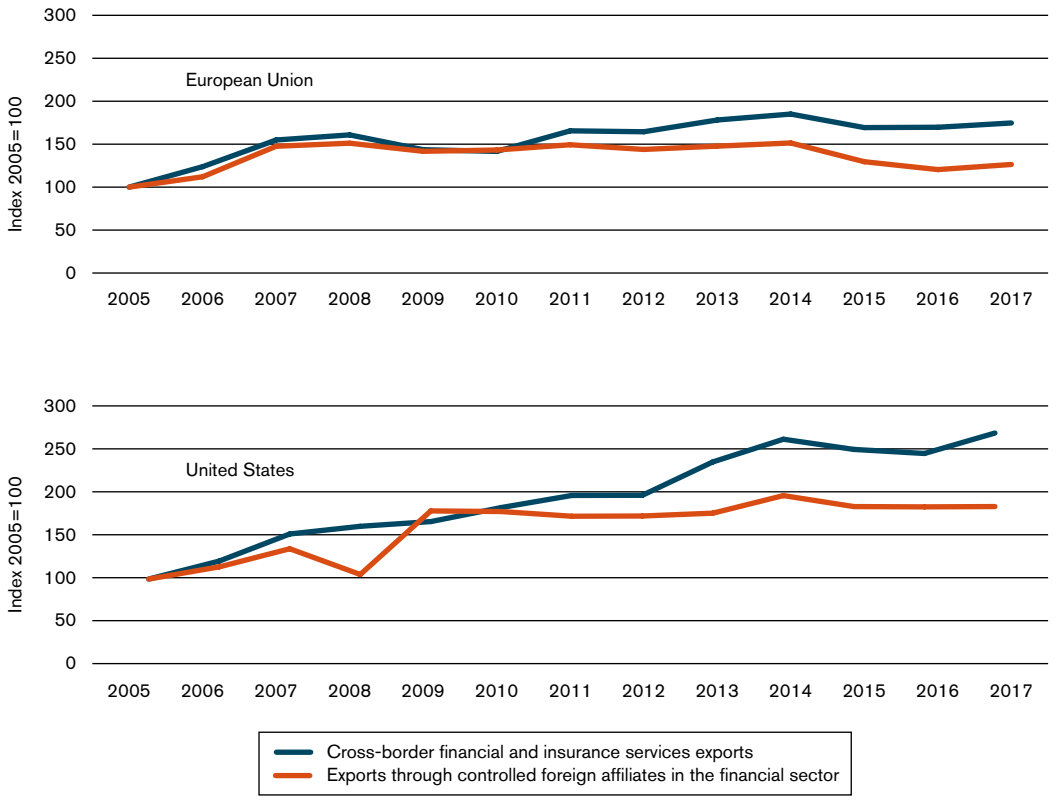
As a result, the share of services exports through branches and subsidiaries established in other economies is declining in leading developed traders. For example, in the European Union, this trend started in the financial sector after the 2008-09 global financial crisis, alongside the structural transformation that the banking system underwent post-crisis (see Figure B.3). In 2017, the share of financial services exported by European Union-controlled affiliates was 6 percentage points lower than in 2005, matching development in the United States. At the same time, the United States' financial services exports through cross-border transactions almost tripled compared with 2005, reaching US$ 109.6 billion.

In distribution services, electronic payments, innovative software and evolving mobile technology are enabling consumers to order goods online from anywhere in the world. This has resulted in a boom of online cross-border sales with many wholesalers and retailers, especially in developed economies, closing physical stores and choosing to sell online, or blending physical presence with online ordering and delivery options.[4] Distributors face fierce competition, especially on the web, and, in order to satisfy consumers' expectations of fast delivery, they need to be able to rely on transport operators.

Whether products are ordered online or through traditional means, the distribution of goods, including internationally, requires an efficient transport and logistics industry. In 2017, one-third of global trade in transport, or US$ 529 billion, related directly to the

Figure B.3: EU and US cross-border financial and insurance services exports are growing faster than exports through foreign-controlled affiliates

EU and US cross-border exports of financial and insurance services and exports through controlled affiliates abroad (mode 3), 2005-17



Source: WTO estimates (2019).

Note: The European Union is calculated as the sum of the 28 EU member states and includes intra-EU trade.

cost of shipping goods across economies, mainly by sea or by air. Supporting transport services such as cargo handling, storage and warehousing made up an additional 16 per cent.

Overall, around half of world trade in transport services is driven by trade in goods, including both goods that directly reach consumers and those that are used as inputs in production processes. This makes the transport sector vulnerable, as freight shipping rates are volatile and fluctuate according to global demand. Since 2005, the transport industry has faced challenges due to weak merchandise trade flows following the global financial crisis, stagnating economic conditions and overcapacity, with 2009, 2015 and 2016 as the worst years on record. Developed and developing economies[5] were equally affected.

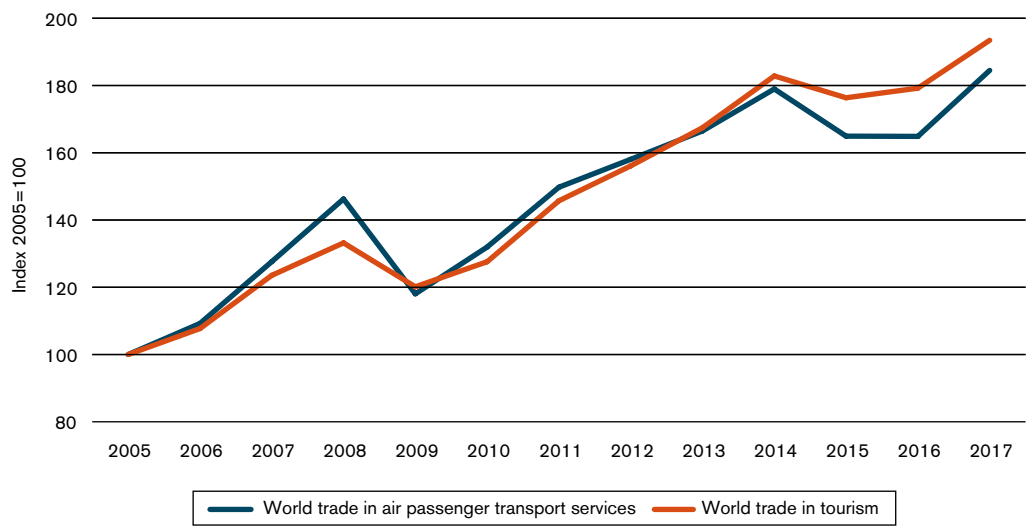
However, transport is vital not only for trading goods, it is essential to move people across the globe, for business or for leisure, enabling also other services to be traded internationally. In the last decade, the rise of low-cost airlines, coupled with the multiplication of direct routes, especially at the regional level, has not only changed the air transport industry, but has fostered impressive growth in international tourism (see Figure B.4).

As the number of international tourist arrivals worldwide rose to some 1,330 million in 2017, up from 809 million in 2005 (UNWTO, 2018), world trade in tourism reached US$ 1,029 billion, almost doubling its 2005 value. International tourism is the most inclusive service sector with participation in trade by economies at all levels of development. In developing economies, the tourism and travel-related industry records the highest contribution in exports by micro, small and medium-sized enterprises (MSMEs) and by women (WTO estimates based on World Bank Enterprise Surveys). The new trend towards sustainable and green tourism will offer further export opportunities to areas not yet touched by tourism development.

Foreign travellers' expenditure during stays abroad enters the tourism value chain directly via the hospitality sector, transport, retail, entertainment and cultural activities etc. Tourism indirectly contributes to the development of other sectors such as conference and events management or communications. It also drives the construction of infrastructure and accommodation.

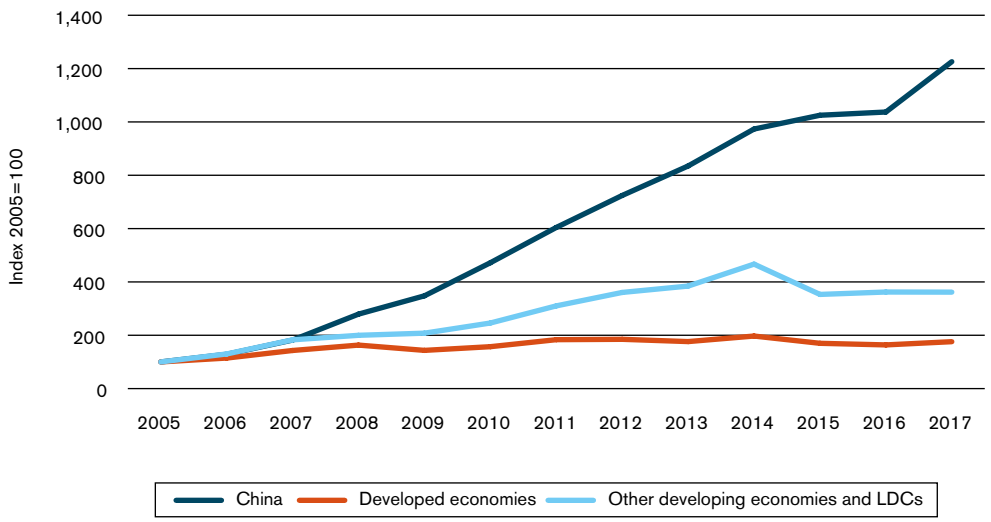
In 2017, trade in construction reached US$ 445 billion, with an average annual growth of 7 per cent since 2005, and a share in global services trade of 3.4 per cent. The last decade has seen the emergence of China as a global construction exporter, involved in large infrastructural building projects. (see Figure B.5). China, whose exports reached US$ 188 billion and accounted for over one-third of global construction exports (37.3 per cent) in 2017, up from

Figure B.4: World trade in air passenger transport services and world trade in tourism develop in parallel
World trade in air passenger transport services and world trade in tourism, 2005-17



Source: WTO estimates (2019).

Figure B.5: China's construction exports are escalating
Construction exports by China, developed economies, other developing economies and LDCs, 2005-17



Source: WTO estimates (2019).

8.4 per cent in 2005, ranked as the second largest exporter in the world after the European Union.

Chinese firms are active in the construction of bridges, harbours, roads and railways, in Africa and in other developing regions. China's construction exports are expected to rise further with the "Belt and Road Initiative", an initiative launched in 2013 by the Chinese government aiming at infrastructure development and investment in many economies.

Technology is permeating all services sectors and gradually transforming them. This is the result of the synergy between the telecommunications industry and its provision of high-speed connectivity such as 5G, the IT sector and its development of innovative industry-specific software, and robotics, thanks to a thriving R&D sector.

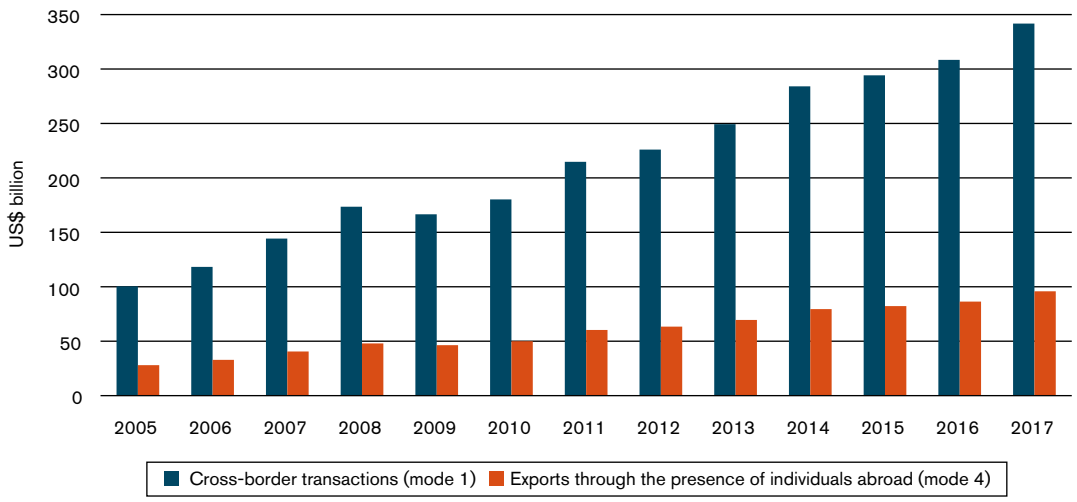
For example, the construction sector is increasingly making use of advanced technology in its operations, such as drones for the aerial surveillance of building projects, replacing land surveillance, and construction through automated modular 3D printing, to cut costs and compensate for skilled labour shortages. In addition, with prefabricated construction taking place indoors in factories and just assembly work onsite, the definition of construction as a service is becoming blurred. At present, over 90 per cent of construction and related engineering services are traded worldwide through a commercial presence abroad; however, it is already possible for construction to be traded across borders too.

Trade in information and communication technology (ICT) services, including computer services and related activities (IT services) was estimated at US$ 1,756 billion in 2017, more than doubling since 2005.[6] The sector has recorded remarkable growth in the last decade, with IT services expanding by 11 per cent annually on average. IT services were resilient during the financial crisis due to a regular demand for new software as well as mounting cybersecurity concerns.

World exports of IT services were estimated at US$ 438 billion in 2017 (see Figure B.6), predominantly exported through cross-border transactions, with the European Union as the largest global exporter and India ranking second. Over the years, India has become a prominent exporter of IT services, with the United States and Canada as the main importers. In 2017, India's exports exceeded US$ 52 billion, of which some 13 per cent was exported through the deployment of IT professionals abroad (mode 4).

IT firms in India and in other economies are increasingly expanding their core services to include product development. This segment, including new technologies such as the Internet of Things, cloud

Figure B.6: IT services are exported across borders and through the presence of individuals
World exports of IT services through cross-border transactions (mode 1) and through the presence of natural persons or individuals (mode 4), 2005-17



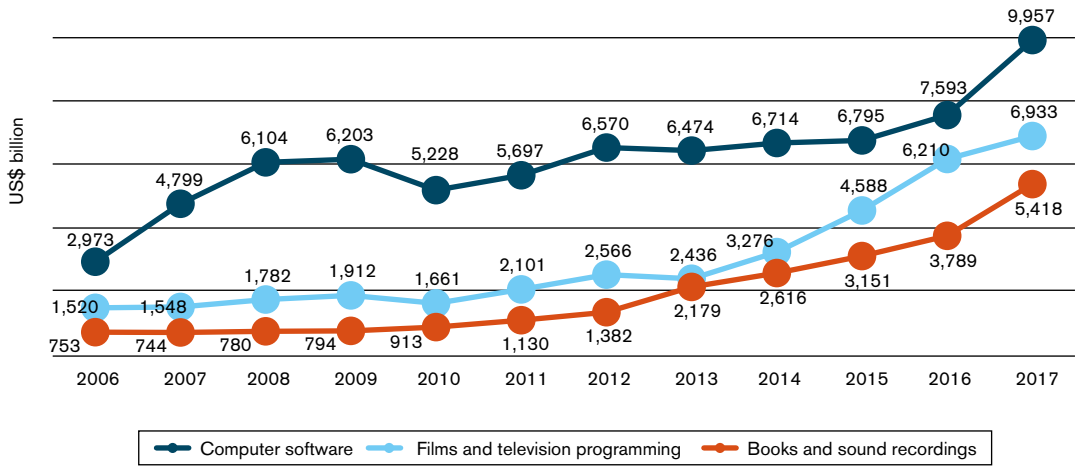
Source: WTO estimates (2019).

analytics and artificial intelligence, is expected to boost not only the IT industry and global trade in computer services, but also trade in intellectual property (IP)-related services in the next few years.

IP-related services cover, for example, fees for the reproduction and distribution of copyrights on computer software, audio-visuals, books, broadcasting and recording of live performances. Fostered also by mobile technology and digital means, trade in IP-related services is growing rapidly. In the last five years, the boom of on-demand music and video streaming, such as through online platforms, has turned audio-visuals into the most dynamic segment of the United States' IP-related services exports (see Figure B.7).

While innovating the audio-visuals industry, digitalization has also revolutionized the advertising services sector. With a young generation of full-time

Figure B.7: Films, music and software drive US exports of IP-related services
Cross-border exports of IP-related services by selected product in the United States, 2006-17



Source: US Bureau of Economic Analysis (2018).

streamers and influencers on social media, advertising is moving away from traditional media, such as television, radio and newspapers, and into digital channels. Data collected through social media platforms, search engines and websites enable the creation of automated and personalized advertisements which can reach potential customers from all over the world. As a result, firms worldwide have turned increasingly to online advertising for their goods and services. For example, since 2006, US exports of cross-border advertising services have almost quadrupled, while the share of exports through US affiliates established in other economies dropped by more than 23 percentage points (US Bureau of Economic Analysis, 2018).

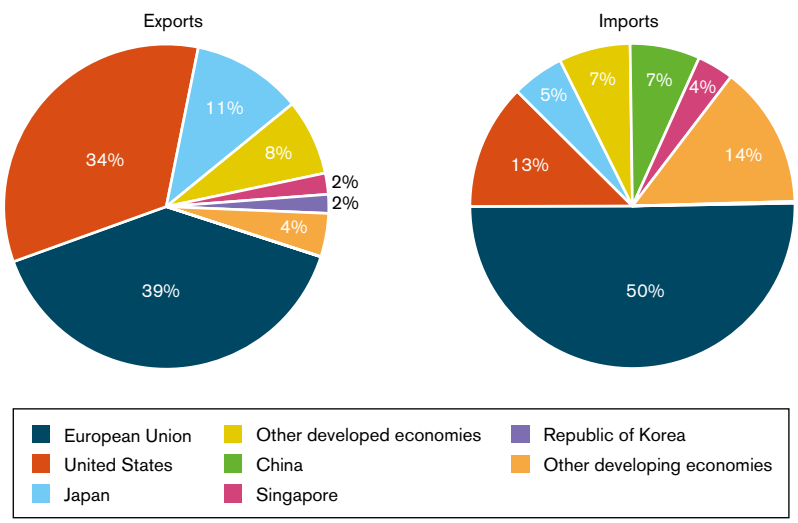
IP-related services cover also fees relating to the international use of patents, outputs from R&D, industrial processes and designs, as well as franchises and trademarks. In general, cross-border trade in IP-related services, estimated overall at US$ 396 billion, is dominated by flows between developed countries (92 per cent of exports and 75 per cent of imports) (see Figure B.8).

However, innovation and creativity thrive in several developing economies, where the applications for patents, industrial designs and trademarks record outstanding growth (WTO, 2018b). Digital communications, IT and electrical machinery were the main areas of technology for patent applications in China in 2017, while Singapore focused on IT, semiconductors, pharmaceuticals and biotechnologies. The Republic of Korea ranked third globally for applications for industrial designs, mainly in ICT and audio-visuals in the same year (WIPO, 2018). Innovation has translated into a significant rise of developing Asia's IP-related services exports (17 per cent on average per year since 2005).

In the Middle East, Israel is an international hub for research and innovation ranging from IT to medical technologies and pharmaceuticals. In 2017, Israel ranked first in the world for R&D expenditure (4.5 per cent of GDP), and fourth for exports of R&D services, behind the European Union, the United States, and China.

Once developed, goods or services need to be marketed. However, exploring business or trade opportunities in foreign markets is a challenging task for firms, irrespective of their size. Firms need guidance on strategies and operations to ensure market viability of their goods or services, as well as their legal protection. Companies need also advice, for instance, on taxation in different jurisdictions and on data privacy, as well as bookkeeping. The last decade's rapid growth of trade in management consulting services, legal services and accounting services mirrors to a large extent the globalization of the economy. Trade in professional and management consulting services through cross-border transactions

Figure B.8: Trade in IP-related services is dominated by developed economies
Cross-border trade in IP-related services, 2017



Source: WTO estimates (2019).

Note: The European Union is calculated as the sum of the EU member states and includes intra-EU trade.

and the physical presence of professionals abroad expanded by 8 per cent on average per year since 2005, to total US$ 308 billion, with the largest share, around 70 per cent, held by developed economies.

Digitalization is also transforming professional services. The number of virtual law firms and freelance management consultants on digital platforms is growing. With no physical offices to run, they have lower operating costs and clients can benefit from reduced fees. Artificial intelligence and machine-learning can be used in accounting and bookkeeping, and several companies, thanks to such technology, may look into relocating these services back to home offices rather than importing them from other countries. Although it might still be early to see it in the numbers, a shift is under way and is likely to affect trade.

Finally, a range of services is taking baby steps in international trade, such as educational, health or environmental services. At present, these services account for a negligible share of trade, but they are rising.

Thanks to over 5 million international students worldwide in 2017, trade in educational services recorded dynamic growth (7 per cent on average annually since 2005), and a value of US$ 111 billion, or 0.9 per cent of world trade in services. English-speaking developed economies, such as the United States, the United Kingdom, and Australia are the main destinations for foreign students but developing economies are no longer only sending their students to other economies. China, Malaysia and India, among others, are emerging as exporters of educational services, attracting students mainly from other developing regions (UNESCO, 2019).

Educational services are predominantly traded through consumption abroad (mode 2). However, online distance education is growing thanks to the thousands of educational platforms flourishing on the web, addressing a variety of educational needs from primary school students to graduates. Several leading universities offer online courses in subjects from sciences to the humanities, with online tutors available to assist students. Online distance learning represents a cheaper and more flexible alternative for students worldwide who, due to financial constraints or for other reasons, are unable to travel abroad to pursue higher education. New technologies are increasingly making it possible to integrate virtual reality into education and training, thereby making e-learning an ever more thorough experience for online students.

Trade in health services, from complex surgery to rejuvenation treatments, was estimated at US$ 54 billion in 2017, with a share in world trade in services of only 0.4 per cent but recording an annual average growth of 11 per cent since 2005. Globally, over 72 per cent of health services were traded primarily by developed economies through affiliated hospitals and medical centres in other countries, and 22 per cent exported to foreign patients during their stay abroad (mode 2).

However, in the coming years, the ways in which health services will be traded may change vastly. New health services providers are emerging across all developing regions, from Asia to Latin America, offering treatment to foreign travellers such as dental work or aesthetic treatments at attractive prices, further increasing the relative importance of trade through consumption abroad. The numbers of medical travel agencies and facilitators are growing, as are those of insurance companies providing health coverage abroad to cut costs. In the meantime, 5G technology and robotics are transforming trade in health services, allowing distant diagnostics and even pioneering remote surgery and medical interventions in real time and without the physical presence of doctors.

Finally, according to preliminary estimates, some US$ 20 billion of environmental services, including waste disposal, recycling, sanitation and cleaning of pollution, were traded in 2017. Environmental services account for just 0.2 per cent of services trade; however, growing environmental concerns and ensuing regulatory initiatives, such as those which aim to reduce pollution by plastics, are boosting demand for these services worldwide, and their trade is growing (4 per cent on average annually since 2005).

From product manufacturing, assembly and design to the shipping and distribution of goods, services have traditionally been seen in a fundamental, yet supporting, role in trade, secondary to trade in goods. However, services not only facilitate trade in goods, they are themselves traded and are enablers of trade in services.

3. Who trades services?

(a) The participation of developing economies

Between 2005 and 2017, developing economies, excluding LDCs, gained over 10 percentage points in their share in global trade, reaching US$ 3.4 trillion

in world services exports and US$ 4.5 trillion in global services imports (see Figure B.9). Such an impressive result is the outcome of a process of structural economic transformation and successful trade diversification from goods to services in several developing economies, in Asia in particular, and the emergence of new services traders and new ways to trade services.

By contrast, in the same period, LDCs increased their share in global services exports by 0.1 percentage point. In 2017, LDCs accounted for only 0.3 per cent of world services exports, or US$ 38.3 billion, and, in imports, their participation was at less than 1 per cent, with services imports totalling US$ 124.1 billion. Commercial services production in LDCs is, on average, 40 per cent of GDP, well below middle-income economies (over 50 per cent) and high-income economies (generally above 70 per cent).

In fact, income plays a role. Three out of five leading developing services traders are high-income economies, while the rest are classified as upper middle-income and lower middle-income economies.[7]

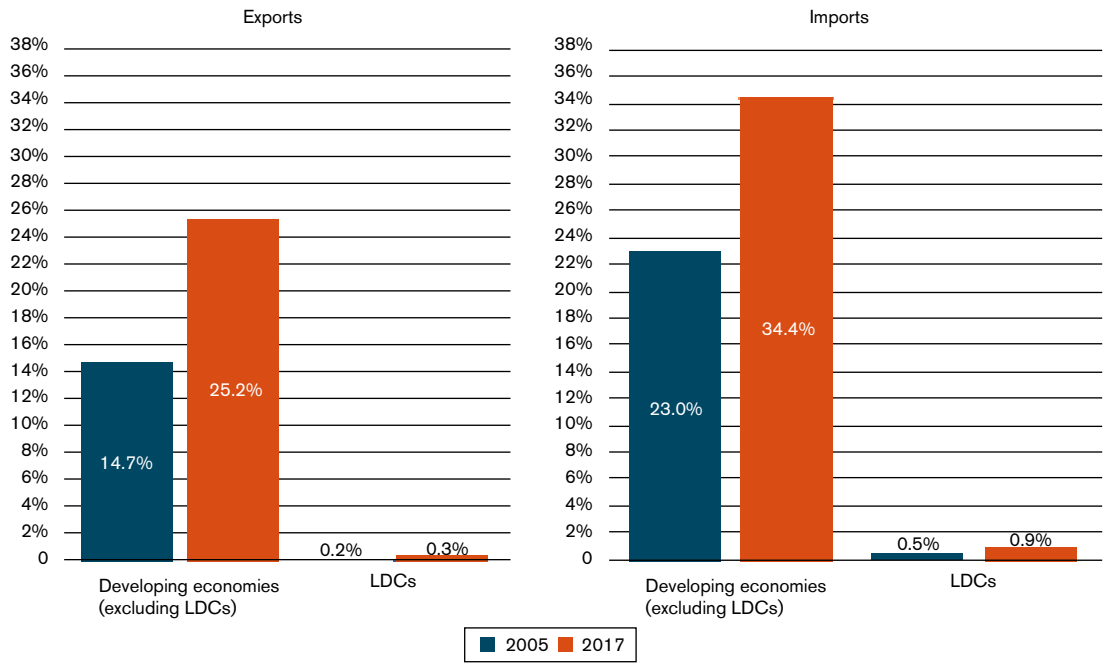
The participation of developing economies in services trade is not yet inclusive. A close look reveals that trade is very concentrated, with the same five economies ranking both as leading services exporters and importers, although in a different order. In 2017, China was the leading services trader, followed by Hong Kong (China), the Republic of Korea, Singapore and India (see Figure B.10).

These five Asian economies accounted for 56.7 per cent of developing economies' exports and 58.1 per cent of imports. They are the main drivers of developing economies' impressive trade performance, with services exports rising by over 12 per cent on annual average since 2005, almost three times faster than in developed economies. From R&D and IP-related services to ICT services, professional services and finance, these five economies are penetrating high value-added services trade.

After 2009, the five leading developing economies substantially modified the way they export services, in a manner which increasingly resembles that of developed economies, and which matches the way the world predominantly imports services, i.e. through a commercial presence of another country.

In 2017, services exported by these five economies through branches and subsidiaries abroad made up, on average, 55.9 per cent of their services exports, a

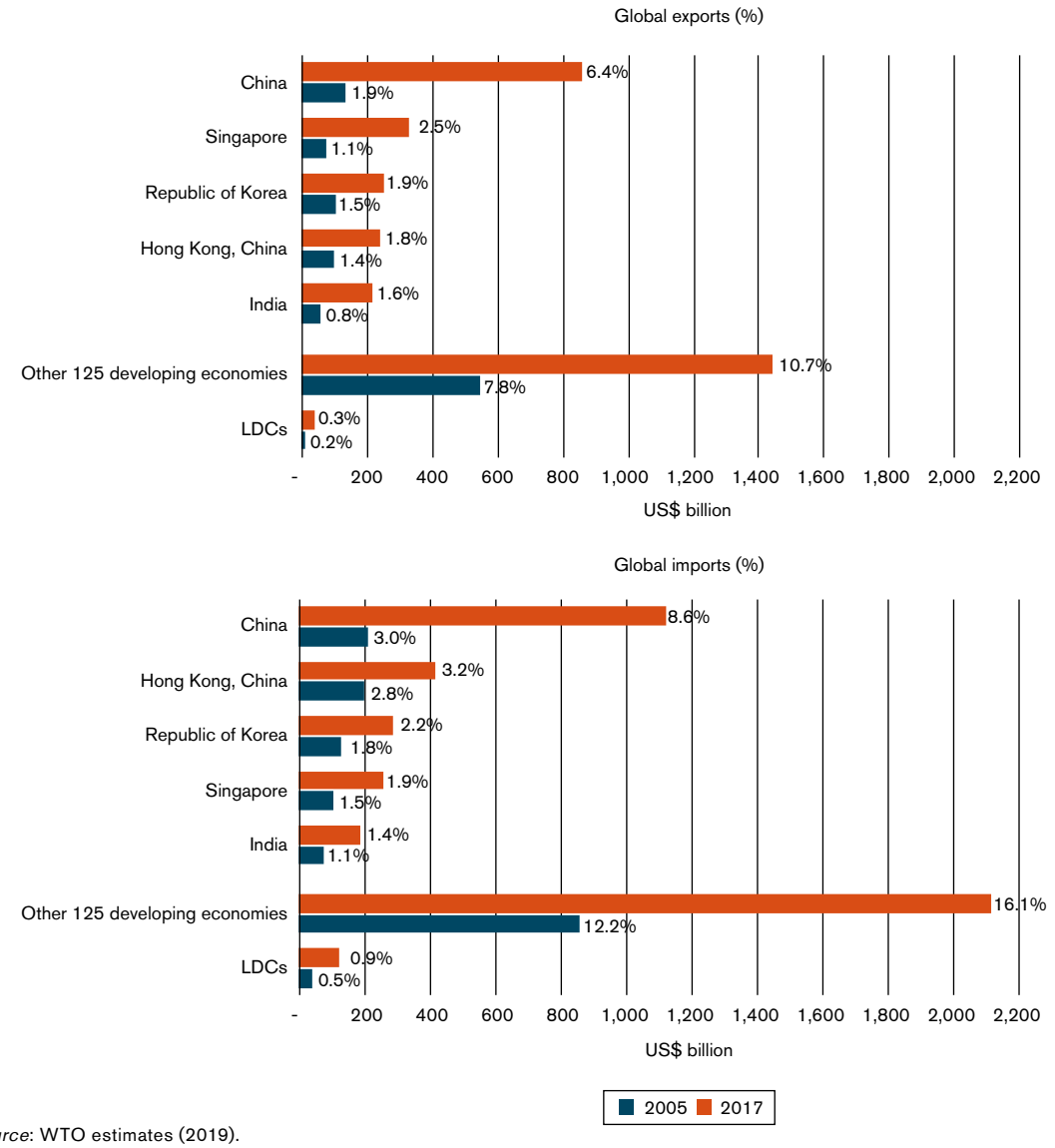
Figure B.9: Developing economies rise in world trade in services but LDCs continue to lag behind
Share in world trade in commercial services by group of economies, 2005 and 2017



Source: WTO estimates (2019).

Figure B.10: Five Asian economies account for more than half of developing economies' exports and imports

Leading developing services exporters and importers, 2005 and 2017



Source: WTO estimates (2019).

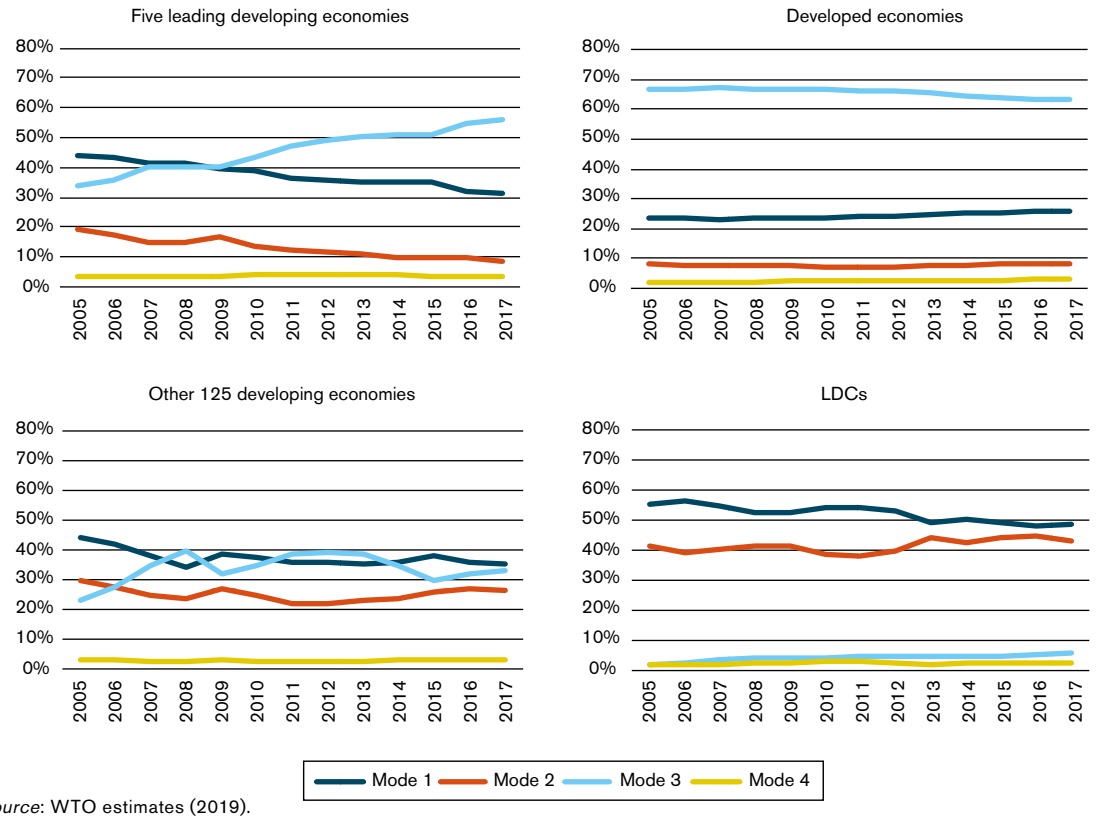
Note: Values differ from reported statistics by the above economies as they include an estimate of services exported or imported through foreign-controlled affiliates.

rise of 22 percentage points since 2005. In China and the Republic of Korea in particular, up to two-thirds of services were exported through foreign-controlled affiliates, more than half in Hong Kong, China, and around half in Singapore, too. In India, cross-border trade remains the dominant mode, with only 20 per cent of services exported through foreign-controlled affiliates in other economies. Nevertheless, this is a 12-percentage-point increase compared with 2005 (see Figure B.11).

For the five leading developing economy traders, construction, finance and distribution are the sectors that contribute most to the remarkable growth of their services exports through foreign-controlled affiliates (see Figure B.12). However, in a variety of other sectors, from professional and business services, to ICT and transport, a shift in the way services are exported has already occurred. In others, such as tourism or health services, a change is well under way. In China, the Belt and Road initiative has further accelerated this process, with Chinese services firms encouraged to "go global" and helped to expand rapidly in local markets (China Ministry of Commerce, 2017).

Figure B.11: The top five developing economies have modified their way of exporting services over time

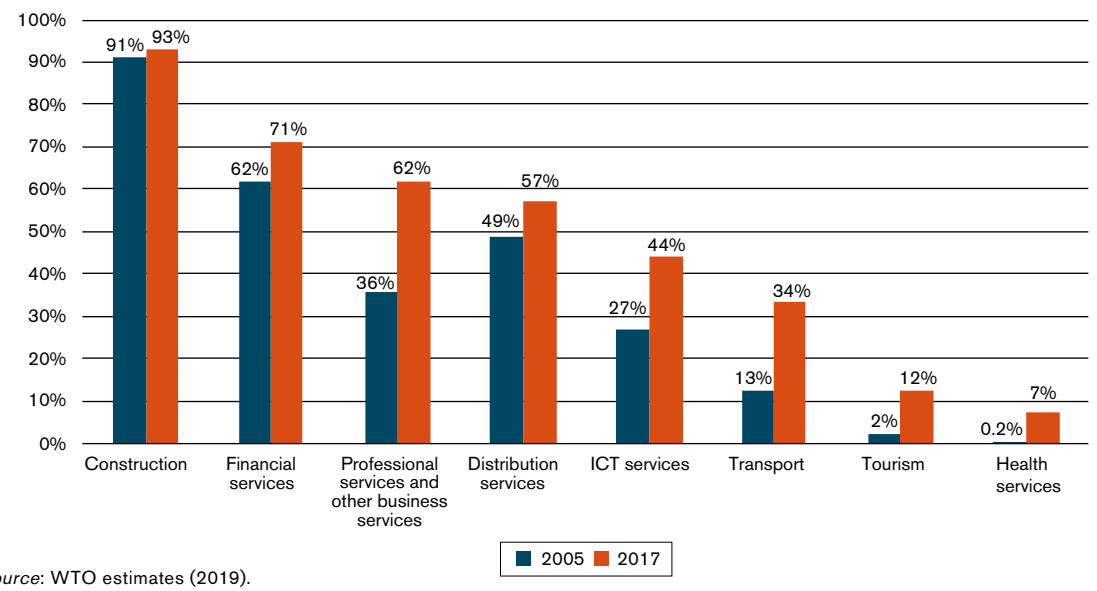
Services exports of selected economy groups by mode of supply, 2005-17



Source: WTO estimates (2019).

Figure B.12: For the top five developing economies, commercial presence is the dominant mode for exporting services

Five leading developing economies' exports through foreign-controlled affiliates abroad (commercial presence) in selected services sectors, 2005 and 2017



Source: WTO estimates (2019).

This is the result of substantial investment flows in services, with the five leading developing economies establishing branches and subsidiaries not only in other developing regions but also in developed economies. For example, US services imports through foreign-controlled affiliates of the five economies are rising. Between 2014 and 2016, distribution services, financial services and transport services imports through China's affiliates established in the United States doubled, although on a small scale, while IT services imports through affiliates of Indian companies grew by 12 per cent on average annually. In the same period, the Republic of Korea held a 13 per cent share in total US imports of distribution services through a commercial presence (US Bureau of Economic Analysis, 2018 and WTO calculations).

Apart from the five leading developing economy traders, the other 125 developing economies export services differently (see Figure B.13). These other developing economies, some 125 in number, spread across all regions, have relatively fewer financial resources to set up affiliates abroad. According to estimates, in 2017 less than one-third of their services exports took place through a commercial presence. This share is 23 percentage points lower than in the five leading developing economies. For these 125 developing economies, cross-border trade is the predominant mode to export services such as in professional and other business services.

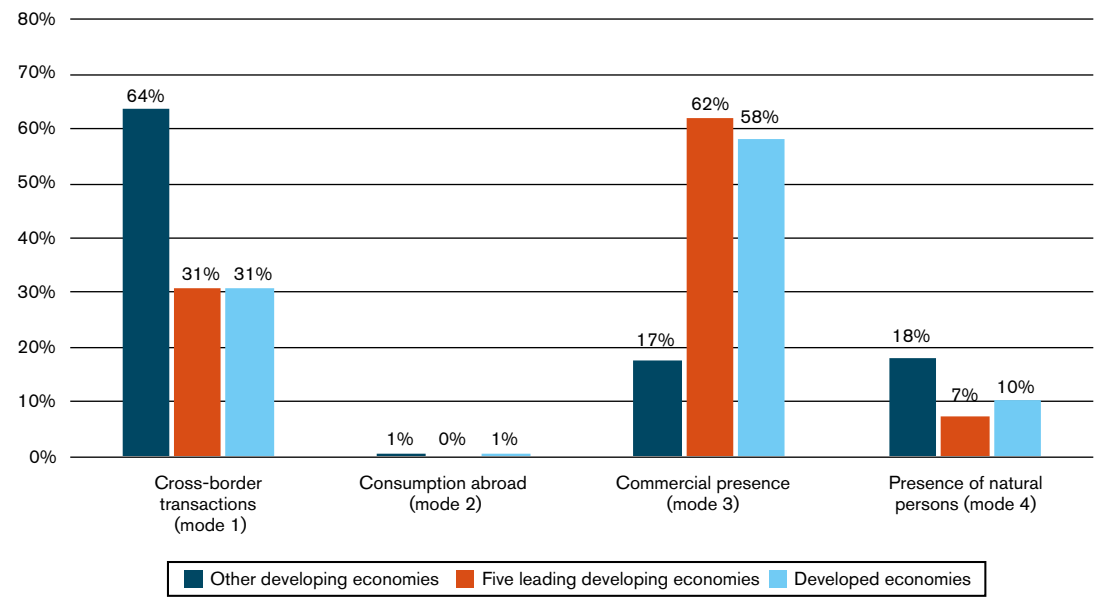
For these 125 developing economies, with relatively good levels of internet penetration, services trade digitalization can offer concrete opportunities to boost exports and gain a share of global services markets. In the meantime, exports through the consumption abroad of services, including health and educational services, can help diversify their service supply; such a trend has already started in several economies.

Turning to LDCs, since 2005, their services exports have been rising by almost 11 per cent on average per year, albeit from a very low base, with growth led by tourism. Boosted by intensified intra-regional arrivals in recent years, tourism represents an important source of revenue for LDCs and is the only services sector in which the group's participation in global exports exceeds 1 per cent (at 1.3 per cent).

However, LDCs' services exports are unbalanced. With tourism as the largest sector (34.4 per cent of services exports), the share of LDCs' services exports through consumption abroad, estimated at 43.1 per cent in 2017, is at least twice as big as in most developing economies and five times bigger than in developed economies. Cross-border trade accounts almost entirely for the other half but is largely concentrated on transport and distribution services, while commercial presence, for example in construction, is in the initial stages.

Figure B.13: The other 125 developing economies export services differently

Professional and other business services: share of exports by mode of supply in selected groups of economies, 2017



Source: WTO estimates (2019).

For LDCs, diversifying services exports in order to integrate into global services exports remains challenging due to infrastructural constraints, lack of skills, low financial resources and a digital gap.

(b) MSMEs' participation

At present no comprehensive dataset exists on international trade by enterprise size covering all economies. One of the reasons is the lack of a commonly agreed definition for MSMEs. For example, MSME definitions by sources considered in this section range from firms with less than 100 employees (World Bank Enterprise Surveys) to firms with less than 250 employees (Eurostat, 2017). Due to differences in coverage and data sources, it is also currently not possible to compare the participation of MSMEs in developing economies with that of MSMEs in the developed group.

To measure participation in international trade by firm size, enterprise surveys and administrative data are often the only sources of data. Over recent years, in developed economies, statisticians' efforts have focused on measuring merchandise trade by enterprise characteristics (OECD Trade by Enterprise Characteristics (TEC) database), while only pilot studies have specifically targeted trade in services by firm size (Eurostat, 2017).

(i) Participation of MSMEs in developing economies

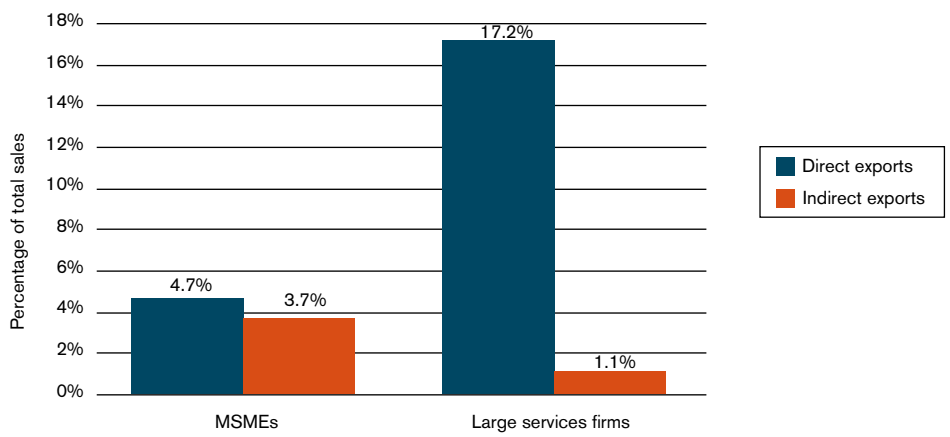
For developing economies, the World Bank Enterprise Surveys[8] provide indicators on a large range of economies in all regions. What are called "direct exports" occur whenever an enterprise sells goods or services directly to customers in another country. A major benefit of exporting directly is that it gives the exporting firm direct contact with its customers and a better understanding of their needs, thereby potentially generating new business opportunities. If direct participation in trade is challenging for developing country firms, "indirect" export participation by supplying (intermediate) services to another domestic firm that subsequently exports can be an alternative for MSMEs.

According to WTO estimates based on the World Bank Enterprise Survey, covering some 19,700 services MSMEs in 83 developing economies in the period 2013-2018, the participation of MSMEs in direct services exports is marginal, only 4.7 per cent of total sales, a share three times lower than large services firms. Indirect services exports, such as catering for hotels, courier services, or road passenger transport through intermediaries, accounted for 3.7 per cent (see Figure B.14).

In comparison, MSMEs in the manufacturing sector were able to export more than double the sales of MSMEs in services, with 10.6 per cent of MSME manufacturing sales described as direct exports and 8.6 per cent as indirect exports.

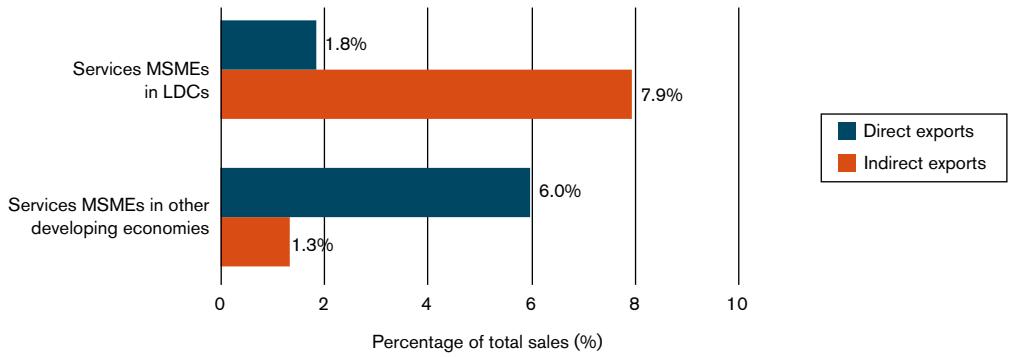
For services MSMEs located in LDCs, exports are a negligible portion of sales, only 1.8 per cent, a much lower share than in other developing economies (6.0 per cent), and almost ten times lower than exports by MSMEs in manufacturing (16.1 per cent) (see Figure B.15). Services MSMEs in LDCs mainly access international markets through indirect exports (7.9 per cent of total sales).

Figure B.14: Participation in services exports is positively correlated with firm size
Shares of direct and indirect services exports by firm size in developing economies



Source: WTO estimates (2019) based on World Bank Enterprise Surveys.

Figure B.15: Services MSMEs in LDCs export only 1.8 per cent of their sales
Shares of direct and indirect services exports by firm size and developing group

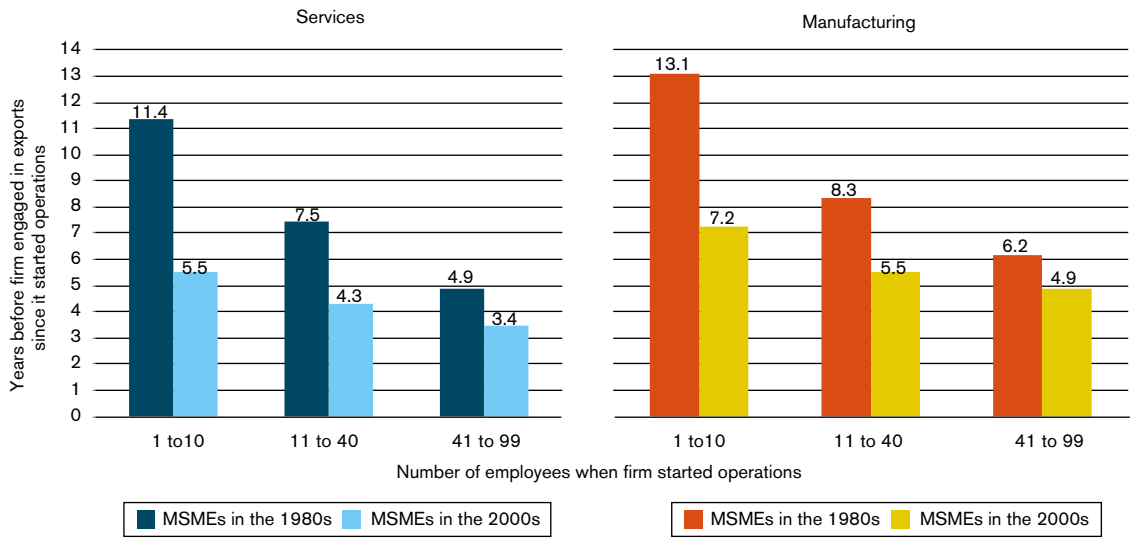


Source: WTO estimates (2019) based on World Bank Enterprise Surveys.

In developing economies, foreign-controlled services firms represent a very small fraction of MSMEs. MSMEs almost exclusively serve the domestic market, with national sales at 96 per cent of total sales, compared to foreign-controlled manufacturing firms, which have only 68 per cent of national sales. Services MSMEs are engaged in distribution services, hotels and restaurants, travel agencies and tour operators, transport, construction and ICT activities.

According to WTO calculations, again based on World Bank Enterprise Surveys, large firms, in both services and manufacturing, begin to export more rapidly after the start of operations than small firms, although this gap has declined significantly since the 1980s. Services firms in developing economies that began operations in the 1980s took on average eight years to begin exporting, compared to four years for firms starting in the 2000s. Although data show that a considerable time lag remains before services MSMEs in developing economies feel confident enough to engage in exports, technological progress and the rise of the internet could offer reasons why MSMEs now access international markets more quickly (see Figure B.16 and the opinion piece by Sonja Grater, Ali Parry and Wilma Viviers on page 42).

Figure B.16: MSMEs engaged in services start exporting in four years on average, compared to six years for MSMEs in manufacturing
Developing economies' time lag between firms' start of operations and engagement in exports, 1980s and 2000s



Source: WTO estimates (2019) based on World Bank Enterprise Surveys.

For each class of initial firm size, the time lag to export in the 2000s was roughly half that of MSMEs which started operations in the late 1980s. In the 1980s, for services firms with one to 10 employees, it took on average 11.4 years to start exporting, for firms with 11-40 employees 7.5 years, and for firms with 41-99 employees 4.9 years. However, for MSMEs trading services which began operating in the early 2000s, it took only four years on average to begin exporting. Service MSMEs with one to 10 employees in the 2000s needed only 5.5 years, firms with 11 to 40 employees took 4.3 years, and firms with 41 to 99 employees needed only 3.4 years on average before engaging in exports.

(ii) Participation of MSMEs in developed economies[9]

Available evidence from survey data in developed economies shows that SMEs have a relatively low propensity to export. According to the Annual Business Survey (ABS), which covers the United Kingdom with the exception of Northern Ireland, 7.8 per cent of services businesses with less than 50 employees engaged in international trade in 2017, compared to 24.4 per cent for firms with between 50 and 249 employees, and 34 per cent for firms with over 250 employees.[10] Similarly, in Canada, only 6.9 per cent of MSMEs exported services in 2017, with 6.5 per cent of firms with one to four employees exporting services compared to 11.6 per cent of firms with 100 to 499 employees.[11]

A pilot study of services trade by enterprise characteristics (Eurostat, 2017) for 15 European countries in 2014 revealed substantial heterogeneity in MSME trade participation. Smaller enterprises led services exports in some economies (e.g. Estonia, Hungary and Norway), while in other economies, large enterprises accounted for most services exports (e.g. the Czech Republic, Finland and the Netherlands) (see Figure B.17).

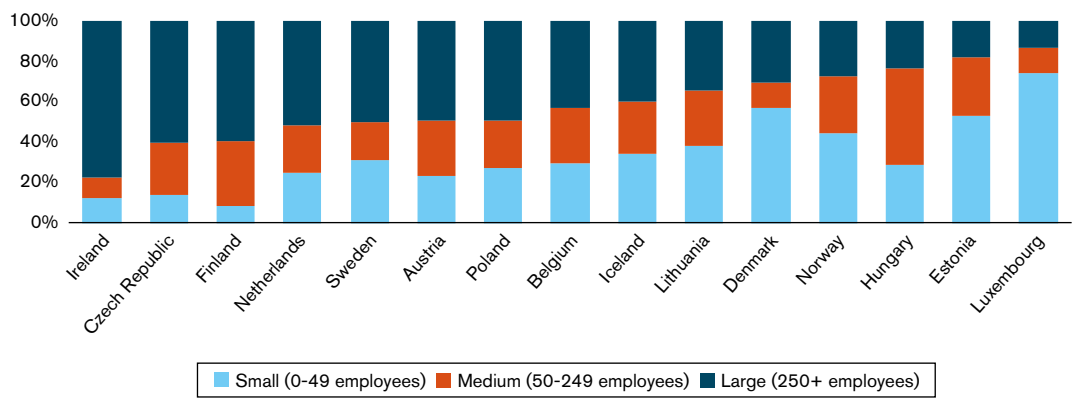
As seen with developing economies, data indicate that the time lag to export services is inversely correlated with the age of the firm. For example, only a quarter of UK MSME services exporters in 2017 had less than two years' experience, with the majority (64 per cent) having at least four years of experience (UK ONS, 2018).

Digital technology has been influential on MSME services trade, especially for MSMEs in developed economies. For example, UK MSMEs in ICT, manufacturing[12] and professional and scientific services were not only more likely to have exported than firms in the construction, accommodation and food, and transport industries, they were also more likely to have innovated goods, services or processes. Further, UK non-exporting MSMEs in the ICT sector were the most likely to report that they were considering exporting in the future (15 per cent) (UK DBEIS, 2019).

The situation was similar in Canada, where professional and technical services had the largest share of exporting MSMEs of any service sector in 2014, a sector often considered very digitizable. Manufacturing and wholesale trade had the next largest shares.

Eurostat STEC also shows that two services sectors with the highest export intensities (defined as the

Figure B.17: In Europe, participation by MSMEs in services trade varied across countries in 2014
Selected EU countries' trade by firm size, 2014



Source: Eurostat (2017).

Note: 2013 data for Austria, the Czech Republic and Norway; 2011 data for Poland due to lack of available data.

share of exports in total turnover) were ICT and professional, scientific and technical services (see Figure B.18). Again, these are two services sectors often considered highly digitizable.

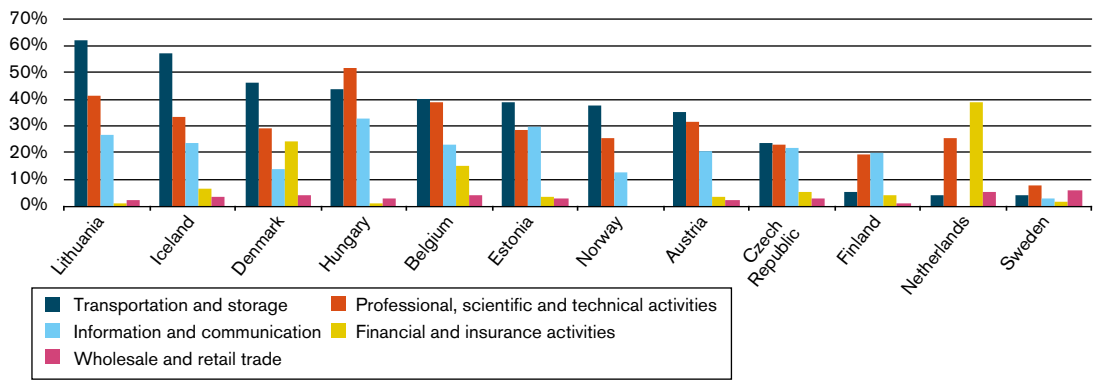
(c) Women's participation

Services play a prominent role in female employment, with participation rising steadily over time. Over the past three decades, women have gradually been moving out of employment in agriculture and industry and have been moving into employment in services at a faster pace than men, although participation remains uneven across economies (see Figure B.19).

Female employment in services is positively correlated with economic development. In 2018, in developed economies, 87 per cent of working women were employed in services, compared to only 28 per cent in LDCs, where agriculture remains the main sector of employment. In other developing economies, where female employment in services

Figure B.18: Professional, scientific and technical activities had the highest export intensity after transportation and storage in European countries in 2014

Ratio of exports to turnover by service sector in selected European countries, 2014

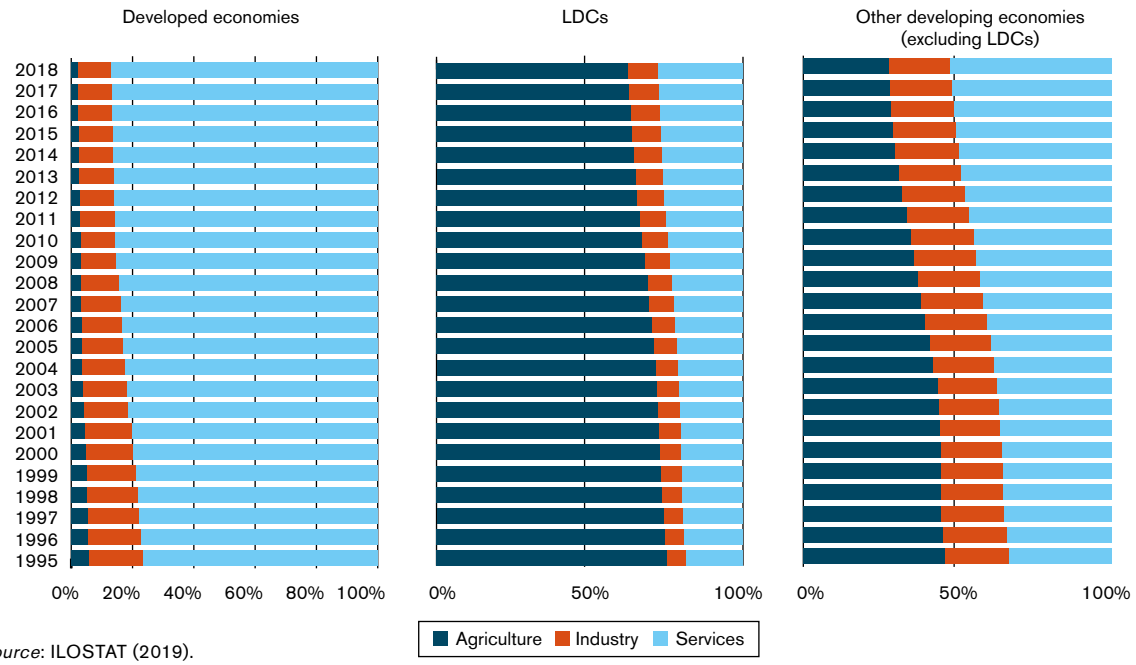


Source: Eurostat (2017).

Note: 2013 data for Austria, the Czech Republic and Norway; 2011 for Poland. No data available on ICT for the Netherlands or financial and insurance activities for Norway.

Figure B.19: Female employment in services is positively correlated with economic development

Distribution of female employment by main sector and group of economies, 1995-2018



Source: ILOSTAT (2019).

exceeds 50 per cent, women have moved faster out of agriculture, compared to developed economies and LDCs, with 19 per cent more females employed in service activities compared to 23 years ago.

In general, in developed and other developing economies, the share of women employed in services is respectively 20 per cent and 10 per cent higher than the share of men. However, in LDCs, employment in services is almost equally low for women (28 per cent) and for men (31 per cent).

Except for wholesale and retail trade, which have high female employment shares in LDCs and other developing economies, the employment of women is largely concentrated in the least-traded services sectors, such as education, health and social work (see Figure B.20).

Education is a key employment sector for women in economies at all levels of development, while women are especially active in health and social work activities in developed economies. This includes a high number of female healthcare workers from developing economies who have contributed to addressing shortages of nurses or caregivers in many developed economies.

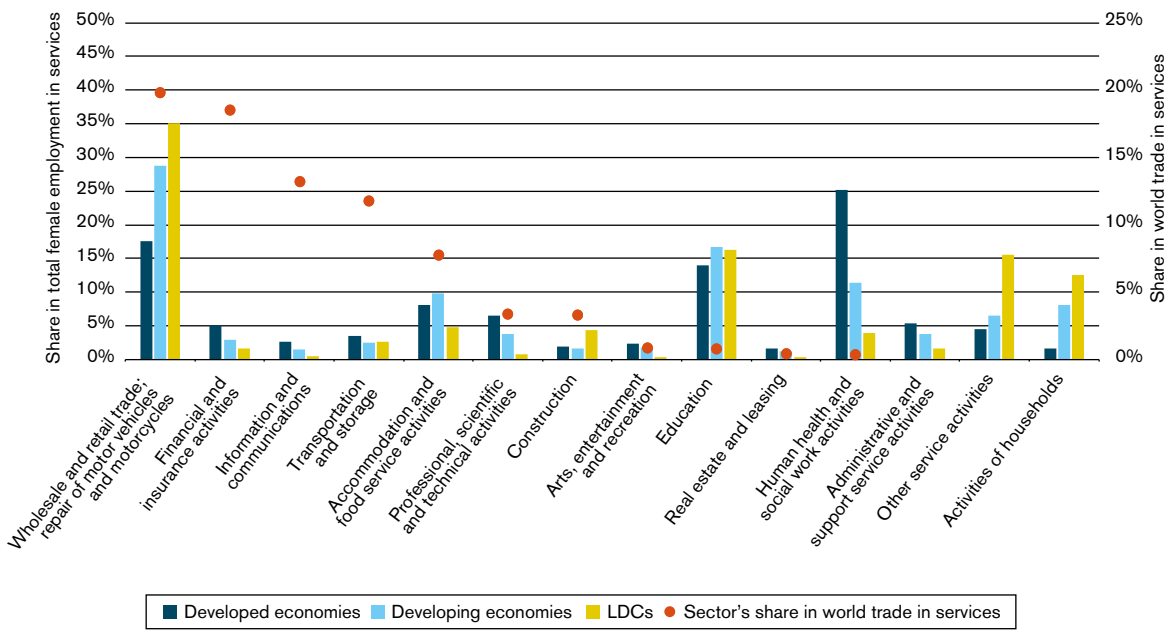
Female employment is at its lowest in ICT, one of the most promising and highly traded services sectors, and only 5 per cent of women in developed economies are employed in financial and insurance activities. Among the most traded services sectors, tourism provides excellent employment possibilities for women at all skill levels.

Employment in tradeable sectors is only one of the ways women can contribute to trade. In fact, women can engage directly in international trade, whether in goods or in services, by owning and running a business. Like all exporters, exporting MSMEs owned by women tend to earn more, pay more, employ more people and be more productive than non-exporting firms (ITC, 2015).

At present, there are no comprehensive statistics which capture the contribution made by firms owned by women to services trade. However, WTO estimates based on World Bank Enterprise Surveys, suggest that in developing economies, on average only 13 per cent of services firms of all sizes were either majority-owned or wholly owned by women. In MSMEs, female ownership was at 14 per cent, and at 6 per cent in large services firms.[13]

Figure B.20: Female employment is concentrated in the least-traded services sectors

Female employment in services sectors by group of economies and the sectors' share in world trade in services, 2017



Source: Based on ISIC Rev. 4. WTO calculations based on ILOSTAT (2019) and WTO estimates (2019).

In developing economies, the participation of firms owned by women in services exports is also marginal.[14] MSMEs owned by women account for only 15 per cent of services exports made by all MSMEs. This share dropped to 2.6 per cent in the case of large services firms, which account for the bulk of exports in developing economies.

However, in comparison, the contribution of manufacturing firms owned by women to exports is significantly lower, at 2.1 per cent for MSMEs owned by women and 0.6 per cent for large manufacturing firms (see Figure B.21). Female ownership of manufacturing firms was also lower, with only 10 per cent of MSMEs and 3.8 per cent of large manufacturing firms owned by women.

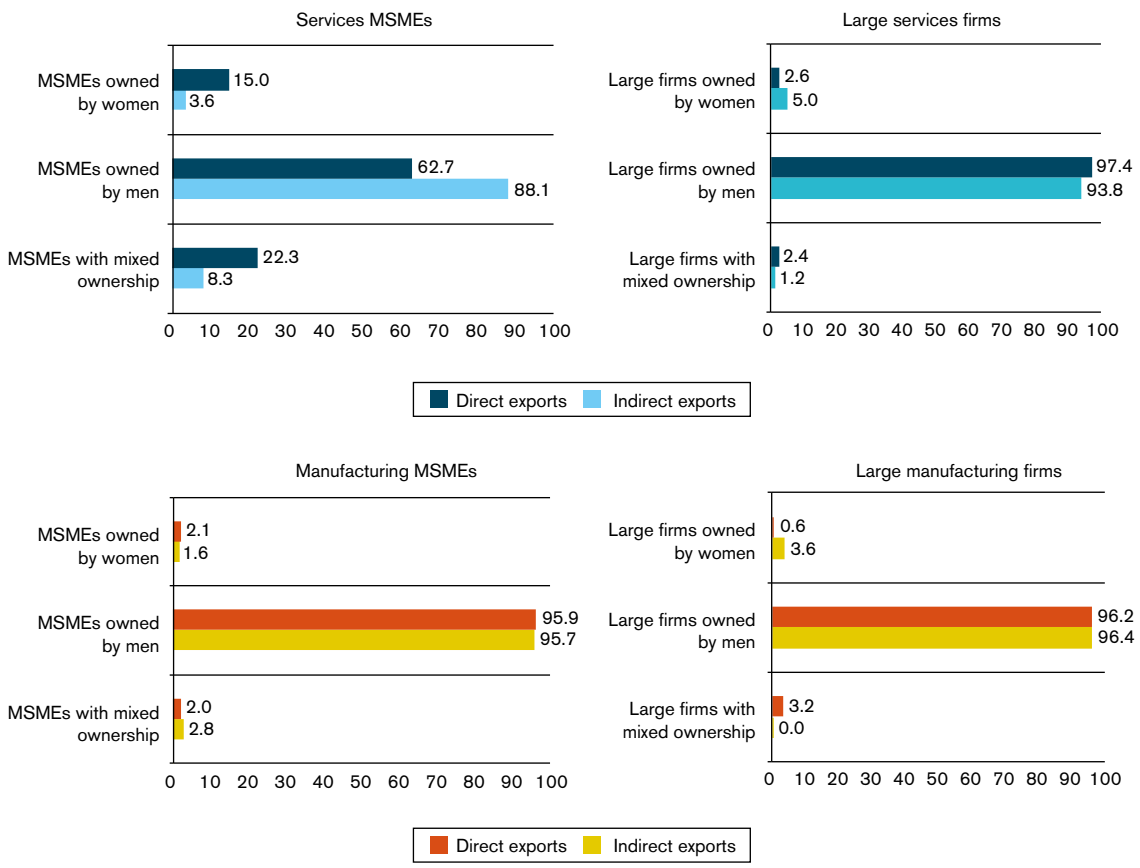
In services MSMEs, the highest shares of exports by firms owned by women were in tourism and travel-related services, such as travel agencies, tour operators, hotels and restaurants, as well as in transport. Tourism is not only an important source of female employment but also offers concrete opportunities for female business-owners to trade internationally.

Mirroring female employment, female ownership in developing economies is concentrated in distribution services, especially retail trade. However, World Bank Enterprise Surveys show that businesses owned by women in this sector primarily targeted local markets.

In the case of developed economies, information on businesses owned by women and women's participation in trade is captured by national surveys, such as on MSMEs. According to information available for some large services traders, the share of firms owned by women and their participation in trade is not much higher than in developing economies.

Figure B.21: Firms owned by women are under-represented in services exports

Direct and indirect services and manufacturing exports by gender of firm owners and firm size in developing economies (Percentage of total exports)



Source: WTO estimates (2019) based on World Bank Enterprise Surveys.

OPINION PIECE

By Sonja Grater,
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MSMES and services trade: A pathway to inclusive growth in developing economies?

There is a general consensus that micro, small and medium-sized enterprises (MSMEs) play a critical role in countries' economies, offering employment to significant numbers of people across a diverse range of professions and trades (Aga et al., 2015).

MSMEs are also widely viewed as holding the key to inclusive growth, which is so frequently spoken about but remains an elusive goal.

Yet it is worrying that a large proportion of MSMEs, despite their recognised potential, fail to become productive and sustainable sources of economic value.

Among the factors holding MSMEs back are inadequate human and financial resources and a policy and regulatory environment that tends to be far better suited to large enterprises (Parry and Markowitz, 2016). In fact, MSMEs generally receive little attention at the official policy level. Where they do, it rarely translates into concrete and viable forms of support. Not surprisingly, these sorts of problems are more pronounced in developing countries than developed countries.

The exponential growth in global services trade could, however, be a game-changer for MSME communities in developing countries, particularly as many services are more accessible to entrepreneurs and small firms than manufacturing, mining or agriculture, which generally require considerable investment.

Information and communications technology (ICT), financial services, transport and hospitality are among the services sectors that hold particular potential for MSMEs, while also conveniently laying the foundation for a well-functioning society. That is not to say that services do not require investment in resources such as financial and human capital, but start-up costs are often relatively low, and trading across borders has become a more realistic option given the developments in e-commerce and the relative ease of communicating and transacting via digital platforms.

Advances in technology, which are having such a dramatic effect on how people live, work and interact, have been the key driver behind the global value chain (GVC) phenomenon. GVCs, which have blurred the lines between tangible goods and services trade, have created many opportunities for MSME service providers to act as links in the chain – even on a modest scale, operating from their home base. In this way,

they gain access to an extended market which, had they had to face the costs and logistical hurdles of shipping goods across borders, might not have been possible.

MSMEs have much going for them in the services arena. With the right resources, they tend to be flexible and able to adapt quickly to changes in the marketplace, whereas in larger firms, decision-making is more cumbersome. This flexibility is often the product of an entrepreneurial spirit and/or a youthful fascination for things that are new and innovative (Ata, 2019).

MSMEs are not the exclusive preserve of young people, but in a world where jobs in large, established companies are becoming increasingly scarce, they constitute an important source of employment for young people with good ideas and a desire to succeed.

The need for flexibility will, of course, intensify as automation, artificial intelligence and other technological developments continue to transform the world of work and erode the pool of more traditional jobs. Many services are powered by digital technologies, thus putting tech-savvy MSME service providers in an excellent position to leverage the continuously unfolding opportunities. The rapid spread of mobile banking services in East and Southern Africa in recent years is an example of how advances in technology have helped to fan entrepreneurial ideas and create new, high-growth industries that have international reach.

In addition, many women who, given their multiple roles in life, have not fitted comfortably into formal corporate structures, are finding new economic purpose in service sectors such as education and accountancy, which lend themselves to flexible, online delivery.

It has been argued that the development of the services sector in developing countries that are still agriculture- or mining-dependent can clear the way for the country to "leapfrog" manufacturing, which would be the next logical stage in the economic development process. This view appears to have some merit if the unprecedented growth in mobile phone usage and the growing popularity of online business and leisure services are anything to go by.

However, a services sector cannot thrive in a vacuum, devoid of a supportive policy environment and regulatory framework and well-functioning infrastructure, notably in the telecommunications and energy spheres.

MSMEs, in turn, need special types of attention and assistance, particularly if they are to make inroads into regional or international markets. MSMEs often lack market knowledge and international business skills, but as they are not well understood or properly catered for in developing countries, they are often confronted by the same rules, regulations and challenges as those faced by larger firms. The services sector is notoriously regulated and requires informed and skilful navigation. A lack of finance, compounded by weak creditworthiness, is another perennial problem. Faced with these challenges, many MSMEs simply retreat into the informal sector where their economic potential remains stunted (Grater et al., 2017).

MSMEs need to be given serious attention if developing countries are to make headway in their frequently expressed desire for inclusive growth and sustainable development. Although stories abound of small businesses in Africa, Asia and other developing regions that have made impressive strides in building a regional or global presence, these are more often than not "pockets of excellence" which do not realistically reflect the status quo. Left on their own, most MSMEs will be unable to grow and reach their full potential.

While opening doors to new sources of finance and building knowledge and skills are critical steps, creating a strong cohort of MSME service providers also depends on a country having an entrenched services culture, from which different services sectors and individual providers can take their nourishment. This implies that while there may be merit in "leapfrogging", it does not include taking short cuts.

Clearly, developing countries (government, business and civil society) need to devote much more time and effort to researching, understanding and unleashing the potential of MSMEs in high-potential service sectors, failing which technology giants and other major economic players could crowd out smaller local entities and set an economy on a course that simply entrenches inequality.

In Canada, female ownership and firm size are negatively correlated (Statistics Canada, 2018).[15] Women owned 17.2 per cent of micro-firms (one to four employees) across all economic sectors and 14.4 per cent of small firms (five-19 employees), but only 12 per cent of medium-sized firms (less than 100 employees). Services prevail over manufacturing, with "other services" (such as personal care services and laundry services), retail trade, and hospitality as the main sectors (see Figure B.22). Only 14 per cent of MSMEs owned by women were exporters, and 4 per cent had exported services in 2017. However, only 11 per cent of female MSME-owners intended to access foreign markets in the following three years.

In the United Kingdom, in 2017, businesses led by women were inversely correlated with enterprise size: 21 per cent of businesses with no employees were led by women, compared to 19 per cent of micro-firms (one to nine employees), 20 per cent of small businesses (10-49 employees) and 15 per cent of medium-sized businesses (50-249 employees).

UK MSMEs in the health and education sectors and in other services sectors were most likely to be led by women in 2017 (52 per cent, 50 per cent and 26 per cent, respectively), while businesses in ICT, construction and manufacturing were least likely to be controlled by women (10 per cent, 11 per cent and 12 per cent, respectively) (UK DBEIS, 2018).

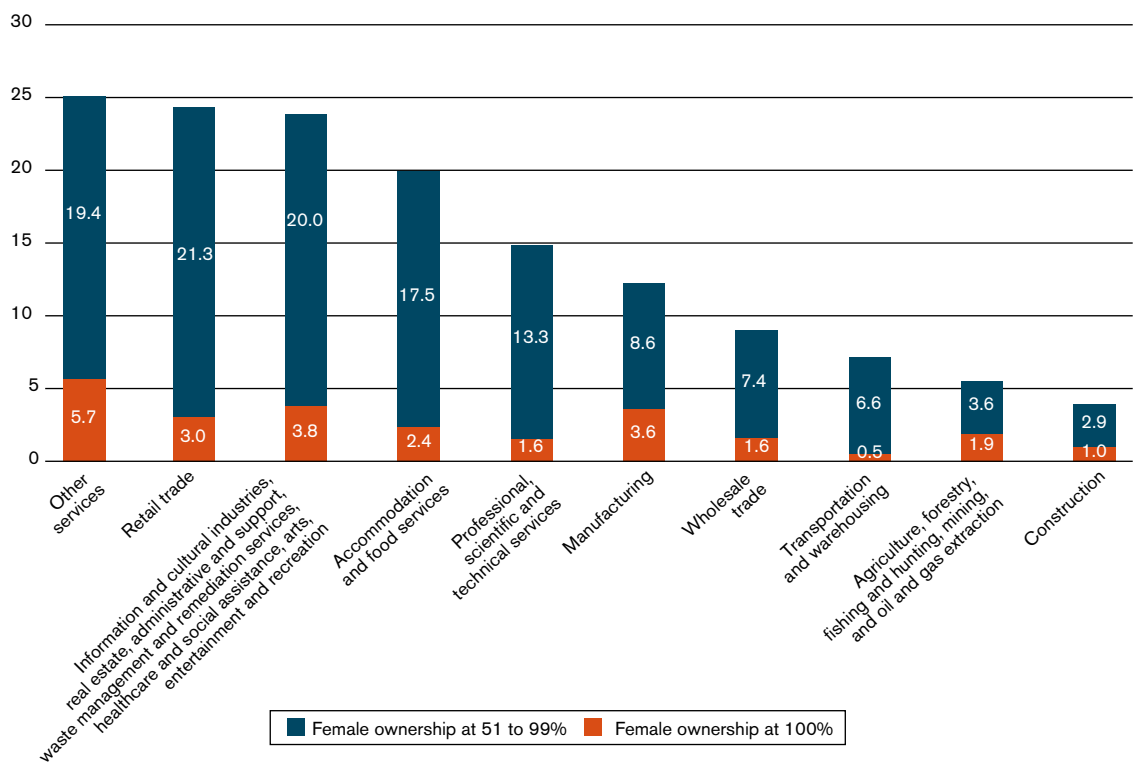
In various economies, at different levels of development, women are largely concentrated in the least-traded services sectors, such as education, health and social care, thus reducing their opportunities to engage in trade. However, educational and health services are in rapid expansion thanks to digitalization and medical tourism, offering good prospects for women's contributions to services trade.

4. What is the role of services in global value chains?

Measuring the role of services in global value chains is increasingly complex as manufacturing and services, including intellectual property, become intertwined components of any production process (Miroudot, 2019).

Figure B.22: In Canada, MSMEs owned by women are largely in services

Canadian MSMEs owned by women, by sector and share of female ownership, 2017 (percentage)



Source: Statistics Canada (2018).

The line between these individual components becomes increasingly blurred, partly also because of the servitization that is the increasing bundling of goods and services by manufacturing firms. For example, ships or airplanes may be delivered with training packages for the crew, or machines may require services in order to be installed (Miroudot and Cadestin, 2017). Other examples include firms such as IBM, which has completely changed its production characteristics and has transformed itself from a goods producer (of computer hardware) to a service supplier (of cloud computing and artificial intelligence). Another recent trend is the emergence of "factoryless" goods producers, whereby traditional manufacturing firms such as Apple or the British appliance firm Dyson outsource manufacturing activities to other firms and focus on services such as design, sales and coordination activities (Bernard and Fort, 2015).

Technology is a key driver of these trends, forcing firms to innovate and change their business models in order to stay in the market. On-going digital transformations render the split between what is a service and what is a good increasingly blurry. Technological convergence is also leading to multi-functional devices, such as mobile phones which can act as cameras, e-readers, music libraries, games consoles, etc., and new technologies, for example sensors which add functionalities to "non-interactive" goods and make them digital (for example, car components or smart fridges).

These recent developments make the measurement of services in international trade even more complex.

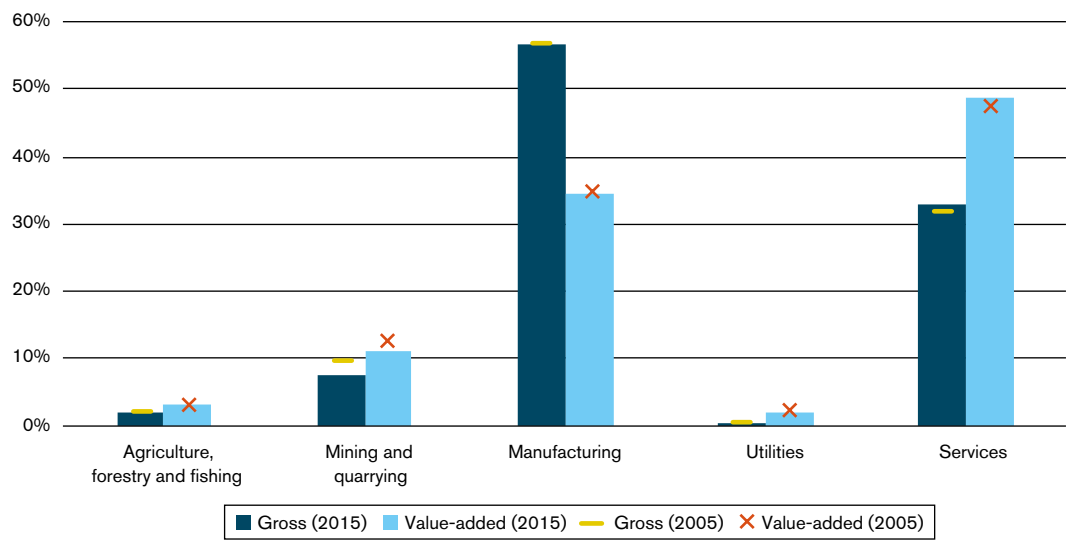
Trade in value-added statistics accounts for intermediate input linkages between sectors and measures the sectoral value-added in exports of goods and services.[16]

Figure B.23 highlights that in value-added terms, services play a much bigger role in international trade than gross statistics suggest. The services value-added that is contained in international goods and services exports accounts for close to half of world exports, compared to about 30 per cent in 1980 (Heuser and Mattoo, 2017). The importance of services in value-added terms reflects their role as inputs into other sectors such as agriculture or manufacturing.

(a) Services value-added in manufacturing exports

Services inputs in manufacturing are often supplied in-house, for example, in the case of multinational enterprises (MNEs), or at arm's length (Low, 2013). Services are not only important inputs along the production process but also constitute important after-sales activities such as training, maintenance, provision of spare parts for repair services, and a range of other customer care services (Gaiardelli et al., 2007).

Figure B.23: Services account for close to half of world exports in terms of value-added
Structure of world trade in gross and value-added terms, 2015



Source: OECD Trade in Value-Added (TiVA) database (2018).[17]

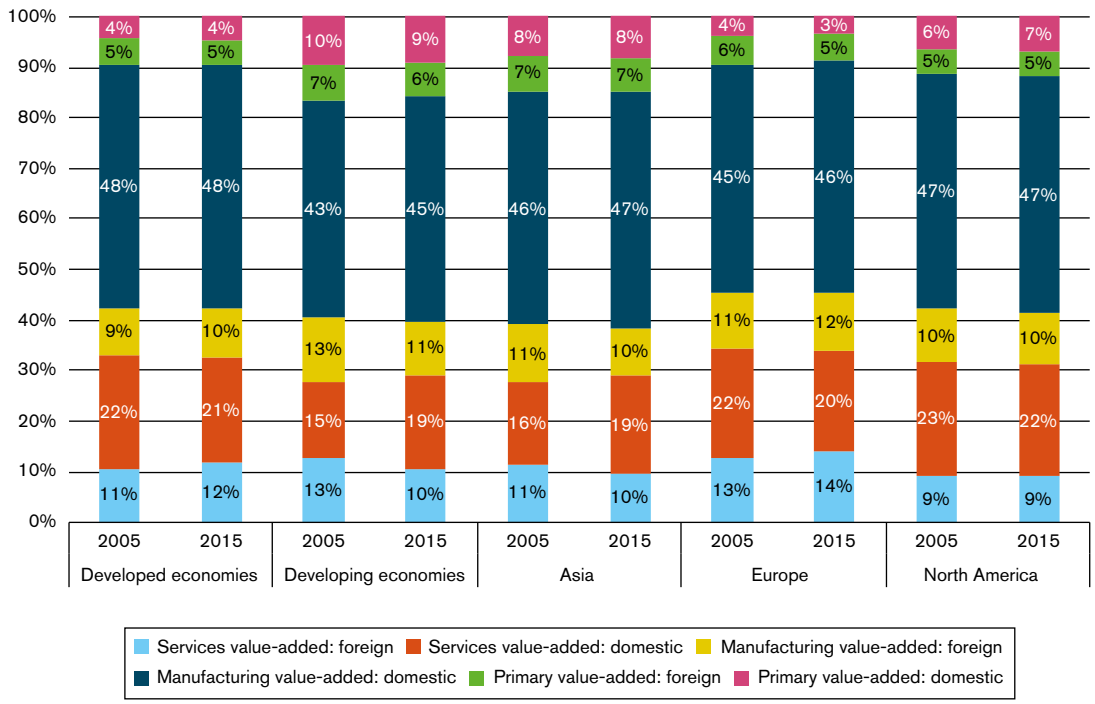
Providing a decomposition of manufacturing exports by value-added and origin, Figure B.24 illustrates the importance of services for manufacturing. In developed economies, due to a higher degree of servicification, services value-added accounted in 2015 for 33 per cent of manufacturing exports compared to 29 per cent in developing countries. The decomposition for the three manufacturing hubs – Asia, Europe and North America – in 2015 shows that Europe had the highest services content (34 per cent), followed by North America (31 per cent) and Asia (29 per cent). While the aggregate services value in manufacturing exports remained stable for developed countries between 2005 and 2015, it increased in Asia, particularly due to the strong increase of the domestic services content in China's manufacturing exports. More heterogeneity is observed at the level of individual economies (WTO 2014).

Providing further detail on the services content in exports, Figure B.25 illustrates the importance of wholesale and retail services, other business services,[18] financial services and transport services as inputs for manufacturing sectors. In contrast, services such as accommodation and food, real estate and construction are closer to final demand. The reliance on different types of services is similar across manufacturing sectors, implying that building the supply-side capacity of these services sectors will thus benefit the competitiveness of all manufacturing sectors.

The value-added shown in these results is considered a lower-bound estimate, as services are often produced "in-house" by exporting companies, including high-value-added services such as R&D and advertising. In contrast to arm's-length transactions, no respective market transactions appear, so statistical frameworks do not capture these flows. As a result, services produced "in-house" might not be adequately measured (Low, 2013; Wölfl, 2019). Using a combination of labour force surveys and the OECD-WTO Trade in Value-Added (TiVA) initiative's database, Miroudot and Cadestin (2017) estimate for a sample of 31 economies that the share of services value-added in manufacturing exports increases from 37 per cent to 53 per cent when the "in-house" services activities of manufacturing firms are added.

Figure B.24: The share of services value-added in manufacturing exports is highest in Europe and is increasing in Asia

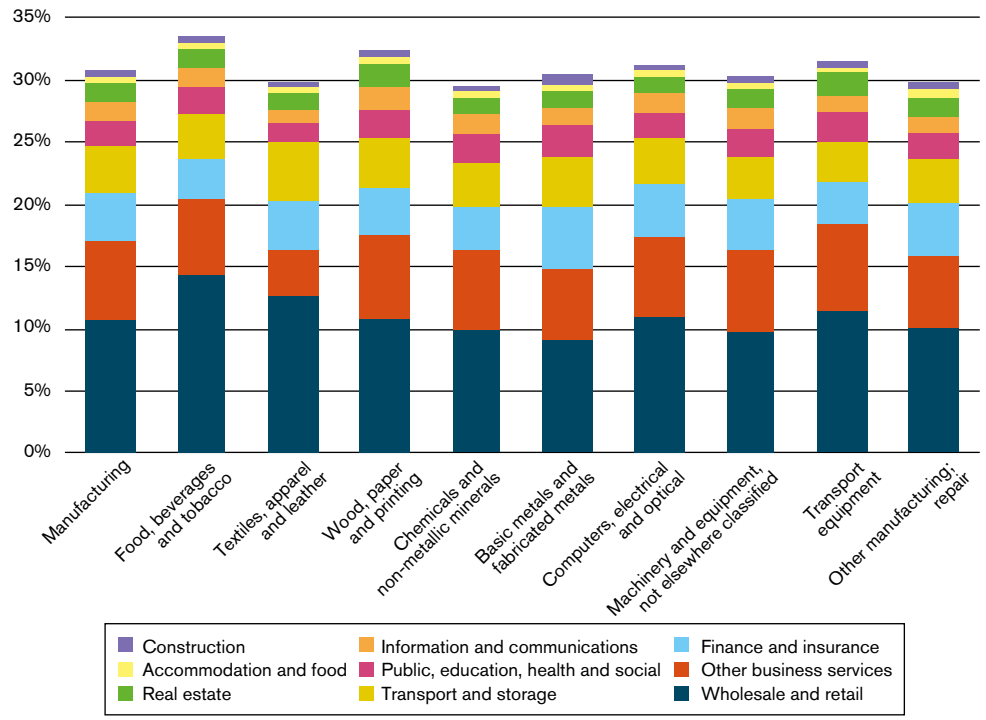
Value-added decomposition of manufacturing and services industry exports, 2005 and 2015



Source: OECD TiVA database (2018).

Note: Services value-added includes construction services. Primary value-added covers agriculture, mining and utilities.

Figure B.25. Services have similar relative importance for exports in different manufacturing sectors
Services value-added in exports of manufacturing industries, 2015



Source: OECD TiVA database (2018).

Across economies, between 25 per cent and 60 per cent of employment in manufacturing firms is found in service support functions such as R&D, engineering, transport, logistics, distribution, marketing, sales, after-sale services, IT, management and back-office support.

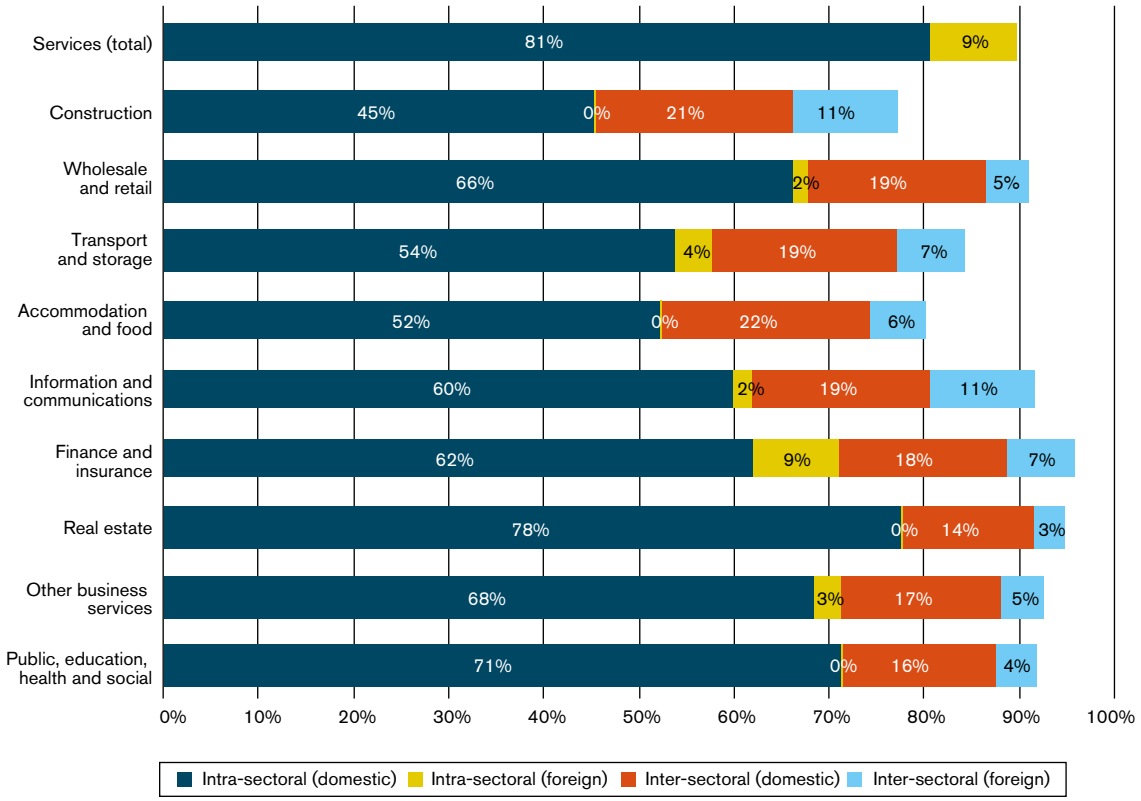
(b) Services value-added in services production

Trade statistics in value-added terms also allude to services fragmentation (see Figure B.26). Services production, at least at the sectoral aggregation of the TiVA database, is less fragmented than manufacturing. Services value-added constitutes 90 per cent of services exports, while the value-added of manufacturing and primary activities account for the remaining 10 per cent. Services exports rely to a large extent on the domestic supply-side capacity, with the domestic services content being 81 per cent of exports. The foreign services content (imported services inputs) of services exports is 9 per cent, slightly below the foreign services content in manufacturing exports (see Figure B.24 above). In this context, it is important to note that, since the activities of foreign affiliates represent domestic services value-added and not foreign value-added, TiVA statistics do not readily identify trade through a commercial presence in another country (GATS mode 3).

The decomposition at the sector level shows that services exports rely to a large extent on services inputs from within the same sector as compared to inputs from other services sectors. The share of intra-sectoral value-added in exports is highest for the following sectors: real estate (78 per cent); public, health, education and social (71 per cent); finance and insurance (71 per cent); and other business services (71 per cent). In contrast, inter-sectoral services value-added is important for the exports of sectors such as construction (32 per cent), information and communication services (30 per cent), and accommodation and food (28 per cent).

Figure B.26: Services value-added constitutes 90 per cent in services exports

Decomposition of services exports by services value-added, 2015



Source: OECD TiVA database (2018).

Note: For illustrative purposes, the decomposition does not show the primary and manufacturing value-added contained in services exports, which would correspond to the difference between 100 per cent and the services value-added represented by the bar.

Endnotes

1 For services, the variable sales is equivalent to output except in wholesale and retail trade, financial intermediation and insurance, and real estate activities.

2 Affiliates are enterprises controlled by a foreign investor. While international treaties such as the GATS define control more broadly, the FATS framework recommends concentrating on control through the majority-ownership of voting power. A more detailed definition is available in UN et al. (2012).

3 The sectoral classification in this section, was adjusted, to the extent possible, to comply with the scope of GATS.

4 At present, the value of international trade in goods through cross-border e-commerce is not yet known. The international statistical community is actively engaged in the development of a measure.

5 In this report, the aggregate "developing economies" includes developing economies, LDCs, and the Commonwealth of Independent States (CIS), including associate and former member states. Except for LDCs, this statistical grouping has no implications for any matter relating to the level of development of WTO members.

6 ICT services cover telecommunications services, computer services and related activities. Estimated values also include audio-visuals and related services. International transactions are recorded as trade in intellectual property (IP) and related services when purchased from another country for commercial purposes, such as for reproduction or distribution. The purchase of digitally downloaded audio-visuals and software, such as music or games streamed for own consumption from another country, is recorded respectively as trade in audio-visual services or computer software.

7 According to the World Bank income classification based on GNI per capita. Hong Kong (China), Singapore and the Republic of Korea are classified as high-income economies; China is classified as an upper middle-income economy; and India as a lower middle-income economy.

8 The World Bank Enterprise Surveys are surveys of firms which are representative of a country's non-agricultural economy. They cover small firms (five to 20 employees), medium-sized firms (20 to 99 employees) and large firms (more than 100 employees). Micro-firms ((less than five employees) are not surveyed. Surveys used in this report were carried out between 2013 and 2018 (and for two economies in 2012) in 83 economies from all regions. In services, the Enterprise Surveys include the following services divisions of the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3.1): construction (45); wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods (50-52); hotels and restaurants (55); transport, storage and communications (60-64); and computer and related activities (72). In manufacturing, surveys cover firms in ISIC Rev. 3. divisions 15 to 37.

9 This section is based on national statistics and not on the World Bank Enterprise Survey.

10 The UK Annual Business Survey covers businesses in the United Kingdom with the exception of Northern Ireland. Insurance and reinsurance are excluded from the survey.

11 Defined as firms with less than 500 employees.

12 The UK Standard Industrial Classification defines manufacturing activities as "the physical and/or chemical transformation of materials, substances or components into new products" (Department for Business, 2018). Ninety-five three-digit SIC codes were cited in the UK Longitudinal Small Business Survey, with the treatment and coating of metals as well as printing being the two largest sub-sectors.

13 In the World Bank Enterprise Surveys, some 18,600 services firms and 25,760 manufacturing firms in different regions reported detailed information on female ownership and exports as percentage of total sales. Surveys used in this report were carried out between 2013 and 2018 (and for two economies in 2012).

14 Direct and indirect female participation in exports is calculated as the share of exports by firms owned by women (majority-owned or wholly-owned) in total exports of all firms (owned by women, owned by men, and with mixed gender ownership).

15 Estimates were generated from the responses obtained from 9,115 MSMEs. Financing and leasing companies, subsidiaries, non-profit organizations, government offices, schools, hospitals and other public sector organizations are not covered.

16 For a description of how these technical estimates are built, see WTO and IDE-JETRO (2011), chapter IX.

17 Services account for one-third of world exports in gross terms according to the OECD TiVA database, but for less than one-quarter according to balance-of-payments statistics. As the OECD TiVA database is benchmarked against national statistics, several methodological differences, including the allocation of trade and transport margins for goods to services trade, can explain the relatively higher importance of services trade in the OECD TiVA database.

18 A key sector that provides extra-sectoral inputs to these and other sectors is "other business services", which encompasses professional and technical activities such as accounting, advertising, architecture, engineering, legal, management consultancy, market research and R&D.

C Why services trade matters

This section examines the role of trade in services in helping countries to achieve rapid and inclusive growth. Section C.1 discusses and attempts to quantify how services trade benefits the economy and promotes growth. Section C.2 discusses the role trade in services plays in enhancing domestic firms' competitiveness, not only in the services sector, but also in manufacturing. Section C.3 considers how services trade promotes inclusiveness in a number of areas, such as skills, gender and location of economic activity. Section C.4 concludes.

Contents

1. The gains from services trade 52

2. Services trade boosts firms' competitiveness 65

3. How services trade affects employment and inclusiveness 69

4. Concluding observations 80

Some key facts and findings

- Trade in services creates welfare gains for society through a more efficient allocation of resources, greater economies of scale, and an increase in the variety of services on offer.
- Services trade improves firms' competitiveness in both the services and manufacturing sectors.
- Because services providers must often be present in the area where the service is delivered, the quality of institutions in the importing country is of greater importance for services trade than for goods trade.
- A large number of jobs is supported by services exports. However, the effect of services trade on the overall level and structure of employment has been small so far.
- Services trade can help to reduce economic inequality for women and MSMEs.

1. The gains from services trade

This section begins with a discussion of the ways in which trade in services differs from trade in goods, and what this implies for the contribution of services to the economy and to growth. This will be followed by a review of empirical research quantifying the impact on economic welfare of an increase in services trade. It also includes author's estimates of the gains from increased trade in services using a framework associated with new quantitative trade models (Arkolakis et al., 2012; Costinot and Rodriguez-Clare, 2014) as well as results from the trade and growth literature (Feyrer, 2019). These estimates are complemented with case studies that illustrate how trade in services has contributed to economic growth and development in a geographically diverse set of economies.

As in the case with trade in goods, trade in services could contribute to a more efficient allocation of resources, greater economies of scale, availability of a greater variety of services for consumers and producers, and it could set in motion a process by which the more productive services firms could expand and grow. Beneficial spillovers could also arise from the transfer of technology and know-how from one economy to another. Beyond these usual sources of gains, some services sectors have special or unique features that may amplify how an economy can benefit from trade in services which are discussed below.

(a) What is different about trade in services compared to trade in goods?

Certain services sectors, such as transport, telecommunications, finance, and water and electricity distribution – generally known as infrastructural or producer services – play critical roles in the functioning of the entire economy. It is inconceivable, for instance, that manufacturing plants can be run efficiently if there are periodic blackouts, and businesses suffer if communication is difficult to establish with suppliers and customers. The financial or capital market is responsible for allocating an economy's savings to their most productive uses and also for allocating investment risk to those willing to bear it (Arrow, 1970). If this allocative function fares poorly because of an underdeveloped or "repressed"[1] financial sector (McKinnon, 1973), it can starve productive firms of much-needed capital, while channelling resources to firms with poor prospects. The state and performance of these producer services sectors have an enormous influence on productivity across the entire swath of a modern economy.

Beyond these infrastructural or producer services, other services sectors have an outsized impact on the productivity of what economists call factors of production, like labour. The productivity of a country's labour force depends on how educated, skilled and healthy it is, attributes which hinge crucially on the quality of the country's educational and health systems. The better the quality of the services generated by these sectors, the more likely that the country's workers will make a substantial contribution to economic growth.

Allowing greater access to foreign services suppliers in infrastructural services, as well as education and health, is one way to improve efficiency with potentially large payoffs for the economy, as discussed in the opinion piece by Bernard Hoekman and Mateo Fiorini (see page 66). The available evidence linking greater trade in services to improved performance of these sectors and the economy is examined further in this section.

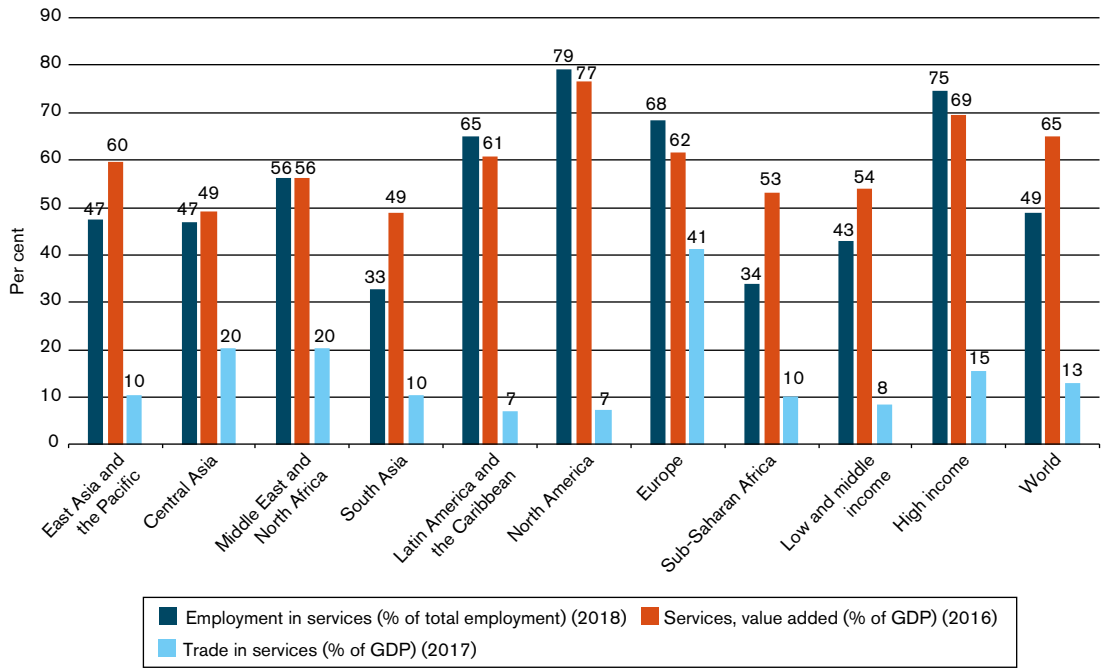
The services sector also constitutes the biggest share of the global economy. As shown in Figure C.1 below, the services share ranges from 49 per cent in South Asia to 77 per cent in North America. Globally, it makes up about two-thirds of value-added. Thus, apart from in South Asia, it is bigger than agriculture, industry and the natural resource sectors combined in all other major geographical regions. This hints at the huge potential that increasing trade in services has to deliver large economic gains to the world.

While the general presumption is that productivity growth in services lags behind that of manufacturing, that presumption is increasingly being questioned and qualified.

First, recent empirical work by Young (2014) on Organisation for Economic Co-operation and Development (OECD) economies estimates that the "true" total factor productivity difference between the sectors might lie between a 0.5 per cent advantage for goods and a 0.4 per cent advantage for services. Taking the middle of this range suggests that a plausible alternative characterization of growth in OECD countries is that goods and services have had similar total factor productivity growth rates.

Second, current measures of productivity do not properly account for the indirect contribution of services to other sectors (Mercer-Blackman and Ablaza, 2018). The line between manufacturing and services is often blurred (Hallward-Driemeier and Nayyar, 2018). Not only are the linkages between the two sectors close, they are also getting closer over time. OECD-WTO Trade in Value-Added (TiVA) data

Figure C.1: The services sector constitutes the biggest share of the global economy
Share of services in value-added, employment and cross-border trade in services, by region



Source: WTO Secretariat calculations based on World Development Indicators.

show that most manufacturing firms rely on services inputs to produce and trade their goods (see Section B). Many firms also provide services in-house.

Finally, it is possible to observe how productivity in some services sectors is catching up with or even exceeding productivity in manufacturing. The features of manufacturing once thought to be unique are increasingly shared by some services sectors that are internationally tradable across borders through advances in information and communication technology (ICT) such as economies of scale (see Box C.1).

With respect to trade in services itself, an important characteristic that differentiates it from goods trade is the "proximity burden" (Francois and Hoekman, 2010). Unlike trade in goods, many services require that supplier and consumer be in close physical contact. This means that physical distance has a disproportionately larger adverse effect on trade in services compared to trade in goods (Anderson et al., 2014). The proximity burden may also require more bundling of local presence with cross-border provision of services than is the case with goods. For example, even if the service may be amenable to cross-border supply, the potential exporter of services may still need to establish a commercial presence in the destination market to be able to attract interest from potential purchasers (see Section C.2). However, it should be noted that digitalization is likely to decrease this burden, as technological changes make more and more services deliverable electronically.

Trade in services is more resilient than trade in goods to foreign income shocks. For instance, according to Ariu (2016), trade in services was far less affected by the global financial crisis in 2008-09 than merchandise trade. His explanation is that services represent essential inputs for the production process, that their flow must be continuous, and that they cannot be stored, nor can they easily be modified in reaction to fluctuations in output. Therefore, even during the crisis, firms continued importing services that provided fundamental production inputs.

The services sector is more likely to be marked by market failures, and therefore to be subject to government regulation (Francois and Hoekman, 2010). Examples of these market failures include natural monopolies (rail transport, electricity distribution), network externalities (telecommunications) and information asymmetry (healthcare, finance) – see the related discussion in Section E. Government intervention in services sectors where market

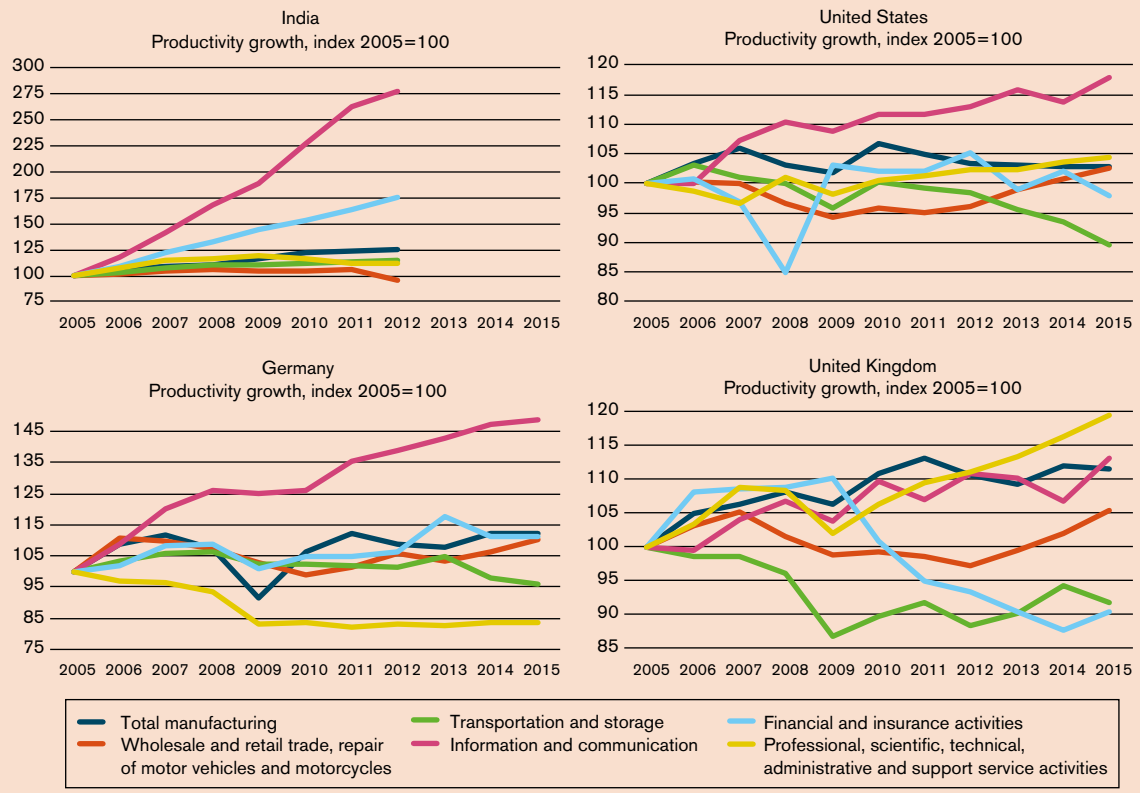
Box C.1: Technological developments and productivity in services

Information and communications technologies (ICTs) are one of the main drivers of global economic growth (Aboal and Tacsir, 2018). Technological innovations, coupled with new business models, have changed the nature and structure of services. ICT development means that economies of scale have become important in ICT-enabled services sectors, as the marginal cost of providing an additional unit approaches zero (Fontagné et al., 2014). The input of professional scientific and technical services into agriculture, mining, utilities and construction are making sizeable contributions to the growth of those sectors (Hallward-Driemeier and Nayyar, 2018). One outcome of this has been increased interest in identifying services sectors that are "potentially ICT-enabled" (Borga and Howell, 2014). These sectors include financial and insurance services, charges for the use of intellectual property, audio-visual and related products, telecommunications, computer and information services, research and development (R&D) services, professional and management consulting services, and architectural and engineering services.

Figure C.2 shows recent developments in productivity growth for some selected services sectors and the manufacturing sector for Germany, India, the United Kingdom and the United States. A few important trends are worth noting. First, the information and telecommunications sector has seen a growth in productivity that is faster than that in manufacturing in all four economies. Second, in the United Kingdom and the United States, the same pattern of higher growth than in manufacturing is observed in professional service activities. Third, in India, productivity growth in financial and insurance activities has also grown faster than in manufacturing. This pattern appears consistent with what has been argued by Aboal and Tacsir (2018) to be the larger role played by rapid advancements in ICT in services than in manufacturing. This higher productivity growth in services enabled by the ICT sector could allay fears that secular or long-term growth of the services sector in many economies will come at the expense of slowing overall growth.

Figure C.2: Total factor productivity in some services sectors exceeds that of manufacturing

Total factor productivity in selected sectors and economies, 2005-15



Source: Author's calculation, based on data from EU KLEMS database (www.euklems.net) and World KLEMS database (www.worldklems.net).

Notes: The productivity measure presented here is total factor productivity, which tabulates the change in output volume relative to changes in the use of inputs, including capital, labour and intermediate inputs. If output volume increases faster than the volume of inputs, then total factor productivity increases. The sector classification is different across economies, and information is available at different levels of aggregation.

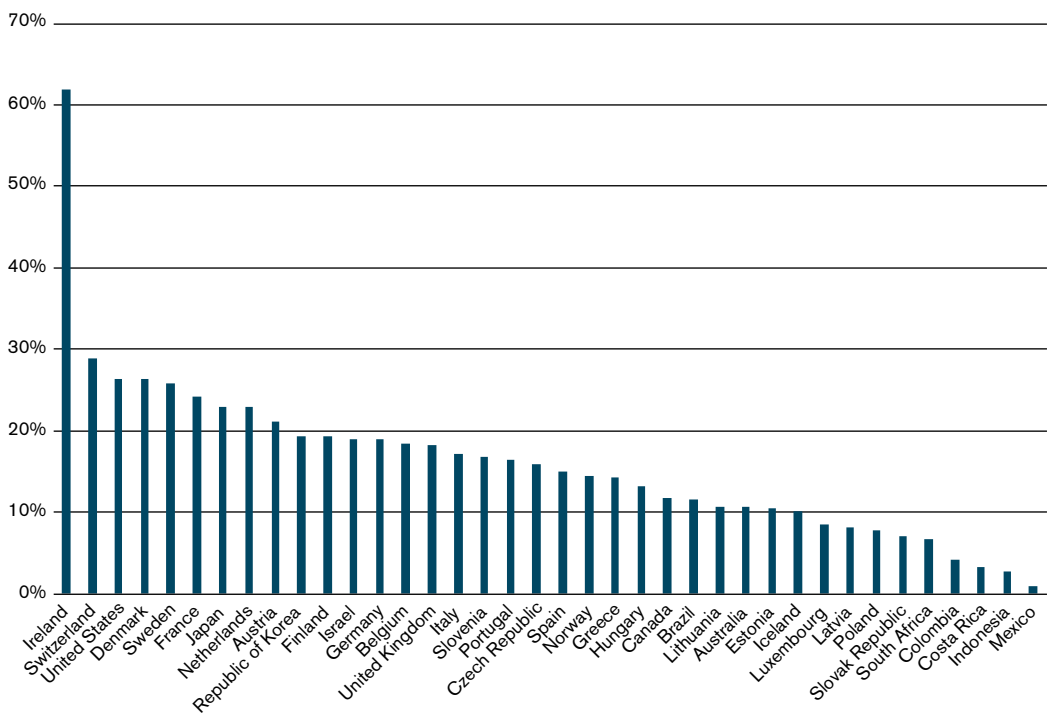
failures exist can improve economic efficiency. This intervention typically takes the form of regulations that affect, among other economic outcomes, competition and market entry. This is not to argue that there are no domestic regulations on goods, but that they seem to be far more visible in the services sectors. These regulations, which can differ widely among economies, affect the ease of trading the regulated services. While regulatory authorities may have no desire to restrict trade, differences in regulations can create conditions that impede more trade than is desirable (see related discussion in Section E). This may be another reason for the low share of cross-border services trade in world trade, and for the need to turn to other ways of supplying foreign markets, notably through the commercial presence of foreign suppliers (mode 3 of the General Agreement on Trade in Services – GATS).

Finally, it could be argued that there is a strong connection between services trade and productivity (Eaton and Kortum, 2018). This takes place through services exports from intangible assets. An oft-remarked fact is the growing share of intangible assets in business investment. For OECD countries, investment in intangible assets averages about one-fifth of gross capital formation; for some members, like Ireland, the share can be as high as 61 per cent (see Figure C.3). Following the influential work by Corrado et al. (2009), intangible assets are understood to include investments in: (i) computerized information, (ii) innovative property (which includes R&D spending) and (iii) economic competencies (which includes investment in brand names as well as investment in firm-specific human capital). Eaton and Kortum (2018) identify a number of characteristics – non-rivalry in use, a close connection with intellectual property (IP) rights, and a near-zero marginal cost of replication – of services exports from intangible assets that have hitherto been overlooked in the literature (see the discussion of IP-related services in Section B). As the digital transformation gains pace in services, and knowledge-capturing products become more important outputs from the services sectors, the admittedly still embryonic Eaton-Kortum framework nevertheless offers a useful starting point to study services trade in the digital economy.

(b) Trade in services contributes to growth: some available evidence

In the last subsection, it was conjectured that allowing greater trade in services particularly in infrastructural services and the education, financial and health sectors can improve their efficiency with potentially

Figure C.3: The share of intangible assets in business investment in OECD countries is significant
Intangible assets as share of gross fixed capital formation in OECD countries, 2016



Source: OECD (2017c).

large payoffs for the economy. This section will now examine some of the available evidence bearing on this matter. A survey of the empirical evidence will be complemented by case studies from a number of economies demonstrating successful developmental outcomes arising from an expansion of trade in services.

(i) Empirical evidence from the literature

Financial services

Claessens et al. (2001) measure the impact of foreign bank participation on various indicators of domestic banking efficiency. They find that the entry of foreign banks is associated with greater efficiency in the domestic banking system. Eschenbach and Francois (2002) explicitly model the effect of financial liberalization on growth. They estimate that if a lower-income country were to move to the higher average openness of financial services seen in higher-income countries (roughly 50 percent), GDP per capita growth rates would increase by between 0.4 and 0.6 per cent on a yearly basis. Mattoo et al. (2006) test a standard growth equation on developed and developing countries. They find that with full financial services liberalization, developed countries grow 1.2 per cent faster and developing countries grow 2.3 per cent faster.

Controlling for other determinants of growth, countries with fully open financial (and telecommunications) services grow 1.5 per cent faster than other countries. A study by El Khoury and Savvides (2006) on trade in financial and telecommunications services suggests that its impact on economic growth depends on a country's level of development. They conjecture that in financial services, human capital is in relative scarcity in lower-income economies. Typically, human capital cannot be lured from abroad by financial liberalization. In addition, lower-income countries do not have the institutional or regulatory structures to ensure the effective functioning of the financial sector. El Khoury and Savvides (2006) find that this is indeed the case for financial services, where openness has a positive impact on growth, but only after a certain threshold of income is reached (equal to US$ 2,291 per year).[2]

Telecommunications

Boylaud and Nicoletti (2000) find for the telecommunications sector in OECD countries that the prospect of competition and actual competition improve efficiency and the quality of the service and lower prices. The study by El Khoury and Savvides (2006) mentioned above also tests the hypothesis that the impact of services trade openness on economic growth depends on a country's level of development in telecommunication services. In contrast to financial services, they find that telecommunication services openness has a positive impact on growth for low-income economies, but that this effect diminishes as per capita income increases. Their explanation for this is that since physical capital is scarce in the poorest economies, and opening up the telecommunication services sector frequently attracts foreign direct investment (FDI), market-opening contributes to raising productivity growth in the sector.

Policies encouraging greater FDI and competition in the telecommunications sector have been associated with enhanced affordability, as well as a higher quality and greater diversity of telecommunications services (Lestage et al., 2013). Countries that have introduced quality regulation – including, in particular, regulation allowing competition – have had greater success than other countries in spurring market growth and developing their digital economy (International Telecommunication Union (ITU), 2017). On this basis, it is not surprising that studies such as Mattoo et al. (2006) and Eschenbach and Hoekman (2006) have found a close link between telecommunications liberalization and higher GDP growth rates.

Electricity distribution

Eschenbach and Hoekman (2006) find that regulatory reforms in transport, telecommunications, and power (and finance) are highly correlated with inward FDI (representing mode 3 of the General Agreement on Trade in Services (GATS), relating to commercial presence in another country). Controlling for explanatory variables common to the growth literature, services reform explains the improved economic performance post-1990 of the transition economies. For example, Bekhet and Othman (2011) use an econometric method known as a vector error correction model to establish causality between electricity consumption and aggregate or economy-wide inflows of FDI in Malaysia between 1971 and 2009. They find that higher levels of FDI (mode 3 of the GATS) led to increased electricity consumption.

Transport

Fink et al. (2002) find that both public policy and private practices affect maritime transport prices. Trade liberalization would reduce transport prices by 9 per cent and generate US$ 850 million worth of savings. Breaking up "private carrier agreements" would reduce transport prices about 25 per cent and save US$ 2 billion on shipments to the United States alone.

Healthcare

Previous research on the link between FDI and healthcare outcomes appears to show that the former is associated with lower life expectancy in the recipient economy (Nagel et al, 2015). But this study only covered 14 high-income economies. Nagel et al. (2015) use cointegration analysis to analyse the effects of FDI (mode 3 of the GATS) on health on a far larger set of 179 economies between 1980 and 2011. They find that that the relationship between FDI and health is non-linear, depending on the level of income. FDI has a positive effect on health at low levels of income and only becomes negative at higher levels of income. For example, Alam et al. (2016) use a vector error-correction model to test the causal relationship between FDI and health in Pakistan. They find that both trade openness and FDI increase population health measured by life expectancy in the long run.

Complementarity of goods and services trade

Recent work by Ariu et al. (2019) provides evidence about the complementarity between goods and services trade. One form this complementarity takes is that opening up one sector (say services) increases trade not only in that sector but also in the other sector (goods) that has not been opened up. Ariu et al. (2019) show the potency of reducing barriers to trade in any one sector, such as services, because the benefits accrue beyond that sector alone. Furthermore, the results from this study appear to show that the gains from opening up both services and goods together are greater than those that result from opening up goods and services separately.

(ii) Case studies

To complement the survey of the empirical evidence, case studies describing successful developmental outcomes resulting from an expansion of trade in services in Ethiopia, India, Kenya, Mauritius, Mexico and the Philippines are discussed. These case studies are of salient interest given the geographical diversity of the economies involved, hinting perhaps at the strength of the link between increased trade in services and development.

Air transport in Ethiopia

Ethiopia has encouraged economic growth by increasing trade in transport services. Due to a successful expansion of the Ethiopian Airlines regional network and abundant cargo capacity, high-value or time-sensitive Ethiopian exports can be transported much more cheaply and quickly than before. The improvement in transportation services has allowed the cut flowers industry to flourish in Ethiopia; exports of cut flowers from Ethiopia to the rest of the world increased from US$ 12 million in 2005 to US$ 662 million in 2014 (Hoekman and te Velde, 2017).

ICT services in India

The ICT services sector in India illustrates another instance of services trade contributing to economic development. Due to a combination of low wages, an abundant supply of moderately skilled workers, the labour force's proficiency in English, and the establishment of software technology parks, India has become a prominent global exporter of ICT services. Indian ICT exports totalled US$ 103 billion in 2014, and the whole sector contributed 9.5 per cent of the economy's GDP. India's ICT sector, which employs roughly 3.5 million Indians, has created many jobs for women and outlying cities (Hoekman and te Velde, 2017).

Financial services in Kenya

Kenya provides a pertinent example of a developing country that has used services trade in the context of trade-opening or liberalization to expand its financial services sector. Through increased openness in the financial sector, the establishment of diversified financial hubs, technological advancements in mobile technology, and a modification of the tax regime, Kenya has expanded its financial sector, boosted trade in financial services, and become a regional leader and hub for financial services. Foreign bank participation, coupled with sound regulation, has been an important driving factor. As at the end of 2017, Kenya's banking sector comprised 42 commercial banks, of which 15 were fully foreign-owned and accounted for 30.1 per cent of total banking assets (WTO, 2019). Exploiting the potential for banking services in its own region, Kenya's banks and financial institutions have pursued vigorous expansion over the last years, with nine banks having subsidiaries operating in other East African Community (EAC) countries. From 2011 to 2016, the number of branches of Kenyan banks abroad increased from 211 to 297 (WTO, 2019).

This transformation has allowed Kenya to generate high-skilled and high-wage jobs in the financial sector. Additionally, the Kenyan reforms have made financial services an important part of the economy, as the sector now accounts for 2.8 per cent of Kenya's total formal employment, and 4.6 per cent of total services exports (Hoekman and te Velde, 2017). A significant factor in Kenya's success in expanding financial inclusion has been the expansion of the mobile banking sector. M-PESA, a subsidiary

of Safaricom, remains the leading player, servicing about 19 million users with about US$ 150 million worth of transactions daily. Services offered have been expanded to include loans and saving products (WTO, 2019).

Health, tourism and financial services in Mauritius

Mauritius has reduced ICT trade barriers and experienced beneficial effects similar to those of India. By opening up regulations for the industry, Mauritius has become more efficient and internationally competitive in ICT services. The value of ICT exports increased from US$ 0.3 billion in 2005 to US$ 1.3 billion in 2015, and the share of ICT services in total services exported doubled from 18.5 per cent to 37 per cent over the same period (Hoekman and te Velde, 2017).

Mauritius has also invested heavily in supporting infrastructure, by creating health facilities, to promote health tourism. These investments led to a 15-fold increase between 2005 and 2011 in the number of foreign patients receiving healthcare in Mauritius. The government's aim is to expand the number of foreign patients to 100,000 by 2020, which would increase revenue from the health tourism sector to approximately US$ 1 billion (United States International Trade Commission (USITC), 2015).

In addition to Mauritius' efforts to promote its ICT and health tourism sectors, the country has also targeted the export of financial services as a vehicle for economic growth. Mauritius introduced offshore banking in 1988, in the hope of transforming the economy into an international finance hub. This has played a vital role in the development of the country's financial services sector ever since. Between October 2002 and 2011, more than 20,000 companies registered in the offshore banking sector, and between 1976 and 2010, the tertiary sector (including tourism and financial services) increased from 50 per cent to 70 per cent of GDP (Zafar, 2011). The Government of Mauritius expects this share to grow further and to spur economic growth.

Tourism in Mexico

Faber and Gaubert (2019) looked at the impact of tourism on various localities in Mexico and on the country as a whole. Faber and Gaubert find that international and domestic tourism inflows cause large and significant local economic gains in "touristic regions" relative to less touristic regions, for example, a 10 per cent increase in local hotel revenues leads to a 2.5 per cent increase in total employment in a given municipality, and a 4 per cent increase in nominal municipality GDP. Furthermore, these gains are in part driven by significant positive spillovers in manufacturing. Faber and Gaubert estimate that a 10 per cent increase in local hotel revenues leads to a 3.9 per cent increase in local manufacturing GDP.

These cross-sector spillover effects can occur through a variety of mechanisms. The development of tourism in an area increases demand for other services inputs to tourism, such as legal, accounting and consulting services. As these complementary services sectors expand in the area, local manufacturing firms can draw on these services inputs to improve their own productivity. Increased tourism revenues can loosen credit conditions in an area, which can help manufacturing firms borrow for their working capital requirements. Manufacturing firms in the area also benefit because of access to an expanded set of contacts and business networks created by the expanding tourism sector. Finally, the favourable economic conditions in touristic regions created by the expansion of tourism can lead manufacturing firms from non-touristic regions to relocate there. This means that, while tourism leads to sizable gains at the local level, these gains are muted at the national level, since the relocation of manufacturing firms from non-touristic to touristic regions reduces the positive agglomerative effects of manufacturing in the non-touristic regions.[3]

The business process outsourcing (BPO) sector in the Philippines

The Philippines is another example of how services trade can transform an economy and catalyse economic development. It did so through BPO, which can be defined as the "transfer to third parties of the performance of service-based functions once carried out within a company, or more generally, within an organization" (UNCTAD, 2005). This arrangement involves foreign companies outsourcing their business processes to a service provider domiciled in the Philippines, which may be purely local, purely foreign, or consist of local companies with foreign partners. The BPO industry has several component sectors: contact centres, back office services, data transcription, animation, software development and engineering development. It has become a critical part of the economy of the Philippines.

In 2015, the BPO sector generated US$ 22 billion in revenue, accounting for 7.3 per cent of the GDP of the Philippines and employing 1.2 million full-time employees (Price et al., 2016). The Philippine BPO sector tripled its share of the global BPO market from 4 per cent in 2004 to 12.3 per cent in 2014 and is expected to increase it to 19 per cent by 2020 (Errighi et al., 2016). The sector's international success owes a lot to the fact that the country has a

young, educated workforce with a strong command of English, as well as relatively low living costs that allow labour to be compensated at an internationally competitive rate (Shead, 2017). Moreover, Errighi et al. (2016) find that, given the BPO sector's growth rate, it will soon overtake foreign remittances as the largest contributor to the GDP of the Philippines.

Trade in value-added terms

Finally, it is possible to use trade in value-added (TiVA) data to illustrate the strong links, both upstream and downstream, between exports of one services sector and many other goods and services sectors of the domestic economy (see Box C.2).

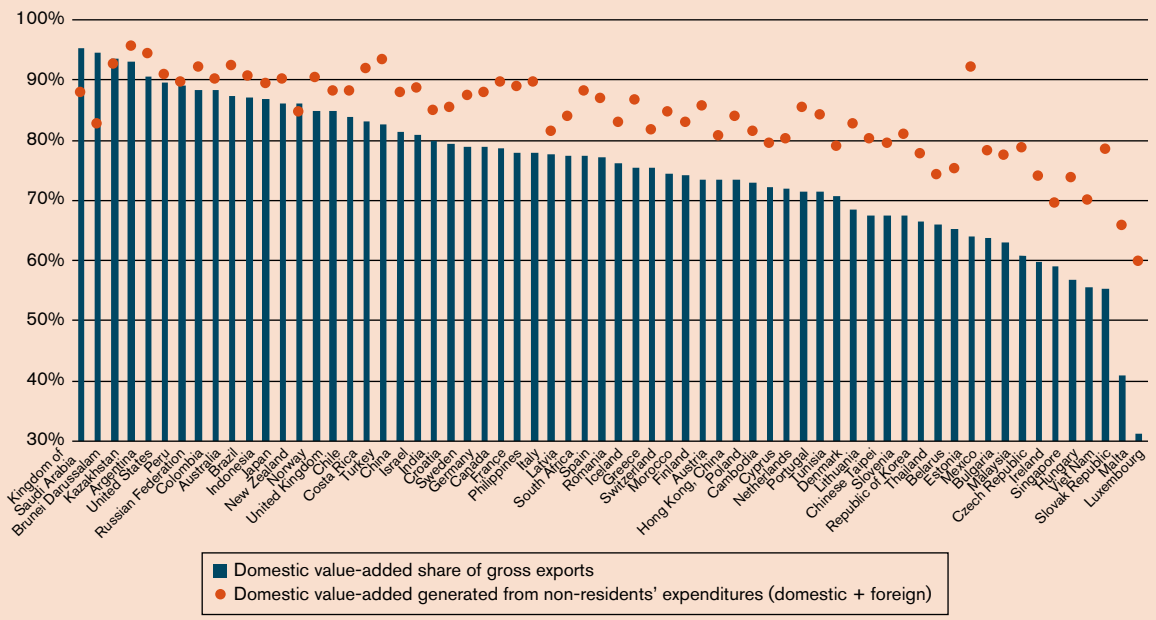
Box C.2: Assessing the impact of tourism exports through trade in value-added

Tourism is among the sectors that benefit most from – and most depend upon – globalization. Assessing the overall impact of tourism on economies is of high importance to policy-makers, especially in least-developed countries (LDCs) and other developing economies where tourism is a major driver of growth (see, for example, WTO (2018c)). To better measure these impacts, the Tourism Committee of the OECD has carried out exploratory work, by combining the OECD's Inter-Country Input-Output tables and Tourism Satellite Account (TSA) statistics, to estimate the origin of the value-added generated by tourism activities.[4]

Applying a value-added approach to tourism can provide a better understanding than conventional trade statistics about how tourism relates to globalization. Unlike the TSA, which measures only direct impacts, TiVA indicators can reveal tourism's indirect upstream and downstream impacts on an economy and provide useful insights into the domestic and foreign value-added content of tourism activities in a comparable standardized format for the 64 economies currently in the TiVA database (see oe.cd/tiva).

The following figures show preliminary TiVA-related estimates that, owing to data limitations, use "non-resident expenditures by households" as a proxy for tourism, resulting in broader coverage than the classifications used for TSA and other traditional tourism statistics.[5] Overall results to date (see Figure C.4) suggest that for nearly every economy in the TiVA database, there is a significantly higher share of domestic value-added in tourism expenditures than in total gross exports. This finding seems to contradict long-held stereotypes of much higher "leakage" levels in international tourism than in other export sectors.

Figure C.4: The share of domestic value-added in tourism is higher than in total exports
Domestic value-added/export ratio for non-resident tourism expenditures and for total economy, 2015



Source: OECD Inter-Country Input-Output Database 2018.

Box C.2: Assessing the impact of tourism exports through trade in value-added *(continued)*

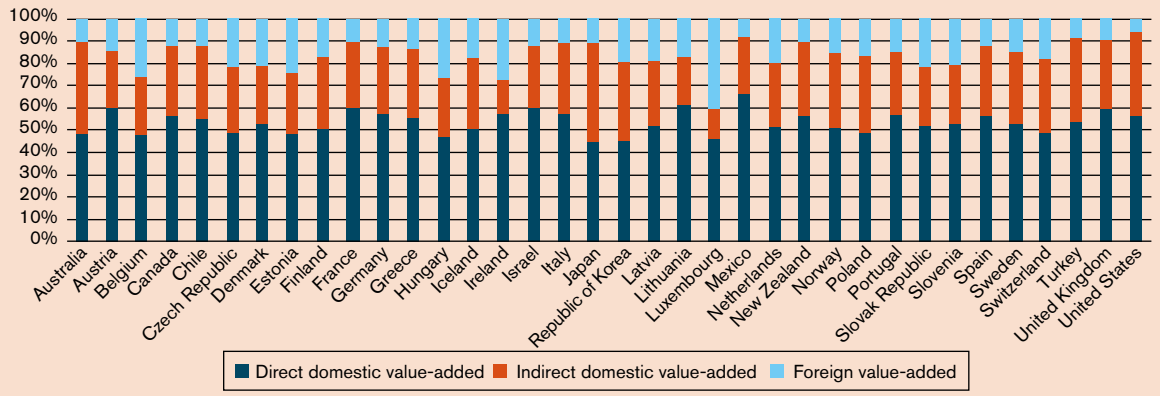
On average, across the economies available for the OECD study, US$ 1 of non-resident household expenditure generated US$ 0.89 cents in domestic value-added and US$ 0.11 in foreign value-added in 2015. The average direct domestic value-added (i.e. from industries serving tourism) represented 56 per cent of total tourism expenditures in 2015, while the share of indirect contributions (the value-added supplied by other, upstream, domestic industries), amounted to 34 per cent (see Figure C.5). This latter figure demonstrates the significant role of domestic supply chains in the creation of products and services purchased by tourists. The share of indirect domestic value-added in tourism expenditures can vary significantly – for example, it amounts to 14 per cent in Luxembourg, 42 per cent in Australia and 44 per cent in Japan.

Regarding the foreign value-added in non-resident tourism expenditures, the largest share was observed for Luxembourg (40 per cent), an economy highly integrated into regional and international production chains. A decomposition of foreign value-added content in tourism expenditures by geographic origin highlights the regional supply chains for the goods and services sold by the tourism industry. For example, tourism-related activities in European Union countries source most of their foreign inputs from other countries in Europe.

Looking at the origin of the indirect domestic value-added content of tourism expenditures, these new results highlight the predominant role of services industries, with major contributions from the distribution, transport and business sectors in particular, as shown in Figure C.6.

Figure C.5: Domestic supply chains have a significant role in products and services purchased by tourists

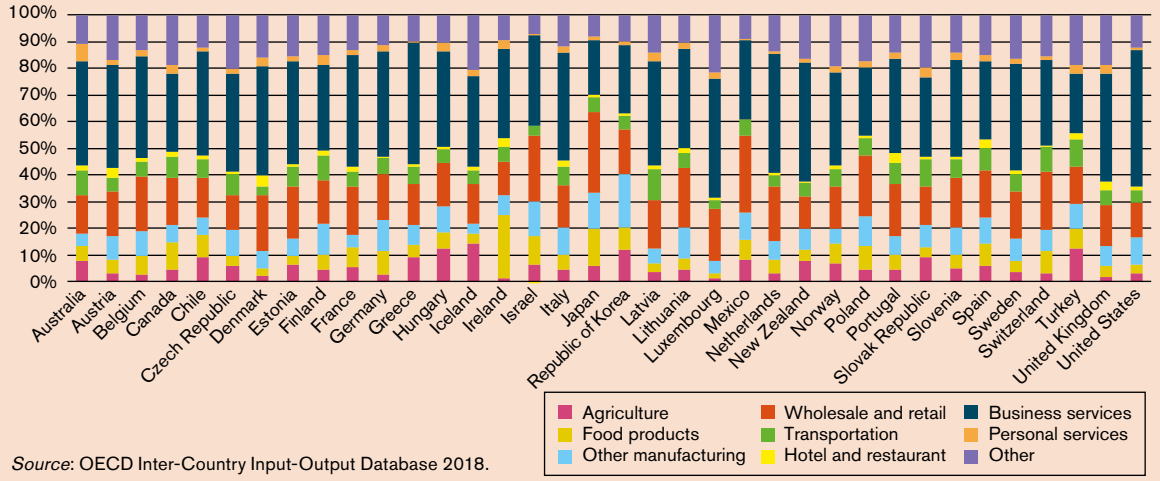
Value-added components of tourism expenditures, 2015 (% share in tourism expenditures)



Source: OECD Inter-Country Input-Output Database 2018.

Figure C.6: Other services sectors make major contributions to tourism

Share in total indirect domestic value-added content of tourism expenditures, 2015



Source: OECD Inter-Country Input-Output Database 2018.

(c) Welfare gains from trade in services

The previous section provides useful evidence about how trade in services improves economic growth and developmental outcomes. However, as the Mexico case study suggests (see page 58), these results may give just a partial picture of the effect on the whole economy. For making definitive statements about the benefits of increased trade in services, we need an assessment of how these changes play out in the whole economy and affect the welfare of the average consumer. In layman's terms, economic welfare refers to the well-being derived from consumption of all the goods and services that an economy produces. Given a fixed amount of resources (land, capital and labour), the more efficiently these resources are allocated and directed to the most productive uses, the greater the level of output and consumption and the higher economic well-being will be. Thus, the calculations that are undertaken and discussed in this subsection reflect how more trade in services can bring about these benefits.

Chadha et al. (2000) study the impact of a reduction in the tariff equivalents of services barriers by 33 per cent across a sample of 15 developing and five developed economies. The estimated welfare gain is 2 per cent for developed countries and 2.5 per cent for developing countries.

Konan and Maskus (2006) use a computable general equilibrium (CGE) model to investigate the potential effects of removing services trade barriers in Tunisia. Welfare and GDP both increase more than 7 per cent, three times more than the estimated gains from goods liberalization. Three-quarters of gains from services liberalization come from the opening-up of commercial presence. This liberalization increases household income by 4 per cent, while the opening-up of cross-border supply increases household income by 1 per cent.

Rutherford et al. (2006) use a CGE model to assess the overall impact of Russia's accession to the WTO. They calculate that the gains from opening up FDI represent roughly 70 per cent of all gains from its WTO accession.

In another CGE study, Francois et al. (2003) estimate the overall economic benefits of a successful conclusion of the Doha Round. In their scenario, they assume a 50 per cent reduction in the "tariff equivalents" faced by services trade.[6] They find that services are an important source of gains, equal to over US$ 50 billion globally, with the biggest gains accruing to India and the United States.

Finally, a recent study by Atkin et al. (2018) found that foreign supermarket entry into the Mexican retail sector led to large and significant welfare gains for the average household, equal to 6 per cent of initial household income. These welfare gains came from reductions in retail prices in both the outlets of the foreign supermarkets and their domestic competitors, availability of new product varieties, and different shopping amenities offered by foreign retailers. One drawback, however, was that the welfare gains were concentrated among the more affluent households because of the greater value these households place on product variety and shopping amenities offered by foreign retailers.

To complement this brief literature review, the following section utilizes the results of a recent study on trade costs by Egger et al. (2018) and the proposed method for calculating the welfare gains from trade by Arkolakis et al. (2012) to provide calculations of the benefits from cross-border trade in services (see Box C.3 for a more technical explanation of the methodology and data used in the calculations). The Arkolakis et al. methodology is convenient since the authors are able to show that, for an important subset of trade models, the welfare gains from trade can be calculated from a very small number of statistics. However, the Arkolakis et al. (2012) approach is not without its critics, who argue that it closes off some avenues of possible trade gains and therefore underestimates the gains from trade. For example, it does not account for how opening up trade affects firms' decisions to enter or exit from domestic and export markets, decisions which open another avenue of welfare gains (Melitz and Redding, 2015).

The results of the calculations are shown in Figure C.7, which shows the welfare changes from cross-border trade in services between 2000 and 2014. These range from a decline of 0.9 per cent in Turkey to an increase of 5.1 per cent in Ireland. The simple or unweighted average welfare gains from trade in services over this period are worth 0.5 per cent. It is probably not a coincidence that the three economies which saw the largest welfare gains during the period are Ireland, Luxembourg and Malta. The already high import share of services in these countries rose significantly between 2000 and 2014. For Ireland, it went from 23.6 per cent to 39.8 per cent; for Luxembourg, the share rose from 41.3 per cent to 48.2 per cent; and for Malta, it increased from 31.3 per cent to 40.5 per cent.

If one takes all the 43 economies of Figure C.7 in 2014, the simple average import share in services is only 9.8 per cent compared to 48.4 per cent in goods. In other words, services are only about one-fifth as traded across borders as goods. These calculations suggest

Box C.3: Methodologies underlying welfare calculations

To complement the discussion in the main text, additional technical details of the approaches underlying the welfare calculations in Section C are provided in this box.

Methodology and data used by Arkolakis et al. (2012)

One of the main results established by Arkolakis et al. (2012) is that, for an important subset of trade models, the welfare gains from trade can be calculated from a very small number of statistics. In the simplest case of one sector, no intermediate goods and perfect competition, the welfare gains only depend on the share of expenditure on domestic goods and the trade elasticity. The trade elasticity measures how much trade falls because of a 1 per cent increase in variable trade costs. Arkolakis et al. (2012) also propose alternative methods to calculate the welfare gains from trade when the economy has multiple sectors or when there are both final and intermediate products. For the purpose of the calculations performed in this report, the formula used corresponds to that for an economy with multiple sectors, so that one can distinguish between the gains from services and goods trade. Under perfect competition, the welfare gains from trade for a country j are given by:

$$\widehat{W}_j = \prod_{s=1}^{S} (\hat{\lambda}_{jj}^{s})^{\eta_j^s / \varepsilon^s}$$

where $\widehat{W}_j$ is the percentage change in welfare in country j from the increase in trade over some period; S is the total number of sectors (both goods and services); $\hat{\lambda}_{jj}^{s}$ is the percentage change in the share of expenditure devoted to domestic goods or services in sector s; η_j^s is the consumption share of sector s in country j; and ε^s is the trade elasticity in sector s.

The method requires the use of sector-specific trade elasticities. Fortunately, Egger et al. (2018) estimated these sector-specific trade elasticities for some 40 economies in the 2013 release of the WIOD. They estimate 35 sector-specific trade elasticities that correspond to the WIOD sectors classified using the third revision of the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3 – ISIC being a standard United Nations Statistics Division classification of economic activities). In that classification, 16 sectors are classified as goods and 19 sectors are classified as services sectors. For the welfare calculations, we use the 2016 release of the WIOD database, which uses the ISIC Rev. 4 classification. The concordance developed by Gouma et al. (2018) is used to map the 35 sector-specific trade elasticities to the corresponding sectors in the 2016 release of the WIOD database. This database includes data spanning the years 2000 to 2014. It is also important to note that trade in services in the database only covers GATS modes 1 and 2 services trade (Timmer et al. 2015) and hence the calculations will understate the gains from services trade.

As noted previously, there is an alternative way to calculate the welfare gains from trade which distinguishes between intermediates and final goods trade. Under perfect competition, this is given by:

$$\widehat{W}_j = (\hat{\lambda}_{jj})^{1/\varepsilon\beta}$$

where β is the share of intermediates in the cost of production. One advantage of this approach is that the trade elasticities estimated by Egger et al. (2018) are based on data on intermediates trade. Unfortunately, this alternative calculation assumes there is only one composite product in the economy, which is a bundle of services and goods. As one can observe from the absence of the identifying sectoral index s in the formula, it is not possible to separate out the welfare gains of services trade, which is the object of interest, from the overall welfare gains from trade.

Methodology of Feyrer (2019)

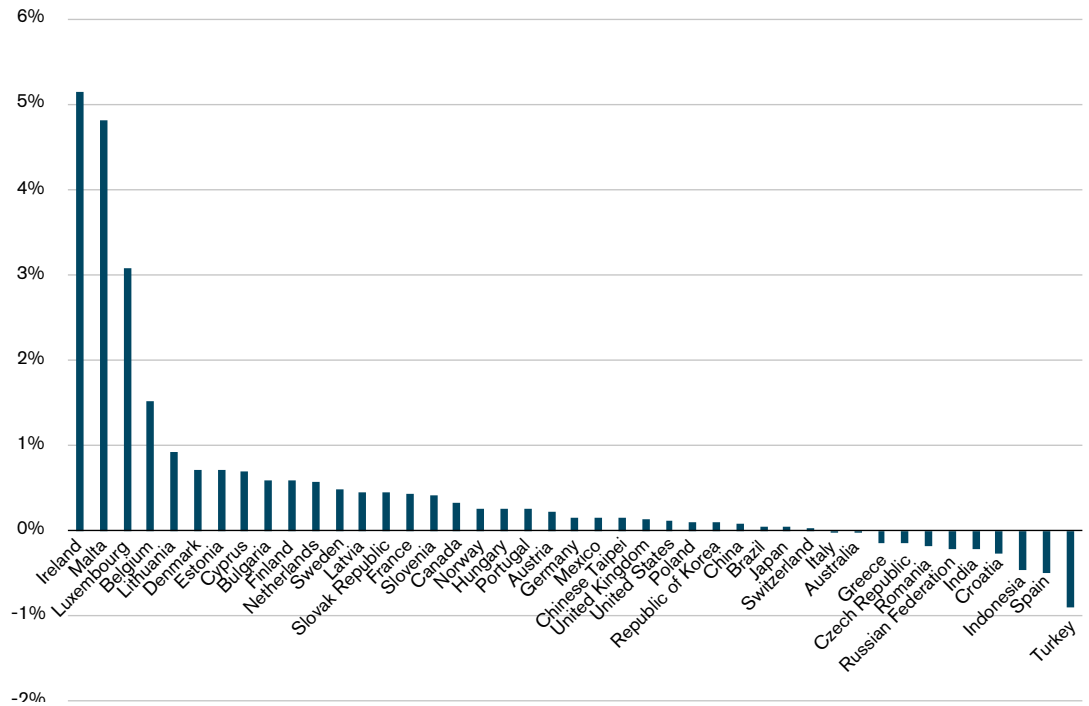
Technically, the Feyrer methodology is not a calculation about welfare gains. Instead, it examines how changes in trade flows can lead to changes in income. Since an increase in income is also expected to increase welfare, the approach offers a useful complement to the Arkolakis et al. (2012) welfare calculation. Following an earlier study by Frankel and Romer (1999), Feyrer sets out to establish a causal relationship between trade and income. As is well known in this literature, there is likely to be bi-directional causality between trade and income. Thus, to establish a causal link from trade to income, some variable that is linked to trade but not to income needs to

Box C.3: Methodologies underlying welfare calculations *(continued)*

be found. Feyrer finds this in improvements in aircraft technology that have caused the quantity of world trade carried by air to increase over time, particularly between country pairs with relatively short air routes compared to sea routes. Using this "instrument", and thus avoiding the trap posed by the endogeneity of both trade and income, Feyrer concludes that trade has a significant causal effect on GDP per capita with an elasticity of roughly one half. In other words, an increase of 1 per cent in an economy's trade will lead to a half a per cent increase in an economy's GDP per capita. This estimated elasticity is used to calculate the increase in per capita GDP between 2000 and 2014 arising from services trade for some 148 economies.

Figure C.7: In the last decade, many economies have experienced welfare gains from more cross-border trade in services

Welfare gains from cross-border trade in services, total percentage change over 2000-14



Source: Underlying data from the national input-output tables of the World Input-Output Database; sector-specific trade elasticities from Egger et al (2018); and authors' calculations.

that increased cross-border tradability can unlock potentially large welfare gains for many economies.

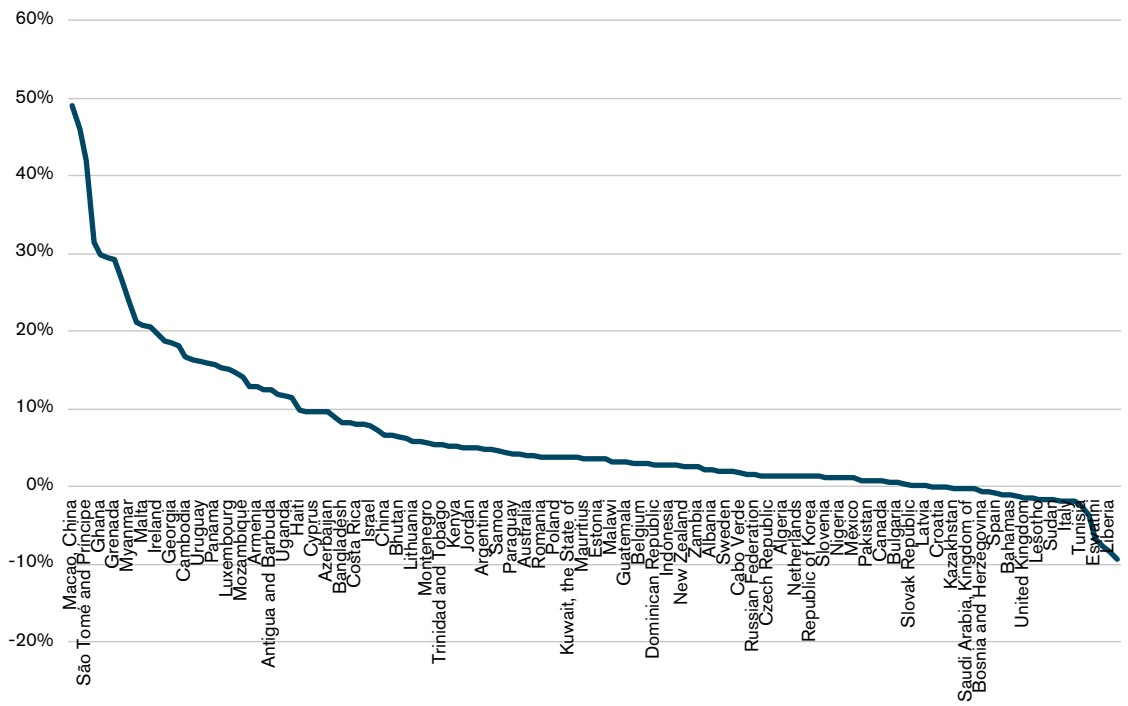
The criticism levied against Arkolakis et al (2012) and the fact that the World Input Output Database (WIOD) data cover only GATS modes 1 and 2 trade (see Timmer, Dietzenbacher et al. 2015) suggest that the calculations are best treated as lower bound estimates of the welfare gains from cross-border trade in services. On this basis, it is important to consider alternative approaches that will complement these results. Drawing on recent work by Feyrer (2019), it is possible to arrive at an alternative set of calculations that provide a contrast to the results of Figure C.7. Feyrer finds that trade has a significant positive and causal effect on GDP per capita with an elasticity of roughly one half – in other words, an increase of 1 per cent in an economy's trade will lead to a half a per cent increase in an economy's GDP per capita. It is possible to use this estimated elasticity to calculate the increase in per capita GDP between 2000 and 2014 arising from services trade covering some 148 economies. While a change in GDP per capita is not identical to a change in welfare, they are nevertheless likely to be closely correlated.

The results of the calculations are shown in Figure C.8. During the period 2000-14, cross-border trade in services led to an average increase in GDP per capita of 6.3 per cent for the economies in the sample. Note that some of those which gained the most are developing economies and LDCs (e.g. Macao (China), São Tomé and Príncipe, Timor-Leste). Since these economies are not part of the WIOD database, it was not possible to include them in that analysis and hence to identify them as economies whose welfare rose the most during the 2000-14 period. What is noteworthy, however, is that some of the economies which are identified as experiencing the largest increases in per capita income from trade in services, such as Ireland, Luxembourg and Malta, are also the same economies which were identified as gaining the most in terms of welfare in Figure C.7. This provides some degree of confidence as to the reliability of the two methods, for while the absolute magnitude of the gains differs, which may be understandable given that Figure C.7 looks at welfare and Figure C.8 at GDP per capita, the ordering of the economies gaining the most in each case is relatively similar.

The review of the available literature and our own calculations of the gains from services trade give a relatively narrow range of possible results (see Table C.1). The CGE modelling literature suggests welfare gains from opening up trade in services that range between 2 and 7 per cent. Using the Arkolakis et al. (2012) framework and estimates of trade elasticities from Egger et al. (2018) would imply that the increase in services trade flows between 2000 and 2014 provided average welfare gains of half a per cent for the 43 economies in the WIOD database. Finally, using the Feyrer (2019) trade to GDP per capita elasticity estimate gives calculations of the benefits from trade in services of an average 6.3 per cent increase in GDP per capita over the same period for some 148 economies.

Figure C.8: In the last decade, the GDP per capita of many economies rose as a result of more cross-border trade in services

Total percentage change in GDP per capita from cross-border trade in services over 2000-14



Source: Data from World Development Indicators and authors' calculations.

Table C.1: Welfare (per capita GDP) gains from services trade

Source of estimate	Range or average	Remarks
CGE literature	Between 2 to 7 per cent	
Own calculations a) Arkolakis et al. methodology (2012)	Average: 0.5 per cent	Country coverage: 43 economies Time period: 2000-14
b) Feyrer (2019) methodology	Average: 6.3 per cent	Country coverage: 148 economies Time period: 2000-14

2. Services trade boosts firms' competitiveness

This section examines the many ways in which services trade, encompassing all four GATS modes of supply, can influence firms' ability to compete internationally. International competitiveness can be broadly defined as a firm's ability to provide products and services more effectively and efficiently than foreign competitors. This ability depends on relative costs and prices, productivity, and other measures of a firm's international performance. This section examines the direct and indirect effect services trade in a particular sector has on services firms in all sectors, and the indirect effect services trade has on manufacturing firms, because services are used as inputs for the manufacturing process and can also comprise the final product.

(a) Direct and indirect effect on services firms' competitiveness

Services trade can determine firm competitiveness through several channels. An important and direct channel for this impact is the positive effect services trade has on the productivity of services firms. The literature on international trade and firm productivity has grown since Bernard and Jensen (1995) documented important within-industry differences between manufacturing exporters and non-exporters. They found that firms with a higher level of productivity were more likely to participate in trade. Other studies have extended the analysis on trade and productivity to the services sector, with a positive correlation between trade in services participation and firms' productivity in almost every economy studied, e.g. Breinlich and Criscuolo (2011) for UK firms, Kelle and al. (2013) for German firms, and Malchow-Møller et al. (2015) for Belgian firms. Temouri et al. (2013), using firm level-data from business services enterprises in the United Kingdom, France and Germany, also found that export-oriented firms were more productive than non-exporting ones, as measured by value-added per employee. Finally, Morikawa (2018) found that the total factor productivity level of Japanese exporting firms was 17 per cent higher for service exporters relative to non-exporters.

According to Nielsen and Taglioni (2004), the channel through which the opening-up of services trade positively affects firms' productivity is the increased productive efficiency resulting from import competition. Scale economies resulting from access to more export opportunities play a more minor role, although it is empirically observable. According to Robinson et al. (2002), opening up services also results in technology transfers from more developed to less-developed countries, which increases productivity.

Services firms' ability to compete internationally also depends in part on their cost-effectiveness, notably when incorporating services inputs. A wide range of services enter as inputs to services production. Miroudot et al. (2013) find that trade costs for services are much higher than those for goods, and this is elaborated on further in Section D. The authors find econometric evidence that services sectors facing lower trade costs, whether to import or export, tend to be more productive and have higher productivity growth than competitors. They also confirm the point that a firm's performance hinges on the cost-effectiveness of the overall services environment in which the firm is operating, whether these services are incorporated in the process of production as direct inputs affecting the marginal cost of production (such as electricity or telecommunications costs) or indirectly (through education, health or transport systems) affecting the competitiveness of firms in an entire economy. The contribution of these infrastructural services is acknowledged by the literature, as discussed in Section C.1, although its contribution at the firm level is harder to evaluate.

OPINION PIECE

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Services trade policy and the United Nations Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development is encapsulated in 17 Sustainable Development Goals (SDGs). These span 17 broad objectives, ranging from reducing poverty to improving public health and protecting the environment. They pertain to all countries, both high-income and developing.

Services can contribute to the realization of the SDGs through at least two channels (Helble and Shepherd, 2019). One channel is economic growth. Achieving many SDGs will require raising per capita incomes. Given that services account for two-thirds or more of total GDP in most economies, increasing per capita incomes requires improving productivity of services activities. Another channel is more direct. Many of the specific targets that are associated with the SDGs call for better access to services or for higher quality services. Indeed, many SDGs and their associated targets mention specific services. For instance, financial services are mentioned in the context of SDG 1 ("End poverty in all its forms everywhere"), with better "access to [...] financial services, including microfinance" identified as a specific target. Access to financial services is mentioned as a means to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" (SDG 2); to "Ensure healthy lives and promote well-being for all at all ages" (SDG 3); to "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" (SDG 8); and to "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" (SDG 9).[7]

Trade and investment are channels to improve access to higher-quality, more varied and cheaper services, and can potentially improve the performance of domestic services sectors through competitive pressures and knowledge spillovers. As a result, services trade and investment policies have a role to play in efforts to achieve many SDGs. Fiorini and Hoekman (2018a) show that more open services trade policies are associated with a greater availability of (access to) several services that figure prominently in several SDGs and related targets, including not just financial services, but also information and communications technology (ICT) and transport services. Because of the intangible nature of services, foreign providers must generate at least part – and often much – of the value-added of their economic activity in the importing (consuming) country. That is, there will often be an investment-related dimension to increasing access to services. An implication is that foreign providers will be affected by the local business environment, so that the magnitude of the potential positive effects of a more open trade and investment regime may be conditional on the quality of institutions in the importing economy (Beverelli et al., 2017).

That trade and trade policy are a means of implementation for sustainable development has long been understood. However, the wording of the SDGs tends to put the emphasis on measures to facilitate or promote developing-country merchandise exports. This is too limited. The focus should extend to policies affecting trade in services and inward investment by service suppliers, as these can affect the availability and quality of a range of services that are relevant for specific SDGs. It is just as important to complement greater attention for services trade policy with efforts to improve the quality of sectoral regulation and economic governance. These will help determine the extent to which trade and investment in services can contribute to making progress to achieve the SDGs.

(b) Indirect effect on manufacturing firms' competitiveness

In addition to its impact on services firms, services trade can also boost firm competitiveness by increasing the productivity of manufacturing firms. This indirect effect of services trade is particularly relevant because services are extensively used as inputs in the manufacturing process. Jones (2011) explains how manufacturing productivity is dependent on the availability of high-quality inputs. As a result, improvements in upstream service quality can lead to an increase in downstream manufacturing productivity through improved inputs. Moreover, trade is an important mechanism for improving a manufacturing firm's available inputs, either by lowering the price of inputs or by increasing the variety of inputs available (Topalova and Khandelwal, 2011). According to Bourlès et al. (2013), improvements to services can take four forms:

i) availability of new services

ii) expansion of existing services to regions that did not have them

iii) improvement to existing services that reduce production costs, and

iv) reduction of market power in the services sector, to foster innovation and competition by increasing the quality and variety of services.

There have been several studies that examine the role of services as manufacturing inputs and how they affect the production process. Liu et al. (2018) demonstrate how the development of financial and business services can be a source of comparative advantage in manufacturing. They find that imported financial services can partly compensate for a weak domestic financial services sector. The authors consider the direct use of these services, as well as their indirect use in manufacturing, as services embedded in intermediate inputs. Bas and Causa (2013) corroborate the conclusion that financial services are crucial for competitive manufacturing, and, in addition, find that gains from a sound financial infrastructure are more pronounced for firms that are further from the industry-level technological frontier, notably in developing countries. In a study on OECD countries, Nordås and Kim (2013) find that the density of telecommunications services and the reliability of the electricity supply are crucial inputs for competitive manufacturing, and particularly for increasing the degree of product differentiation, unit prices obtained in export markets, and the duration of trade. Using India as her case study, Bas (2014) finds empirical evidence on the importance of reliable telecommunications, electricity and transport services on manufacturing competitiveness.

Based on firm-level data from the Czech Republic, Arnold et al. (2011) show a positive relationship between services sector reform and the performance of domestic firms in downstream manufacturing sectors. Opening up trade in domestic services industries – mainly through a commercial presence – appears to be the key channel through which services liberalization may contribute to the improved performance of the manufacturing sectors. Furthermore, using firm-level data for the period 1993-2005, Arnold et al. (2016) find that banking, telecommunications, insurance and transport reforms all had significant positive effects on the productivity of Indian manufacturing firms.

This result is corroborated by Bas (2014), who finds that opening up services in India resulted in a 6 to 8.5 per cent increase in the probability of exporting for manufacturing firms, and that services reform in India was associated with a 5 per cent expansion in the export shares of manufacturing firms. In addition, Francois and Woerz (2008) find that increased openness to services trade increases manufacturing productivity in skills-intensive industries in OECD economies.

Fernandes and Paunov (2008) find that FDI in producer services, a proxy for commercial presence, enhances productivity of manufacturing firms in Chile. Using China as an example, Bas and Causa (2013) find that if Chinese financial regulation was improved to the average level observed in OECD economies, China's economy would experience a 6.5 per cent increase in manufacturing productivity. Finally, at a more aggregated level, Amiti and Wei (2009) found that services imports by high-income countries raises productivity of manufacturing sectors.

The relationship between services trade and manufacturing productivity is not uniform. The positive effect is contingent on the sector of the manufacturing firm and the income level within the economy. Sector-wise, Nordås and Kim (2013) find that the textiles and clothing, electronics and automotive industries are the manufacturing industries in which firms are the most sensitive to service quality and availability. Clothing manufacturing is a high turnover and low mark-ups industry, and competitiveness in it depends on reliable logistics, transport and travel services. Improving the reliability of the electricity supply and reducing time for exports is important for low- and middle-income countries which wish to enter global value chains in the electronics sector. A reliable electricity supply is strongly associated with competitive manufacturing across all manufacturing sectors and income groups.

In addition to ensuring a reliable supply of power to the manufacturing sector so that factories can run without interruptions, Nordås and Kim (2013) underline the importance of the electricity sector to a rapidly proliferating industrial internet, where sensors monitor and control manufacturing processes and supply chain management systems. Investing in electricity distribution, for instance in smart grids, is a substantial contribution to competitiveness, particularly in high-income countries where the production technology and business processes are more sensitive to disruptions in electricity supply. The study finds that high-technology industries use more business services than other services, and that the more widespread use of business services is associated with higher export prices obtained in major markets.

Another channel by which services trade can increase a firm's competitiveness is through product differentiation. Product differentiation is defined as the process of differentiating a certain product to make it more attractive than its potential competitors. When done successfully, it provides consumers with a product for which they are willing to pay a premium and allows firms to strengthen their positioning in a given market. Efficient services increase product differentiation.

In the presence of increased foreign competition, firms can use services for product differentiation by adding and/or bundling them with products (Lodefalk, 2017). Successful manufacturers distinguish themselves from competitors through services such as branding and intellectual property. Such practices were brought to light by Vandermerwe and Rada (1988), who introduced the term "servitization of business" as the process of creating value by adding services to goods. Ariu et al. (2019) study the demand complementarities between goods and services, and how manufacturing firms can exploit them to increase exports. They find that including services with products allows Belgian manufacturing firms to increase export revenues by 25 per cent. Moreover, firms were able to increase both the quantity and prices of their goods by simultaneously providing services, indicative of successful product differentiation.

One way in which firms can differentiate products using services is to tailor the product to the consumer's precise needs (Nordås, 2008). Apple's introduction of iTunes along with the iPod provides a relevant example. According to Amit and Zott (2012), by pairing the music device with the iTunes service that allowed consumers to instantly and remotely buy music, Apple exploited the complementarity between the demand for a good and the demand for a service. By doing so, Apple essentially monopolized the market for MP3 players, and their income and stock price dramatically increased after this innovation. Their success was not solely due to inventive new hardware, but was also attributable to a software that would allow an on-going relationship with the consumer.

Another possibility for product differentiation using services is for firms to add "intelligent" systems that communicate with the manufacturer in real time to provide additional customer value. Enhancing goods by bundling them with "intelligent" services allows firms to earn greater profits through product differentiation (Cernat and Kutlina-Dimitrova, 2014). A pertinent example is provided by Amazon's Echo, a speaker that comes with a digital assistant. By calling upon Echo's digital assistant, called "Alexa", which contains voice recognition technology, and talking to it, one may accomplish tasks such as setting an alarm, creating a reminder for a certain activity, discovering how long a commute is, or buying a good. Son and Oh (2018) find that these speakers, which integrate artificial intelligence (AI), have resulted in an increase in purchases of digital content. The introduction of the Echo speaker has allowed Amazon to differentiate its product successfully; it is not just a speaker, but also a digital assistant that has capabilities beyond those of a traditional music player.

(c) The role of institutions and the regulatory environment

The positive impact that services trade can have on firms' competitiveness is determined by the quality of institutions[8] and the regulatory environment in the importing country. Establishing an economic climate conducive to investment and business can increase the positive effects of services trade. Beverelli et al. (2017) explain how the institutional quality of an importing country impacts the extent to which services trade openness positively affects its manufacturing productivity. Beverelli et al. find that an identical reduction in services trade restrictiveness in Canada and Tanzania would increase manufacturing productivity by 16.7 per cent in Canada, compared to only 3.9 per cent in Tanzania. The ability of economies to provide domestic regulatory policies that complement services trade opening is a source of comparative advantage for downstream manufactured goods (Van der Marel, 2014).

The relevance of high-quality institutions in conditioning the benefits from services trade is reflected in the proximity burden. While a good can be produced in Pakistan and sold in Sweden, this

is not necessarily the case for services because they are typically non-storable (Parry et al., 2011). Consequently, the service provider and service consumer need to be in close proximity for services trade to occur. This reality becomes evident when one recognizes that the majority of services trade happens mainly through mode 3 (establishment of a commercial presence in the destination market). Andrenelli et al. (2018) bolster the relevance of a proximity burden; they find that most of the services used as inputs in manufacturing are located in the country of production. Institutional quality impacts services trade through the proximity burden via two distinct channels.

When a firm is deciding whether to export services into a particular country, its decision to enter the market is dependent on the institutional quality of the importing market. If the institutional quality is low, it might dissuade firms from entering that particular market, giving rise to an ex ante (i.e. before the fact) effect of these institutions on the firm's trade decision. Theoretical models explaining a multinational firm's export decisions, as a function of country-level differences in institutions, are developed in Antras and Helpman (2004) and in Grossman and Helpman (2005). Generally, better economic governance and regulatory environment contribute to institutional quality (Fiorini and Hoekman, 2017). Specifically, better economic governance results in a greater number of exporting companies establishing affiliates in foreign countries (Bernard et al., 2010). Thus, the proximity burden associated with the mode 3 services trade has an ex ante effect on a firm's decision to export to a given country that depends on the importer's institutional quality.

Once a company has made the decision to export to a particular country, the institutional quality of the importing country determines the firm's profitability because this is where demand is located and the service performed. There are several studies that provide a link between firms' productivity and their institutional environment. Gaviria (2002) explains, using a Latin American case study, how corruption and crime can reduce firm competitiveness. Dollar et al. (2005) investigate the impact of the investment environment on firm performance in South Asia. The authors find that conditions which harm the investment climate – e.g. power outages or lengthy delays in setting up a phone connection – have a negative effect on firm productivity and factor returns (wages for labour and rent for capital). Lensink and Meesters (2014) analyse how well-developed institutions result in the efficient operation of commercial banks. Borghi et al. (2016) find that the productivity of electricity firms in the European Union is positively correlated with high-quality institutions.

Institutions also affect market structure and thus the degree of competition in markets. Francois and Wooton (2001) examine how market structure impacts the distribution of gains due to opening up trade in the transport sector. They show that in Latin America, South Asia, and sub-Saharan and Southern Africa, the effects of complete liberalization in the maritime industry depend critically on the degree of competition. A more competitive industry results in a higher share of gains from trade liberalization accruing to consumers and producers instead of to maritime firms or cartels.

3. How services trade affects employment and inclusiveness

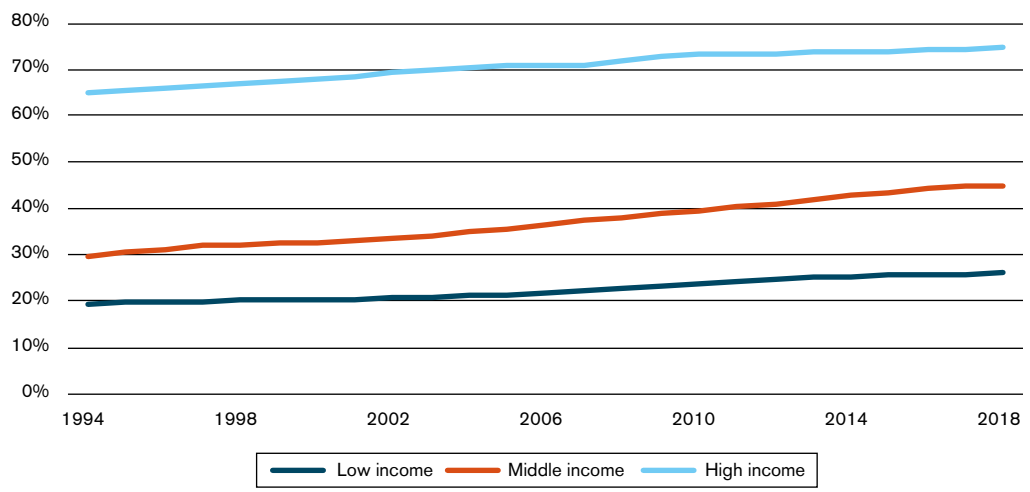
Services trade has grown rapidly over the past decades thanks mainly to technological progress and opening up trade. Section B demonstrated that the value of services trade nearly doubled between 2005 and 2017. For economies with a comparative advantage in services this implies that the number of jobs in firms exporting services grew. For instance, in the United States, the number of jobs related to services exports increased by 40 per cent from 2005 to 2015, according to the OECD's Trade in eMployment (TiM) Database. Moreover, services trade allows firms to import whole business functions, from accounting to IT services. Even low-value projects are traded via platforms such as Upwork or Amazon MTurk, which facilitate transactions between service customers and suppliers across different economies.

This brings about considerable benefits for firms and consumers in terms of lower prices and a more varied product offer. Section C.2 concluded that services trade can considerably boost the productivity of firms that use services as inputs, and that it raises the quality of production factors by improving education and the performance of financial markets. Section C.2 also provided evidence that services trade improves welfare, income and growth.

In addition, across the world, the share of services employment in total employment is on the rise. Structural change due to innovation, changing demographics, rising incomes, and other factors (see Section D), continues to pull workers into the services sector, as Figure C.9 illustrates. This implies, for instance, that in high-income economies, services trade has the potential to benefit a larger share of workers than trade in goods and an increasing share of workers in low- and middle-income economies.

These potential benefits contrast with concerns about the labour market impacts of services trade in

Figure C.9: The share of services in total employment has been on the rise across the world
Service sector employment as a share of total employment, 1994-2018



Source: ILOSTAT. Income categories according to the World Bank.

developed economies. There is a widespread view that services offshoring, i.e. the import of services that were previously produced in-house, could cause significant job losses, triggered by several large estimates of how many jobs are offshorable. These estimates are typically based on the task content of jobs or on the ability to perform them in another location to that where they are consumed. One study suggests, for instance, that almost 30 per cent of US jobs are susceptible to offshoring, not least because technological progress allows firms to disentangle service delivery from service consumption and to exploit labour cost differences between advanced and developing economies (Blinder, 2009).

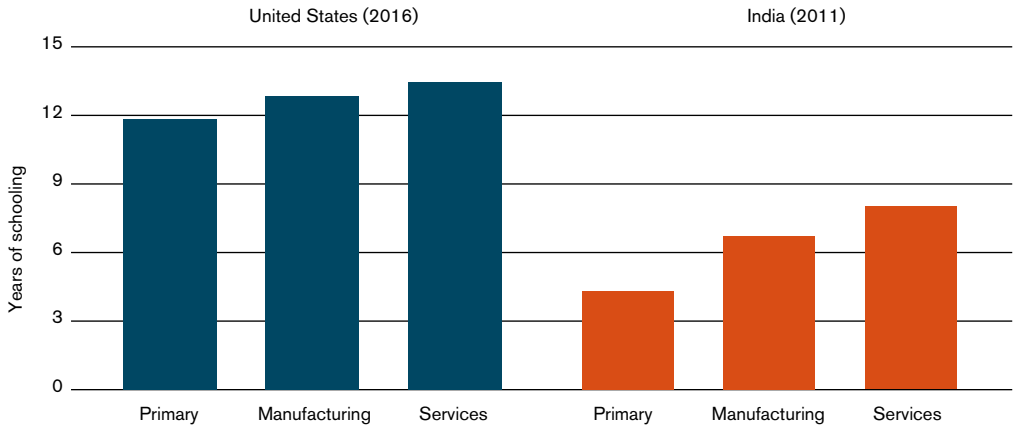
Similarly, there is a concern that services trade, while creating jobs, could lead to higher inequality in both developed and developing economies. From the perspective of developing countries, many services jobs, especially trade-intensive services jobs, require relatively more skills than existing work in agriculture or manufacturing. This reflects higher skill requirements in many services, as highlighted in Figure C.10, which plots the average years of schooling per worker in the primary, manufacturing and services sectors for the United States and India. From the perspective of developed economies, however, many of the jobs affected by services imports, such as bookkeeping, are relatively less skill-intensive than the jobs related to services exports, such as marketing or consulting. As a result, the benefits of services trade may predominantly flow towards high-skilled workers in both developing and developed economies.

In addition, the geographical distribution and gender composition of services is different from those of agriculture or manufacturing. This adds another potential layer of inequality. While the relatively high share of female employment in services could imply that services trade helps to close employment and wage gaps related to gender, the concentration of services in cities could lead to a wider rural-urban divide.

This subsection looks at the links between services trade and employment and discusses inclusiveness. First, there is an examination of the impact of services trade on aggregate employment and wages. Second, the significance of skills and geography is considered in the context of the potential of the services sector to make trade more inclusive. Third, the future of the services trade-labour market relationship is briefly discussed. It is necessary to mention the caveat that studies on the labour market impact of services trade are less common than studies looking at manufacturing, especially for developing economies. In particular, the effects of services exports have rarely been examined.

The review of the existing literature finds that, so far, the labour market effects of services trade have been relatively modest, with respect both to aggregate employment and to inclusiveness. While there is some evidence that services trade benefits high-skilled workers and workers in cities in particular, the effects are quantitatively not large, and the literature on the skills bias is not conclusive. The finding that the effects of services trade are relatively small is independent

Figure C.10: The services sector requires more years of education on average
Average years of schooling of workers by aggregate sector, 2016 and 2011



Source: WTO calculations based on the Integrated Public Use Microdata Series (IPUMS) for the United States in 2016 and the National Sample Survey Office data for India in 2011.

of the mode of supply. While most studies look at the cross-border supply of services, the existing studies on consumption abroad or commercial presence come to similar conclusions. This probably indicates that services trade, just like trade in goods, has both positive and negative effects on employment, so that net employment outcomes tend to be small.

As technology continues to advance, however, more and more services might become tradable across borders in the future. In particular, high-skilled jobs could become subject to offshoring as the remote supply of services becomes possible and removes the physical presence constraint of services. Examples extend from doctors operating remotely to accountants or engineers consulting from a distance. This could potentially magnify the impact of services trade in the future and implies that a much larger share of the workforce may be subject to international competition.

While this subsection does not examine the role of policy in enhancing the inclusiveness of cross-border trade in services, it is clearly of capital importance. The opinion piece by Rupa Chanda (see page 78) contains a discussion of the role of complementary policies to increase the likelihood that greater trade in services leads to more inclusive outcomes.

(a) The impact of services trade on aggregate employment and wages

Trade in services has different effects on employment and wages that seem, so far, to balance each other out, leading to small net effects, comparable to trade in goods. On the one hand, services or goods offshoring can reduce the demand for labour as domestic labour is substituted by foreign inputs. On the other hand, imports can lower costs and raise productivity, which leads to higher labour demand if lower prices translate into a higher demand for output (Grossman and Rossi-Hansberg, 2008). Moreover, services imports can allow firms to increase their scale without replacing their own core functions. Rather than buying the same service that was previously provided in-house, imports can supply complementary services that enhance firms' own processes or that help them to manage periods of peak demand such as cyclical upswings (Bergin et al., 2011). Finally, services exports can raise the demand for domestic labour.

As a result, empirical evidence on the average wage impact of services trade in advanced economies is mixed and generally reports small effects. For instance, a study on Italy finds that, while wage disparity rises as a result of services trade, with some workers gaining and others losing, average wages are not significantly affected (Borghi and Crino, 2013). Comparable results are obtained in studies on Germany, the United Kingdom and the United States (Eppinger, 2019; Geishecker and Görg, 2011; Liu and Trefler, 2019).

Similarly, aggregate employment is shown to be largely unaffected by services trade. For instance, a study of the impact of US services imports from

China and India on US labour markets finds negative effects on employment levels, but since the estimates are very imprecise, a zero effect cannot be rejected. Rather, the study argues that services trade led some workers to switch occupations, thus changing the composition of the workforce (Liu and Trefler, 2019). This is in line with evidence from Belgium, Ireland, Italy, Spain, the United Kingdom and the United States, which finds no or only small effects on the level on employment, but stronger effects on the structure of employment, which is discussed in the next subsection (Amiti and Wei, 2005a; 2005b; Crinò, 2010b; Fuster et al., 2019; Görg and Hanley, 2005; Hijzen et al., 2011; Ornaghi et al., 2017).

A study on Germany finds even a significant positive effect of services imports from non-OECD economies on firm-level employment, suggesting that productivity gains can, in some cases, more than compensate for labour substitution (Eppinger, 2019). In line with the peak demand or complementarity channel, one study finds that the offshoring of IT, management, marketing, or transport services can increase employment in the same areas in the offshoring country (Nordås, 2019). This is supported by descriptive data from the Offshoring Research Network, an initiative of Duke University, which reports that out of 486 sampled offshoring initiatives, only 183 involve offshoring the whole business function, while in 303 cases, only selected tasks of a function were offshored, to allow for increased specialization (Elia et al., 2017).

Studies on the effects of services exports are considerably rarer than studies on the effects of imports, but they also report relatively small effects. The above-mentioned Liu and Trefler (2019) study on the impact of US services trade with China and India finds, for instance, that services exports partially offset the effects of services imports. Using an alternative methodology, another study suggests that growing services exports added 2.78 million jobs in the United States between 1995 and 2011, and counteracted a fall in labour demand due to trade in goods. Once services imports are accounted for, the number goes down to just above 1 million jobs (Feenstra and Sasahara, 2018).

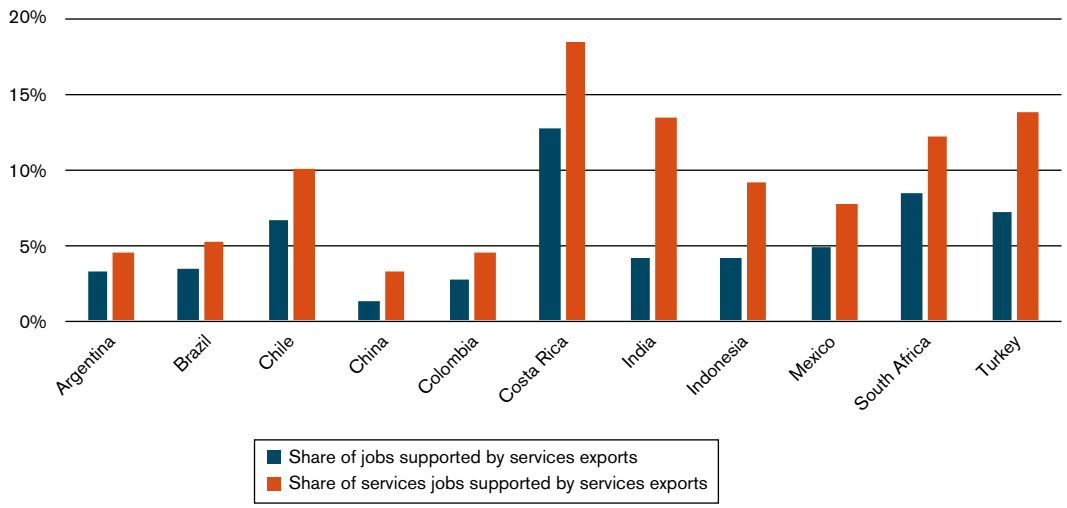
Concerning developing countries, evidence is still relatively scarce. Given that the negative labour substitution effect of services offshoring is less prevalent in developing countries, as they tend to be offshore locations rather than offshoring economies, a positive effect would appear more likely. The available evidence points to offshoring increasing employment volatility but also improving working conditions in developing countries. For example, Mexico's offshoring sectors experience employment fluctuations that are twice the size of corresponding US fluctuations, suggesting that US lead firms use services imports to manage business cycle swings rather than to replace domestic functions permanently. Some Indian business process outsourcing companies report 100 per cent staff turnover annually, but they also report better working and employment conditions in terms of wages, hours of work and non-wage benefits (Bergin et al., 2011; Messenger and Ghosheh, 2010).

Descriptive statistics highlight that services trade supports a large number of jobs in some developing countries; for instance, the ICT sector in India employs 3.5 million workers (Hoekman and te Velde, 2017). Figure C.11 shows the number of jobs supported by services exports relative to the total number of jobs and the number of jobs in the services sector. In several economies, including Chile, Costa Rica, India, South Africa and Turkey, exports account for more than 10 per cent of employment in services. Obviously, these numbers do not indicate whether services exports increase the number of jobs or just absorb resources from other sectors, but they illustrate the importance of services trade for domestic employment.

One reason that the literature has so far found limited effects of services trade for employment might be that it typically looks only at the cross-border services trade and ignores other modes of services supply. Section B found that other modes of services trade are economically important, and, in the case of commercial presence in another country, even more important than cross-border trade. Hence, it is possible that employment effects change once consumption abroad, commercial presence and the temporary movement of individuals as suppliers of services are included in the assessment.

Faber and Gaubert (2019) analyse the effects of tourism in Mexico and report significant benefits from tourism on total employment and wages in exposed municipalities relative to less touristic regions. Faber and Gaubert find that a 10 per cent increase in local tourism sales is associated with a 2.5 per cent increase in local employment and substantial positive spill-over effects in the local manufacturing industry. However, as the regional employment and wage gains might come at the expense of less touristic regions, it is not clear whether tourism raises aggregate employment and wages. This reflects earlier work based on general equilibrium modelling, in which national employment effects varied widely, with underlying assumptions preventing general conclusions (Dwyer and Forsyth, 1998).

Figure C.11: Cross-border services exports support a high share of employment in developing countries
Share of (services) jobs supported by services exports, 2015



Source: OECD Trade in employment database. Estimates are for 2015. Services defined as divisions 45 to 98 of ISIC Rev. 4 (i.e. excluding utilities).

Another recent study looks at the effects of retail imports through FDI, in particular the entry of Walmart into Mexico, but finds no significant employment effects. While real wages increase due to lower prices, employment gains in new foreign-owned retail stores are cancelled out by the contraction of local stores (Atkin et al., 2018).

From the perspective of the exporting country, the employment effects of services FDI depend on whether the service is deliverable across borders or not. If it is deliverable, services FDI might substitute for domestic employment. If it is not deliverable, such a substitution effect is not possible, as the services have never been supplied across borders. In both cases, however, productivity and revenue gains from foreign affiliate sales can support domestic employment. In line with this, several studies, using evidence from Estonia, France, and Japan (Hijzen et al., 2011; Masso et al., 2010; Tanaka, 2012), report small positive employment effects for parent firms. Once again, however, it is not possible to infer aggregate effects from this firm-level evidence with any certainty. In any case, this does not change the conclusion that, so far, the aggregate employment and nominal wage effects of services trade remain small.

(b) The inclusiveness of services trade

As discussed above, services trade has only small effects on national employment or wage levels, but this does not necessarily mean that services trade does not have substantial effects at a more disaggregate level. For instance, as trade-intensive services industries tend to cluster in a few locations, services trade could lead to stark differences at the regional level. Similarly, services trade might increase the demand for high-skilled workers at the expense of low-skilled workers, given that many services industries require higher skills than manufacturing or agriculture, as highlighted by Figure C.9. In this case a zero-net effect on employment would hide stark differences across skill groups.

(i) The skills divide

The majority of studies on the labour market impact of services trade suggests that services trade is biased in favour of high-skilled workers. Evidence from Italy and the United States shows, for instance, that the employment of college-educated workers in high-skilled, or "white-collar", occupations increases relative to low-skilled employment when services imports increase in the firms or industries that require those high-skilled occupations (Crinò, 2010a; Crinò, 2010b). Similarly, a study of the United Kingdom shows that industry-level services imports increase real wages of high-skilled workers but reduce real wages of low- and medium-skilled workers in the same industry (Geishecker and Görg, 2011). This effect is confirmed for employment by two cross-country studies on OECD countries, of which the latter emphasizes that the effects are quantitatively

small (Cassette et al., 2012; Crinò, 2012). Going beyond cross-border services trade, a study on the effects of tourism has also found that high-skilled workers were favoured (Petit, 2017).

More recent data shows, however, that the effects can also be reversed. Evidence from Belgium suggests, for instance, that services imports have a negative impact on employment growth among highly educated workers in the services sector (Ornaghi et al., 2017). Liu and Trefler (2019), examining US services imports from China and India in high-skilled industries, report a relative decline in the average wage of high-skilled workers in the exposed industries, albeit a decline of only 1 per cent. Liu and Trefler also show, however, that services imports increased the incidence of "occupational downgrading", that is, the switching of workers to a lower paid occupation, by 7 per cent, and that these workers experienced earnings losses of up to 47 per cent. This was, however, counterbalanced by a 6 per cent increase in occupational upgrading.

Criscuolo and Garicano (2010) differentiate occupations not by skill but by their exposure to occupational licensing. This introduces another level of inequality. Criscuolo and Garicano show that workers in occupations that require a license benefit from services imports in terms of both wages and employment, while workers in non-licensed occupations see small wage losses and employment gains that are smaller than those of workers in licensed occupations.

Evidence from developing countries regarding inequality is as scarce as that concerning aggregate employment or wages. Existing studies on India and the Philippines confirm the hypothesis that services trade benefits high-skilled workers, as it is relatively skill-intensive (Amoranto et al., 2010; De and Raychaudhuri, 2008; Mehta and Hasan, 2012; UNCTAD, 2013). A positive side effect of this is, of course, that services trade raises the incentives for workers in developing countries to obtain more education. Evidence from India suggests that opening up telecommunications, finance and insurance, as well as services exports from the BPO sector, have raised educational attainment in India (Jensen, 2012; Nano et al., 2019; Oster and Steinberg, 2013; Shastry, 2012). Shastry (2012) finds that, as a result of the increased educational attainment, the increase in the skill premium was less pronounced in India. An important caveat of the work on developing countries is, however, that they tend to look either at services liberalization more generally, e.g. including the opening of certain services sectors to private domestic investors, or are not particularly rigorous.

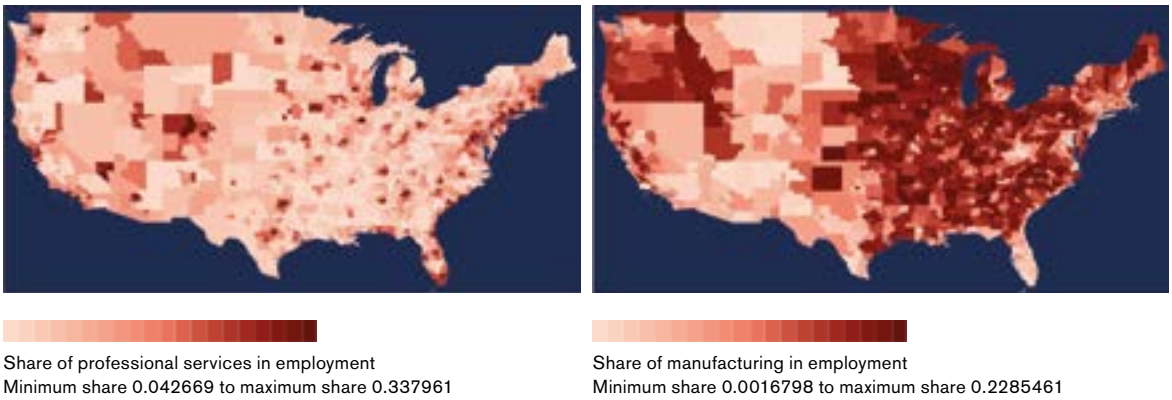
(ii) The rural-urban divide

An additional aspect of inclusiveness related to services trade is the economic divergence between rural and urban regions. Evidence shows that, due to similarities in the sector's skill requirements, it is advantageous for services firms to co-agglomerate, or cluster, with a view to skill-sharing (Diodato et al., 2018). As high-skilled workers locate increasingly in cities, this makes it increasingly convenient for skill-intensive services industries, such as finance, marketing, or consulting, to locate in cities as well (Brinkman, 2014). In the context of the advertising industry, for example, networking effects in services have been shown to decay rapidly across space, further incentivizing a reduction of distance in order to preserve networking effects, thus favouring co-agglomeration (Arzaghi and Henderson, 2008). Dispersion forces, such as high rents, are less constraining to services firms, which tend to use less space than manufacturing or agricultural firms. As a result, there is a strong rationale for skill-intensive services firms to cluster in cities.

In both developed and developing countries, advances in communications and transport technology have allowed services industries that are not bound by face-to-face constraints, i.e. most business-to-business services, to capitalize on these agglomeration forces and cluster in cities. Evidence from India suggests that most workers in Indian cities work in the services sector (Topalova, 2007). In the United States, firms that produce what a study considers tradable services are located primarily on the dense coastal areas (Gervais and Jensen, 2019). Figure C.12 illustrates this by plotting the importance of business-to-business services and manufacturing for employment for commuting zones, i.e. local labour markets, in the United States. While manufacturing supports employment in many commuting zones, producer services are heavily clustered in urban areas. Similarly, Figure C.13 shows that, in India, services play a much larger role in urban districts than in rural districts.

This regional concentration pattern of producer services suggests that a rise in services trade could widen the rural-urban divide by boosting employment and wages primarily in cities. A recent study of the United States finds that US labour markets with larger initial shares of highly-skilled services employment grew substantially faster than the nationwide average. This alone can account for 30 per cent of the rise in the overall US college wage premium between 1980 and 2010 (Eckert, 2019).

Figure C.12: Employment in business-to-business services in the United States is significantly more concentrated in particular locations than employment in manufacturing industries
Share of business-to-business services (left), manufacturing employment in a region's total employment (right), 2016

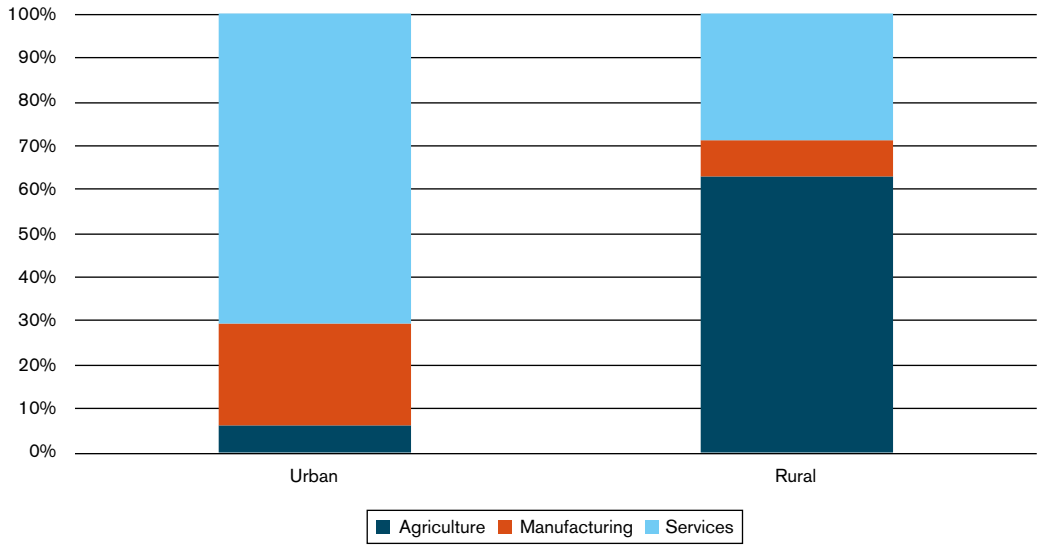


Source: Authors' calculations based on the American Community Survey for 2016. Business-to-business services refer to NAICS sectors 51 to 56. Commuting zones as defined by Autor et al. (2013).

(iii) Opportunities for women and MSMEs

It is an important point that services trade can also help to close gaps within economies. Section B highlighted, for instance, that levels of female employment are significantly higher in several services sectors than in manufacturing. Therefore, women may be expected to benefit more from services exports than from manufacturing exports. While there is no evidence available on the distribution by gender of employment or wage gains from services trade, a study on India suggests that opening up services has helped to close gender education gaps by raising education levels among women more than those among men (Nano et al., 2019).

Figure C.13: Services employment is higher in urban areas than in rural districts of India
Rural and urban employment in India disaggregated by aggregate sectors, 2011



Source: Authors' calculation based on the National Sample Survey Office data for India in 2011.

Services trade can also offer opportunities for micro, small and medium-sized enterprises (MSMEs). A study by Lejárraga et al. (2014) looking at MSMEs in over 100 economies found, for instance, that some barriers to trade are less constraining for services MSMEs than for manufacturing MSMEs. For instance, access to finance affects services MSMEs less than manufacturing MSMEs, since services tend to have lower fixed costs, such as investments in machinery or factories. Looking at more detailed data on French MSMEs, Lejárraga et al. report that firm size is less correlated with a firm's export status in services than in manufacturing. As also highlighted in Section B, a rise in services trade is therefore likely to be less biased towards large firms than a rise in manufacturing trade.

(c) Services trade and the labour market in the future

Another reason for the relatively small impact of services trade on aggregate labour market outcomes is that, despite its rapid growth, services trade, and especially cross-border delivery of services, still accounts for only a small share of total trade. Most services are, as yet, still traded in very limited quantities. For instance, while medical tourism takes place to an extent, the travel time and costs, as well as regulatory differences, imply that it is not widely practised.

Both policy barriers and structural barriers related to the characteristics of services, such as the requirement of physical presence, have hindered the growth of services trade. As discussed in more detail in Section D, policy-related trade costs tend to be relatively high for the supply of services, with consumption abroad and commercial presence in another country sometimes being the exception. Occupational licensing can, for instance, render the supply of services across borders nearly impossible in the absence of mutual recognition agreements. Similarly, work visas for the temporary movement of workers remain restricted in most economies.

Advances in digital technologies, however, have the potential to magnify the scale and scope of trade in services by alleviating structural barriers related to physical distance. This can reduce services trade costs from extremely costly to very low, with major implications for the cross-border supply of services in particular. While many such technologies are already in place, combining them could magnify their potential, something sometimes referred to as combinatoric innovation (Baldwin, 2019).

One example is the combination of videoconferencing technology with real-time translation technology. Videoconferencing can remove the requirement for physical presence, especially when new network standards such as 5G will dramatically increase the quality and reliability of networks. However, currently the technology can only connect people, domestically or across countries, that share the same language. Beyond that, it relies on the multilingualism of people. Only by combining it with real-time translation can the technology allow global interactions and internationalize the market for consulting and many other services.

Such innovations can considerably promote the remote supply of services, sometimes referred to as telemigration or international telecommuting (Baldwin, 2019). While this form of services supply already exists via platforms such as Upwork,[9] its potential has not fully been used due to the technological limitations currently in place. Additional reasons for the limited uptake of remote services supply are, for instance, contractual difficulties due to different jurisdictions, lack of trust in foreign suppliers, unclear quality and network size, and the limited spread of some technologies to all regions within countries and across the world.

As these barriers disappear, digital technology is likely to boost services trade and expand its role for the labour market. This is likely to magnify the effects that have already been observed, but it may also lead to new effects. If occupations previously shielded by structural barriers to services trade become exposed to foreign competition, the effects of services trade on skills, gender or rural-urban divides may change. Remotely-operated cleaning devices could, for instance, allow unskilled workers from developing countries to benefit from trade. Remote surgery and similar applications in the medical field could imply new competition for high-skilled workers in developed economies.

It is important to note, in this regard, that the remote supply of services is complementary to automation and thus widens the scope of occupations exposed to technological change. Several estimates exist concerning the share of jobs at risk from automation. One study suggests, for instance, that 47 per cent of jobs in the United States are susceptible to automation, and highlights three characteristics in particular that impede automation: creative intelligence, social intelligence, and perception and manipulation (Frey and Osborne, 2017).

Advances in the remote supply of services imply that such characteristics do not necessarily protect jobs

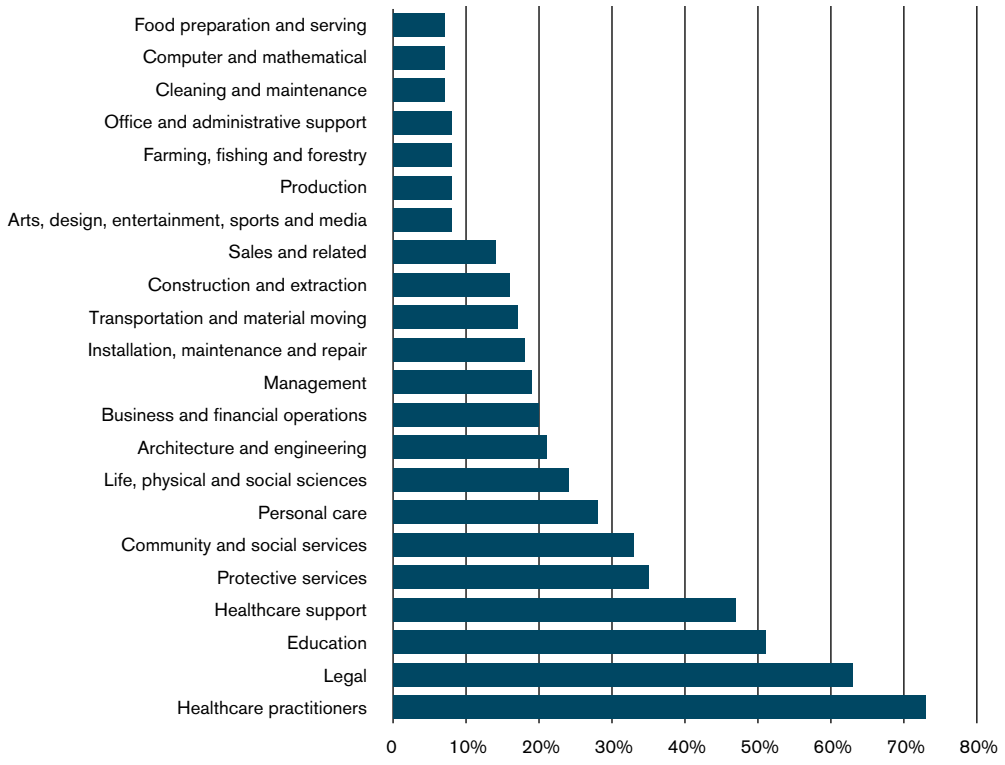
from technological change any longer, as machines operated by humans could have all three of these characteristics. As examples of occupations less likely to be computerized, Frey and Osborne (2017) list psychologists and nutritionists, occupations relying on social interaction. While it might be very difficult to programme or train AI to possess such skills, it is much more likely that professionals in these areas may begin to offer their services remotely through a virtual presence.

Naturally, it is difficult to foresee which jobs will actually vanish, as cheaper inputs of complementary tasks can have a positive effect on employment for the remaining tasks. As was discussed before, lower offshoring costs can lead to a finer specialization of tasks within occupations across economies, rather than replacing occupations. For instance, if routine surgeries can be done remotely from abroad, domestic doctors can perform more specialized surgeries and reduce waiting times for certain operations. Other jobs will probably continue to require a physical presence in the foreseeable future, such as care professions, where human interaction cannot be adequately replaced by mechanization, or professions such as hairdressers where investment into costly technology is unlikely to be profitable in the near or mid-term future.

In addition, policy remains a highly relevant barrier to remote services supply. As mentioned above, occupational licenses only available to domestic suppliers can impose considerable barriers, even when technology would allow for cross-border services trade. Figure C.14 shows the share of licensed workers for a given occupation in the United States in 2018. Healthcare professionals, both practitioners and supporting, stand out as being highly subject to licensing. So, while remote surgery and counselling are technically possible, it is an open question whether regulation is adapted to allow for cross-border supply of such services. Remotely supplied cleaning services or remote consulting services in the areas of computer or mathematical sciences, on the other hand, are less affected by regulation, and are thus more exposed to potential foreign competition in the future.

Figure C.14: The share of professionals in services sectors with a license differs widely across industries

Share of professionals in a given service industry holding a license, United States, 2018



Source: Labour force statistics from the Current Population Survey of the US Bureau of Labor Statistics for 2018.

OPINION PIECE

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Ensuring inclusive services trade: role of complementary domestic policies

It is well recognized that trade in services is critical for sustainable development, economic growth and social progress. Services trade has the potential to facilitate inclusive growth and development by creating employment opportunities, raising incomes, promoting access, improving the quality of services, enabling innovation, and contributing to economy-wide competitiveness through critical linkages with other sectors of the economy (see IMF et al., 2018; Fiorini and Hoekman, 2018b; UNESCAP, 2013).

Increased FDI in key infrastructural services such as transport, telecommunications and energy can promote inclusive growth by increasing capacity and enabling access to these essential services. Trade in health services through the movement of health professionals, medical tourism, or telemedicine can address inadequacies in healthcare infrastructure and quality, thereby enabling more equitable access to healthcare. The tourism services trade has the potential to generate huge positive social and economic externalities by creating jobs and raising incomes across the skill spectrum, improving infrastructure and standards, creating rural-urban linkages and improving connectivity. Trade in IT and BPO services can increase economy-wide efficiency and productivity and can help bridge geographical, gender and other divides within and across countries by improving access to both goods and services.

The realization of these sustainability and inclusiveness objectives, however, is neither automatic nor guaranteed. It depends on the domestic policy and regulatory environment which shapes the extent to which and how the benefits from services trade are distributed and adverse outcomes are mitigated.

In the absence of sound domestic policies and regulations, trade in services could widen inequality by aggravating the divide between regions, between the skilled and less skilled, between urban and rural areas, the rich and the poor, and between those with access to services and those without.

The conditional nature of the benefits from services trade is well exemplified by sectors such as health and education. Trade in health services can contribute towards achieving universal health coverage and access to quality essential healthcare services (SDG 3.8) and towards increased health financing, as well as to the development of the health workforce in developing countries (SDG 3.9c), through inflows of foreign exchange, cross-border affiliations and partnerships which enable the transfer of knowledge, technology and manpower, and the upgrading of skills and standards. FDI in hospitals and associated development of private healthcare establishments can help reduce the burden on government resources (Chanda, 2017).

However, these are potential and not automatically guaranteed benefits. Trade and investment in health services could have undesirable effects on equity and access if there is cream-skimming by rich and affluent foreign medical tourists at the expense of domestic patients, or if it results in the internal brain drain of health workers from public hospitals to better-paying and better-managed foreign investor hospitals, or if it leads to a diversion of resources towards highly

specialized segments of healthcare at the expense of basic and preventive healthcare services.

Whether trade in health services promotes more equitable access to healthcare or aggravates inequities thus depends on domestic policies and regulations, i.e., how the resources generated from health services exports or increased FDI in health services are deployed in the economy, to whom they accrue and to what extent supporting policies concerning health insurance, pricing, cross-subsidization mechanisms, public-private linkages, training of human resources and management of public health establishments, among others, prevent distortionary and inequitable outcomes.

Without complementary measures that address issues of standards, infrastructure, human resources and technology in the healthcare sector, health services trade may not be inclusive.

Policies that are conducive to human resources development and management in the health sector can go a long way in addressing the issue of brain drain. More efficient allocation of expenditures in the health sector and improved regulatory governance can help prioritize spending in line with local needs and conditions of demand, and can mitigate adverse consequences such as cream-skimming, dualism and the crowding out of local patients that can arise with trade and FDI in this sector (Chanda, 2002; 2017; Hanefield et al., 2018).

The issues are similar in the context of education services. While opening the sector to foreign educational providers can augment capacity and create employment, and the entry of foreign students can enhance incomes, these may also lead to profiteering, higher costs, excessive focus on commercial specializations, and fewer available seats for domestic students.

It could also dilute quality and standards if due diligence on the eligibility of foreign students and foreign educational providers and on the recognition of degrees and employability is not done by the relevant regulatory authorities.

Hence, alongside trade and investment there needs to be adequate regulatory capacity to govern education service providers, along with complementary domestic policies regarding fees, standards, partnerships, and recognition, among others.

But for countries to reap the aforesaid benefits and mitigate adverse effects on equity and inclusiveness, they must first have the capacity to engage in services trade.

Domestic policies are once again critical to shaping the very ability of countries to participate in services trade, and the opportunities and challenges they face in this regard. Unless countries have the requisite skills, standards, human resources, infrastructure and enabling policies in these areas, they may not be able to avail of the opportunities for services trade (Waite and Nino, 2004).

Restrictive services trade policies and regulations may preclude countries from engaging in the global services market (Braga et al., 2019).

This issue is highly pertinent in the context of professional services trade, wherein many developing countries wish to promote services exports through the temporary cross-border mobility of services providers, but may lack supporting domestic policies with regard to education and training, standards, qualifications, accreditation and certification systems, and the regulatory set-up.

Exports of professional services would require countries to upgrade their domestic standards and systems to internationally accepted ones, enter into mutual recognition arrangements, open certain segments to foreign providers so that partnerships could be established, and change domestic regulations to provide a level playing field for domestic firms.

Likewise, if countries are to exploit the growing export opportunities for IT-enabled services and to reap the associated benefits in terms of employment, incomes, technology and connectivity, domestic policies concerning telecommunications, data protection and IT infrastructure and its accessibility are critical.

Thus, supporting policies that develop human resources and infrastructural and regulatory capabilities for services trade are essential.

In sum, services trade is like any other form of trade, and its associated benefits cannot happen in a vacuum. To engage in services trade and ensure that it is inclusive, the right policies and regulatory framework are needed.

4. Concluding observations

As in the case of goods, trade in services will create welfare gains for society because it produces a more efficient allocation of resources, increases the variety of services that consumers and producers can purchase, and allows the more productive services firms to expand.

This section has drawn on the empirical literature, case studies and own calculations to provide a variety of evidence of the growth- and development-enhancing potential of trade in services. The fact that some services sectors like transportation, telecommunications and energy are essential to the functioning of the entire economy, while others, like health, finance and education, affect the quality of the basic factors of production, implies that increasing services trade can deliver large economic gains to the global economy. This potential is underlined by the current low share of cross-border trade in services across many economies.

An important avenue through which services trade benefits societies is the improvement in firms' competitiveness, defined as the ability of firms to compete in international markets. This can occur directly, when trade in services increases the productivity of services firms. A second and indirect benefit is the increase in productivity of manufacturing firms and other services firms when services are used extensively as inputs in these sectors. Another way by which services trade can increase firm's competitiveness is through product differentiation, for instance by bundling the provision of services with a manufactured product.

The positive impact services trade can have on firms' competitiveness depends on the quality of institutions in the importing country. Establishing an economic climate conducive to investment and business can increase the positive effects of services trade, which underscores the importance of putting complementary policies in place, while reducing barriers to trade in services.

So far, the impact of services trade on aggregate labour market outcomes has been small. Most evidence suggests that total employment and average wages are not significantly affected by services trade, although some studies report positive effects.

In contrast, services trade has affected the composition of the workforce, with several studies suggesting that high-skilled workers in cities tend to be the main beneficiaries in both developed and developing countries. The magnitude of these effects is, however, relatively small.

Services trade may also benefit women and MSMEs, as employment in services sectors is more gender-balanced than manufacturing or mining, and because services are less affected by certain barriers to trade, such as access to finance.

Finally, technological progress has the potential to expand services trade by removing existing barriers to the cross-border flow of services. This could potentially upend current conclusions with respect to the role services trade plays in the labour market.

Endnotes

1 Financial repression refers to government action to manage the allocation of capital by capping interest rates paid to savers and lowering the cost of borrowing to favoured borrowers (typically the government itself, state-owned enterprises and financial institutions, and favoured industrial sectors) in the economy.

2 The authors do not mention in their paper whether this is in constant dollars.

3 In brief, agglomeration refers to the idea that increasing the number of firms in a certain geographic area increases the productivity of the firms established there. The two frequently cited explanations for these effects are demand linkages and cost linkages: moving a firm from location A to location B raises the profitability of firms in location B by increasing the size of the market and by increasing the supply of intermediate goods that they use.

4 See OECD (2019). UNCTAD also recently analysed tourism from a TiVA perspective. See pages 48-55 of UNCTAD (2017b), comparing South Africa and Tunisia with Indonesia and Thailand.

5 These indicators cover products and services purchased directly and indirectly by all international non-business travellers to the specified economy, including cross-border workers, overseas students and passengers in transit.

6 The authors derive these ad valorem equivalents of trade costs in services from a gravity equation.

7 See https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals for the more detailed targets for each SDG.

8 While "institutions" is a broad term, it is defined in the literature as "measures of the quality of economic governance such as control of corruption, rule of law, regulatory quality, contract enforcement, and more generally the investment and business climate" (Beverelli et al., 2017).

9 https://www.upwork.com/

D Services trade in the future

This section attempts to provide some guidance as to how services trade patterns will change. Using a novel approach, this section begins by showing recent trends in trade costs related to services and identifying the factors affecting these costs. Then, major future trends in technology, demography, income and climate change are examined with a view to explaining how these trends can affect the choice of which services countries trade and with whom they trade, as well as how they trade. Finally, the potential impact of these trends on trade in services is quantified using the WTO Global Trade Model.

Contents

1. Trade costs 84

2. Major trends that will affect trade in services 100

3. Quantifying services trade in the future 122

4. Concluding observations 134

Appendix D.1: Trade costs and their decomposition 137

Appendix D.2: Simulations 138

Some key facts and findings

- Trade costs are key in determining whether and how much a country trades.
- Trade costs in services are almost double those in goods, but they dropped by 9 per cent between 2000 and 2017 thanks to digital technologies, reduced policy barriers and investment in infrastructure.
- Four major trends will affect services trade in the future: digital technologies, demographic changes, rising incomes, and the impact of climate change.
- Analysis using the WTO Global Trade Model suggests that the share of services in global trade could increase by 50 per cent by 2040. If developing countries can adopt digital technologies, their share in global services trade could increase by about 15 per cent.

Predicting how services trade is likely to evolve in the future is not an easy task. Traditional economic theory points to technology and the relative abundance of factors of production (i.e. labour and capital) across countries as key drivers of trade patterns. A country with a relative abundance of labour will have a comparative advantage and therefore specialize in the production of goods and services whose production requires intensive use of labour. More recent economic theory predicts that countries with large economies will develop an advantage in exporting what they consume the most. Thus, not only factors of production and technology, but also preferences and consumption patterns, are key drivers of trade. This is true for goods trade as much as for services trade.

However, when services are traded through commercial presence in another country, comparative advantages take place at the level of the firm. A firm that establishes itself abroad will use its own technology, created in its home economy, and will match it with the host economy labour and capital. This is, for example, the case for a foreign hotel company, with very efficient managerial organization, that builds a hotel on a tropical island. Services are also traded by individuals who temporarily move abroad to provide a service. In this case, comparative advantage occurs at the level of the individual. A doctor who moves temporarily abroad to perform an operation using the physical infrastructure in the destination country is an example of this.

1. Trade costs

In order to understand how trade costs may evolve in the future, we need first to understand what the main determinants of trade costs in services are, and how they have evolved in the past.

This section uses a new approach to measure trade costs based on the comparison between domestic and international trade to capture the full range of obstacles confronted by a firm when it decides to sell or source its services internationally.[1] This measure builds on a recent WTO study on trade costs in the global economy (Egger et al., 2018) and is based on data that cover cross-border supply (mode 1 of the General Agreement on Trade in Services – GATS), such as via the internet, consumption abroad (mode 2), such as in the case of tourism, and the presence of individuals in the territory of another member (mode 4), such as consultants. Commercial presence in another country (mode 3), such as when an affiliate is established in a foreign country to serve the local market, is excluded due to a lack of data.[2]

Given this methodological approach, the trade costs in services include trade policy barriers, costs imposed by "behind-the-border" regulatory measures, and information and transaction costs related to cultural and institutional differences. Transport and travel costs also matter, as the exchange of services frequently requires the proximity of suppliers and consumers (Bhagwati, 1984; Francois, 1990; Hill, 1977; Sampson and Snape, 1985). Furthermore, trade costs also include any policies that disproportionately impact exporters and importers, for instance through their effect on firm competitiveness or availability of trade finance. Finally, since trade in many services is related to trade in goods,[3] costs specific to trading goods may impact services trade too.

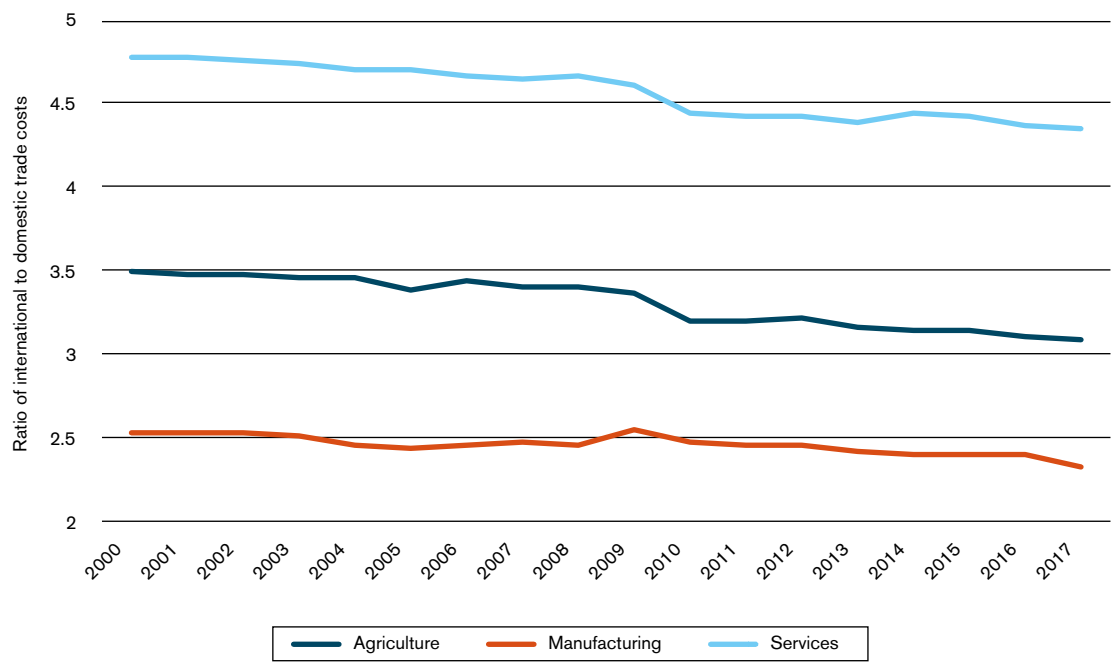
(a) Trade costs are higher in services

Figure D.1 illustrates the relatively higher trade cost of the services sector. Our estimates reveal that trade costs in the services sector are higher than those in manufacturing and agriculture. This finding is consistent with similar studies in the literature (e.g. Fontagné et al., 2011; Gervais, 2018; Miroudot et al., 2013). The estimated trade costs – defined as an average of both export and import costs – represent the ratio of international to domestic trade costs. Hence, an estimated trade cost for services in 2017 of 4.3 means that international trade is about four times more costly than domestic trade.[4]

It is also worth noting that trade costs in services have declined over the last two decades. Between 2000 and 2017, services sectors registered a cumulative decline in trade costs of around 9 per cent, about the same rate of decline as manufacturing. Notably, both services and manufacturing registered a slight increase in trade costs during the financial crisis of 2008-09, yet the declining trend in trade costs continued after 2010. Our findings differ from conventional estimates of trade costs, which generally find that trade costs in services have remained relatively steady. We are able to identify this trend thanks to our more refined estimation of trade costs compared to existing estimations, as our results stem from the use of a new set of estimated elasticity parameters that varies by sector.[5]

Trade costs also vary by income levels. Figure D.2 shows a breakdown of services trade costs among economies of different income levels.[6] Trade costs in services are lowest among advanced economies and highest for emerging economies. In 2017, trade costs in emerging economies were 66 per cent higher than in advanced economies. The decline in trade costs was faster in emerging economies before the financial crisis. However, the costs of services trade stopped declining and even grew in emerging economies after the crisis.

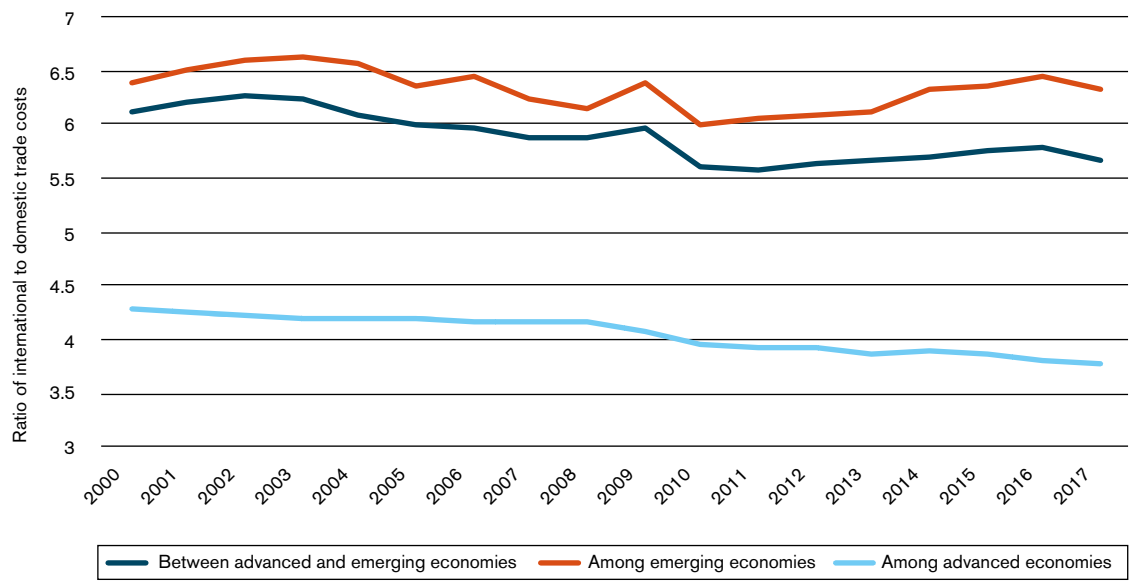
Figure D.1: Trade costs are highest for services
Trade costs by broad sector, 2000-17



Source: WTO estimates.

Note: The results are based on data for 43 economies. See Appendix D.1 for data sources and an explanation of the estimation methodology. The value of trade costs represents the ratio of international to domestic trade costs.

Figure D.2: Services trade costs are lowest among advanced economies
Services trade costs by economies of different income levels, 2000-17



Source: WTO estimates.

Note: The results are based on data for 43 economies. See Appendix D.1 for data sources and an explanation of the estimation methodology. The value of trade costs represents the ratio of international to domestic trade costs.

There is also considerable variation of trade costs across different services sectors. Figures D.3 and D.4 illustrate the evolution of trade costs by sector. In general, trade costs in many sectors have witnessed a declining trend since 2000.

Services sectors with low trade costs include transport and logistics, wholesale trade, other business and professional activities, post and telecommunications, financial intermediation and other services such as community, environmental, cultural and personal services. It is no surprise that transport, logistics and travel services have lower trade costs, as these services sectors often involve transactions across borders. Wholesale trade services have experienced a marked decline in trade costs, as did other business and professional activities.

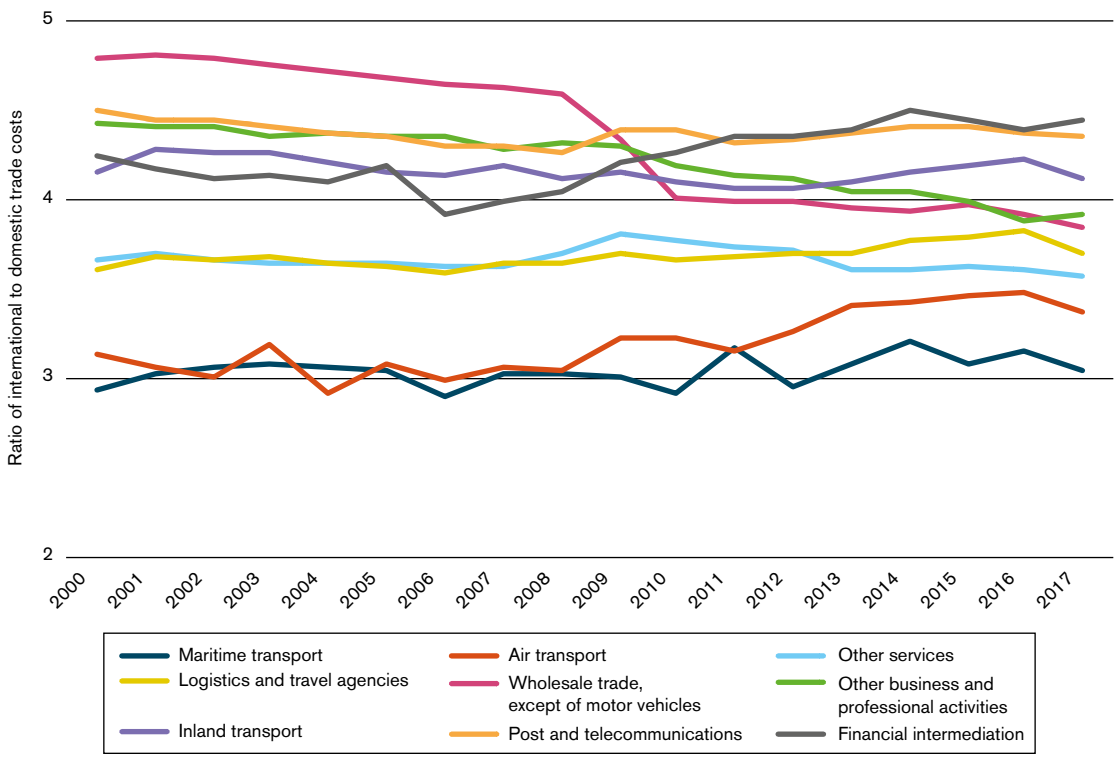
The largest trade costs are observed in services such as real estate activities, retail trade, the sale of motor vehicles, and construction. The high estimated costs for these sectors reflect the fact that these services are not highly tradable across borders and tend to be produced and consumed domestically (Jensen and Kletzer, 2005). However, retail trade and sale of motor vehicles saw a dramatic decline in trade costs, possibly reflecting the expansion of online sales. Sectors such as health and social work, education, electricity and water supply, and hotels and restaurants face medium trade costs.

(b) Trade policy, information barriers and distance drive trade costs

Trade costs include different components. Some barriers are related to geography and cultural or institutional differences, others are policy-induced. Being able to distinguish and quantify the different components of trade costs is essential to allow researchers to predict how trade costs may evolve in the future and to help policy-makers to identify areas where policy reforms can make a difference.

Figure D.5 presents the breakdown of bilateral trade costs into five components: transport costs, information and transaction costs, technology, trade

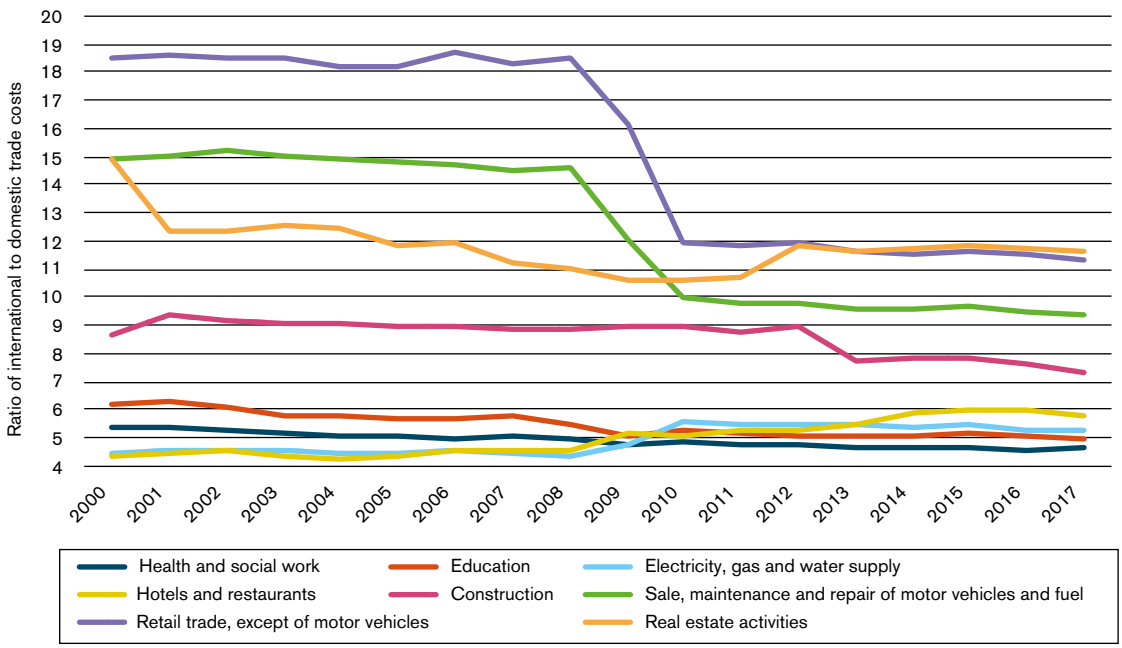
Figure D.3: Services sectors with low trade costs
Trade costs in services by sector, 2000-17



Source: WTO estimates.

Note: The results are based on data for 43 economies. See Appendix D.1 for data sources and an explanation of the estimation methodology. The value of trade costs represents the ratio of international to domestic trade costs. "Other services" include community, environmental, cultural and personal services.

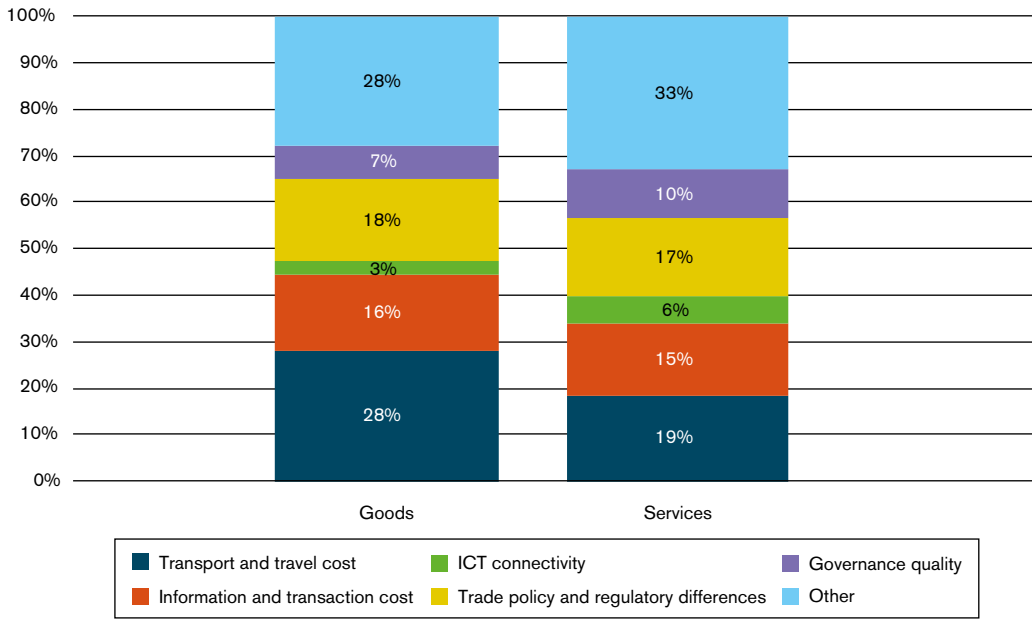
Figure D.4: Services sectors with high or medium trade costs
Trade costs in services by sector, 2000-17



Source: WTO estimates.

Note: The results are based on data for 43 economies. See Appendix D.1 for data sources and an explanation of the estimation methodology. The value of trade costs represents the ratio of international to domestic trade costs.

Figure D.5: Policy-related factors account for a significant part of trade costs
Breakdown of bilateral trade costs in services and goods in 2016



Source: WTO estimates.

Note: Figure D.5 shows to what extent various factors contribute to explaining the bilateral variance in goods and services trade costs. "Other" represents the part of bilateral variation in trade costs that remains unexplained in our analysis. See Appendix D.1 for data sources, an explanation of the methodology and definitions of trade cost categories.

policy and regulatory differences, and governance quality. The analysis captures the extent to which different components of trade costs contribute to the variation in bilateral trade costs. That is, how much a component can explain why costs to import to a country vary across its exporting partners and why costs to export from a country vary across its importing partners.[7]

Trade policy barriers and regulatory differences explain a large part of why trade with some partners is easier than with others. They account for 17 per cent of bilateral trade costs in services and 18 per cent in goods. Trade policy and regulatory differences include policy measures that make access to the domestic market relatively more difficult for foreign firms. In our estimation, their impact is captured by membership in regional trade agreements, in deeper economic agreements such as the European Union and the Euro-zone, and by heterogeneity in services trade regulation. In addition, they also include barriers pertinent to trade in goods, such as the average bilateral tariff or the efficiency of customs procedures.

Looking at the specific factors provides some more insights. The regression analysis that underpins our decomposition shows that regional trade agreements reduce trade costs in some goods sectors, but do not appear to affect trade costs in services significantly. Membership of the European Union, on the other hand, significantly decreases trade costs in many services sectors. On top of that, being part of the Euro-zone further reduces trade costs in retail trade, other business and professional activities and other services such as cultural and personal services. Heterogeneity in services trade regulation consistently increases trade costs, especially in telecommunication and other services such as cultural and personal services. Goods-specific barriers, such as the average bilateral tariff, significantly increase trade cost in retail and wholesale trade.

Information and transaction costs are also an important component of bilateral trade costs, accounting for 15 per cent of their variation in services and 16 per cent in goods. Information and transaction costs capture, for instance, the difficulty of obtaining information about buyers, sellers and products in a different country, understanding foreign business environments, securing contracts and establishing business networks. These costs decrease with cultural, linguistic, legal and institutional similarity.

Governance quality affects the ease, transparency, security and predictability of doing business in a foreign country. It is represented by perceptions of regulatory quality, corruption and the rule of law.[8] These factors account for 10 per cent of overall trade costs in services and 7 per cent of trade costs in goods, with differences in regulatory quality having an especially marked impact.

ICT connectivity captures the ease of connecting with foreign partners and using the internet. It is represented by fixed line, mobile phone, and broadband coverage. We take the lower value of ICT connectivity between trading partners because the benefits of technology are determined by the ICT penetration level of the less connected partner. Having fast internet access in an exporting country is of little use if nobody is connected in the importing country. The results show that mobile phone and broadband coverage are significant drivers of trade costs in most services sectors, much more so than in goods.

Finally, **transport and travel costs** are captured by geographical distance and the quality of transport infrastructure. They capture the costs of delivering services and goods from suppliers to customers, which accounts for 19 per cent of bilateral trade costs in services and 28 per cent in goods. The reason why distance still matters for services trade is that some services still require face-to-face interaction and hence involve travel for either the supplier or the customer. Furthermore, as seen in the case of tariffs, trade costs that matter for goods may also matter for services that are related to goods trade.

Overall, governance quality, trade policy and regulatory differences can account for more than a quarter of bilateral trade costs in services. Information and transaction costs are important components of trade costs, accounting for a major share of costs. The extent to which countries adopt ICT plays a much more important role for trade in services than for trade in goods. Transport and travel costs also play an important role, although their effect is less important compared with trade in goods. Thus, declines in these trade costs can bring substantial benefits to trade in services, and different services sectors may be impacted differently by reductions in these trade costs.

(c) Factors that affect trade costs

Several forces explain the patterns of trade costs observed so far. This section will look more closely at some of these factors, as they may be key to determining what trade costs in services will look like in the future and which services sectors can benefit from this. Three main factors are at play: technological developments and ICT penetration have brought down trade costs in services, particularly through

cross-border supply. Government regulations and trade policies also play a crucial role in ensuring policy coherence and facilitating services trade. Quality physical and digital infrastructure can further reduce trade costs and bring new opportunities for trade in digitally enabled services.

(i) Digital technologies lower trade costs in services and boost cross-border services trade

Advancements in digital technologies have made it possible to codify, digitize and transmit services activities globally, abolishing the requirement for physical proximity in some services sectors.

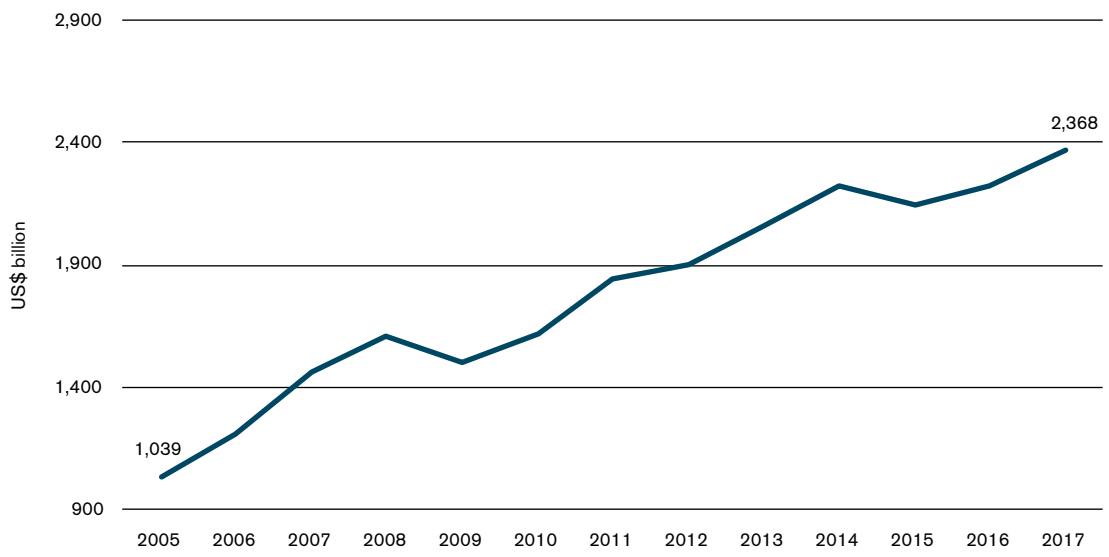
As a result, cross-border trade is progressively easier, especially through cross-border supply (mode 1 of the GATS). Figure D.6 illustrates the average yearly values of trade in potentially ICT-enabled services: the global exports of potentially ICT-enabled services[9] delivered through cross-border supply more than doubled between 2005 and 2017.[10]

Digital technologies significantly bring down the costs of searching for, matching, tracking and verifying information (Goldfarb and Tucker, 2017), thus reducing information and transaction costs in trade. Technologies to digitize contents have made it possible to produce and transmit services in large quantities over the internet at near-zero costs, making distance matter less.

Recent ICT developments have given rise to online platform and search engine services, which reduce the cost of searching for and obtaining information. Online platforms can match businesses with consumers, ordinary consumers with suppliers, firms with workers, investors with entrepreneurs, etc. The reduction in search costs and verification costs can lead to an increase in international hiring and offshoring, bringing new opportunities for services trade (see Box D.1).

As described in Box D.1, a number of online labour platforms have been developed to connect freelance service providers with worldwide clients. Individuals can offer their services across borders with more flexibility through online freelance marketplaces by using web collaboration software and video conferencing. Occupations such as software development, creative design and multimedia, and sales and marketing support, as well as professional services, are the most likely to be offered online (Kässi and Lehdonvirta, 2018). Workers operate more like entrepreneurs in a global marketplace. In many economies, the wages earned through such platforms exceed the averages for local companies (Lund and Manyika, 2016). Agrawal, Lacetera and Lyons (2016) show that online platforms with standardized

Figure D.6: Trade in ICT-enabled services has been growing steadily
Global exports of ICT-enabled services, 2005-17



Source: WTO experimental dataset on Trade in Services by Mode of Supply.

Note: Figure D.6 covers only services exports through cross-border supply (mode 1 of the GATS). Potentially ICT-enabled services include, in the balance-of-payment services classification, financial and insurance, charges for the use of intellectual property, telecommunications, computer and information services, business services and personal, cultural and recreational services.

Box D.1: Online workplace platforms stimulate trade in professional services

Recent years have seen the emergence of online marketplaces for services provided by skilled professionals. Platforms such as the United States' Catalant,[11] Germany's Comatch,[12] Denmark's Worksome[13] or the United Kingdom's Outsized[14] help companies to access highly-skilled and often highly-educated expertise in areas ranging from financial services to management consulting to IT services, including artificial intelligence (AI), machine learning and cybersecurity (Edgecliffe-Johnson, 2018).

These "white collar" platforms offer a useful contribution to enhancing firms' efficiency. In order to have access to the knowledge-intensive services they require, businesses were faced, prior to the development of such platforms, either with the fixed costs of hiring long-term staff, or with the large overheads occasioned by procuring the services of consultancy firms which assign employees at premium fees. Unless firms had projects of a scale that was sufficiently important to justify these costs, they might have chosen to forego these efficiency-enhancing opportunities. However, by connecting companies to freelancers, online platforms enable firms to transform fixed costs into variable ones, thereby increasing operational flexibility. They also contribute to lowering the cost of these services and are, as such, of particular value to micro, small and medium-sized enterprises (MSMEs). Given that the services they make available are targeted at solving problems that are significant, but generally one-off and short-term, they provide smaller firms with much-needed flexibility.

For their part, freelancers stand to benefit from the significant demand for the services they offer, which is driven by fast-moving technological developments and the linked evolving knowledge needs, as well as their high levels of skills and education. Online platforms also offer these service professionals an avenue to work independently and with more flexibility. They tap especially into retired staff and younger professionals, some of whom reportedly find freelance work more appealing than a permanent job with a single employer, particularly in senior roles (Deloitte, 2018).

Many of the platforms rely on algorithms that search the CVs on record and scour the feedback and ratings about freelancers' past services in order to offer the best match for the services requested by their users. Revenues come from the commissions charged on the services supplied. Many operate not exclusively in their market of origin, but also in foreign markets, and they present not only domestic professionals, but also foreign ones. These individuals then provide their services either on location, at home and abroad, or remotely. In this way, online platforms are not only supplying services themselves, but are also enabling trade in services by the suppliers using the platform (Edgecliffe-Johnson, 2018).

information disproportionately benefit workers from developing countries.

The reduced costs of searching information have led to the development of online "peer-to-peer" platforms dedicated to facilitating matching. This technological development, coupled with the growing demand for affordable services, has boosted the "sharing economy". Platforms allow apartments, cars and other items to be sold or rented by private owners directly to consumers. Horton and Zeckhauser (2016) emphasize that many of these markets are driven by an unused capacity for durable goods. Low search costs enable such unused capacity to be filled more efficiently. As consumers get more used to lodging and transportation services mediated through online platforms, the demand for services increases and the need to purchase durable goods declines.

The rise of international business-to-business (B2B) portals and online labour market platforms provides new avenues for international contracting and hiring of service suppliers, whether of companies or persons. B2B platforms are growing and expanding into offers of services such as transport, distribution, logistics, courier services and "handyman" services, as well as a host of personal services. The objective information available online, combined with the ability to send the output of the work by electronic means at a low cost over long distances, helps companies and workers who are far from the buyer to profit from international services trade. Head et al. (2008) investigate the extent to which services trade has managed to overcome the impediments created by geographic distance and institutional differences. They find that distance costs are high but are declining over time.

Box D.2: Online platforms and the digital transformation of logistics

The terms "digital" and "logistics" have gone together for at least two decades, as evidenced by the wide use of radio-frequency identification (RFID) in shipment tracking and inventory management, as well as the application of various types of software in supply chain management since the 1990s. Nevertheless, compared to most other industries, like media, telecommunications, banking, travel and retail, the logistics industry appears to be trailing behind the current wave of digitalization, which is characterized by Big Data analytics, the Internet of Things (the connection of physical devices and everyday objects via the Internet), AI and digital platform-based business models.

However, in recent years, tech start-ups such as Flexport,[15] Uship[16] and Freighthub[17] are transforming the logistics industry in the same way that Airbnb transformed hotel services, and Uber taxi services. There are now more than 400 start-ups worldwide that could undermine the competitive advantages of traditional logistics services providers (LSPs) and that have attracted remarkable investments – more than US$ 11 billion between 2005 and 2015 (Wyman, 2017).

A large percentage of the new logistics start-ups focus on online platforms and data-driven services – areas that are easily scalable and require little fixed-cost investment. Built on Big Data, cloud-based digital logistics platforms are taking over the intermediary role of LSPs with more efficiency. They can match shipping demand and freight capacity instantly, provide transport rates immediately, and coordinate all associated activities in a smooth and seamless way. As a result, shippers, especially those with less complex shipments, can now switch easily to these new, platform-based services, while carriers can use the online platforms to conduct business directly with shippers (Accenture, 2017).

Currently, only 40 per cent of freight transport volume is reliant on long-term forwarding contracts. The other 60 per cent is made up of short-term business, and it is this that is primarily attracting the interest of the newcomers. Uship, a Texas-based freight exchange start-up, has been particularly successful in this field. The company focuses on private individuals and small businesses looking for transport solutions for moving furniture, cars and even horses. Over 600,000 transport providers in 19 economies advertise their services on the platform, which now has 4 million registered clients.

There is a significant variety of digital logistics platforms in the market (Little, 2017). Simple platforms usually act as information brokers only, neither validating offer details nor taking any liability or risk for the services provided to the client. High-end digital freight exchange (DFE) platforms make extensive use of advanced algorithms to calculate and predict rates, capacities and means of optimization. Additionally, they tend to have wider value-chain focus. For example, some DFEs offer key account and operations management functions and take commercial responsibility for their offers. Some are aiming at establishing global networks, supporting regular freight flows and entering new modes of transport, especially air- and ocean freight. Flexport, the first e-freight forwarder, founded in 2013, is expanding exponentially, hiring more than 1,000 people across 11 offices around world, with valuation reaching US$ 3.2 billion; it has its own warehouses for consolidating cargo and has also started to chart its own aircraft.

The logistics industry is facing digital disruption along its entire value chain – from freight forwarding, brokerage and long-distance transportation, to warehousing, contract logistics and last-mile delivery.

Facing fierce competition, traditional LSPs have been forced to embark on the journey of digital transformation. Sixty per cent of LSPs are building or buying digital platforms. Some of these include Saloodo!,[18] which is backed by DHL, Drive4Schenker[19] by Schenker and Twill Logistics[20] by Damco, a Maersk-owned LSP. In addition to logistics start-ups, traditional LSPs are also facing competition from giant companies outside of the transport and logistics sector. For example, Amazon and Alibaba are investing in logistics start-ups to innovate last-mile delivery; BMW and Mercedes are developing passenger and cargo transport platforms as well as autonomous driving solutions; and venture capital is also quickly scaling up asset-light business models in fast-growing areas of logistics. It is digital platforms that are driving the digital transformation in the logistics industry. TradeLens,[21] for example, is a block-chain based industry platform that could transform the logistics sector by providing a single, secure source of shipping data to enable more efficient global trade.

By reducing trade and entry costs, online platforms enhance competition by opening the market to new entrants and facilitate the participation of MSMEs in trade (see Box D.2).

By enabling the recording and storage of digital footprints, digital technologies also facilitate tracking and verification, which in turn result in a reduction in the costs associated with the verification of entity and reputation. Platforms have developed mechanisms to overcome asymmetric information. Online platforms provide mechanisms such as online rating systems, in which ratings from past buyers and sellers are posted for future market participants to see, that improve consumer trust in online sellers. A number of studies empirically demonstrate that sellers with better ratings obtain higher prices and higher revenues (Houser and Wooders, 2006; Livingston, 2005; Lucking-Reiley et al., 2007; Melnik and Alm, 2002).

A benefit of improved online verification procedures for individuals has been the ability to make payments more securely and easily. Mobile banking allows consumers to send and receive money as easily as domestic payments, facilitating cross-border business transactions (see Box D.7 on fintech in sub-Saharan Africa). The peer-to-peer lending market has grown rapidly in emerging markets, owing to an increase in knowledge of marketplace lending, greater investment transparency and lower interest rates to consumers. Economides and Jeziorski (2017) show that the use of mobile devices to verify identity digitally in Tanzania enables the use of mobile payment networks to transfer money.

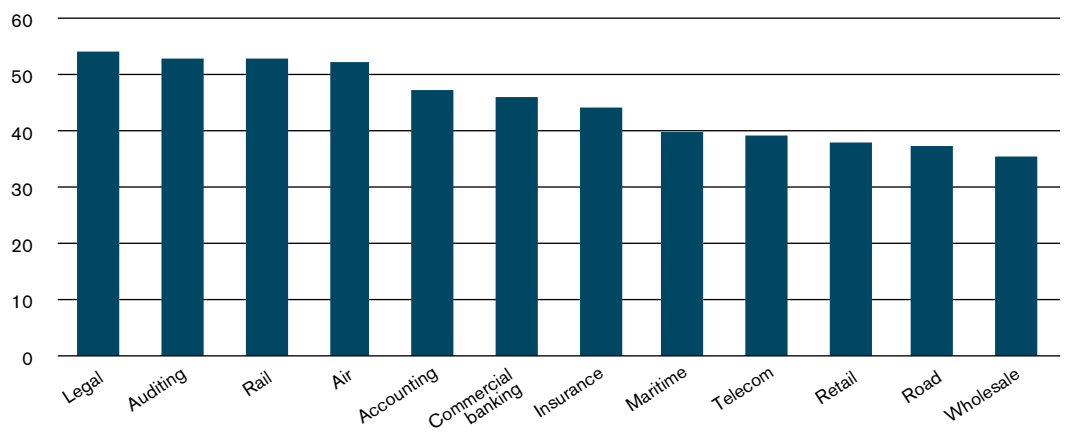
(ii) Policy restrictions in services trade

As discussed in Section C, government interventions in services sectors where market failures exist are not only necessary, but also desirable to improve economic efficiency. Trade policy barriers and regulatory measures, however, can account for a major share of trade costs in services. Restrictive services trade policies may induce higher trade costs on service suppliers and consumers. Differences in domestic regulations between economies, including the lack of regulatory capacity, can make it more costly for firms that operate across borders.

The openness or restrictiveness of services trade policies are reflected in the new World Bank Services Trade Restrictions Index (STRI). The regulatory database on which the STRI is based – a joint endeavour between the World Bank and the WTO – contains richly textured policy information as well as links to the quantification of policy measures (see Box D.3 for more information). It collects and makes publicly available information on services trade policy, which is assembled in a comparable manner and offers an important source of information on services trade policies.

Figure D.7 shows the STRI for selected services subsectors. Legal and auditing services are the most restricted, due, in particular, to many

Figure D.7: Some services sectors face high restrictions
Services Trade Restrictions Index by subsector, 2016



Source: World Bank STRI.

Note: To obtain the STRI, the trade restrictions by different modes of supply were weighted according to their importance for the supply of the respective services in each sector, and then aggregated.

Box D.3: World Bank-WTO Services Trade Policy Database and World Bank STRI

The STRI is a measure of the restrictiveness of an economy's de jure regulatory and policy framework based on a list of the most relevant impediments to trade in services. The World Bank recently updated its STRI. The raw regulatory information used to compute this STRI is derived from the World Bank-WTO Services Trade Policy Database (STPD), which is disseminated through the WTO Integrated Trade Intelligence Portal (I-TIP).[22] The information is currently available for 68 economies, representing the most important services traders around the world. For 25 of these economies, the information underlying the updated STRI was collected through a survey conducted jointly by the World Bank and WTO, while the information for the remaining 43 economies was sourced from the Organisation for Economic Co-operation and Development (OECD) STRI regulatory database, thanks to the cooperation of the OECD, which is gratefully acknowledged.

Out of the broad set of information available in this STPD, a subset of approximately 115 regulations and policies was selected to compute the index. Retaining such a subset ensures comparability with the previous World Bank STRI published in 2012, consistent coverage of measures across economies, and compatibility with the classification of restrictions by the OECD.[23] The types of restrictions covered include conditions on market entry (e.g. forms of entry authorized, quantitative limits, foreign equity limits), operational requirements that may be discriminatory, and other types of regulatory measures (e.g. transparency), which could also significantly contribute to the restrictiveness of policies.

The construction of the STRI comprises three steps (Borchert et al., 2019a): (1) the selection of key restrictions entering the STRI; (2) the determination of the level of restrictiveness of individual measures or, if necessary, bundles of measures if they are conceptually intertwined; and (3) the aggregation of measures into indices at the sector-mode level, sector level and country level, respectively. The STRI ranges from 0 to 100, where 0 indicates that none of the restrictions underlying the index is applied, and 100 means that the sector/mode is completely closed to foreign services and service suppliers.

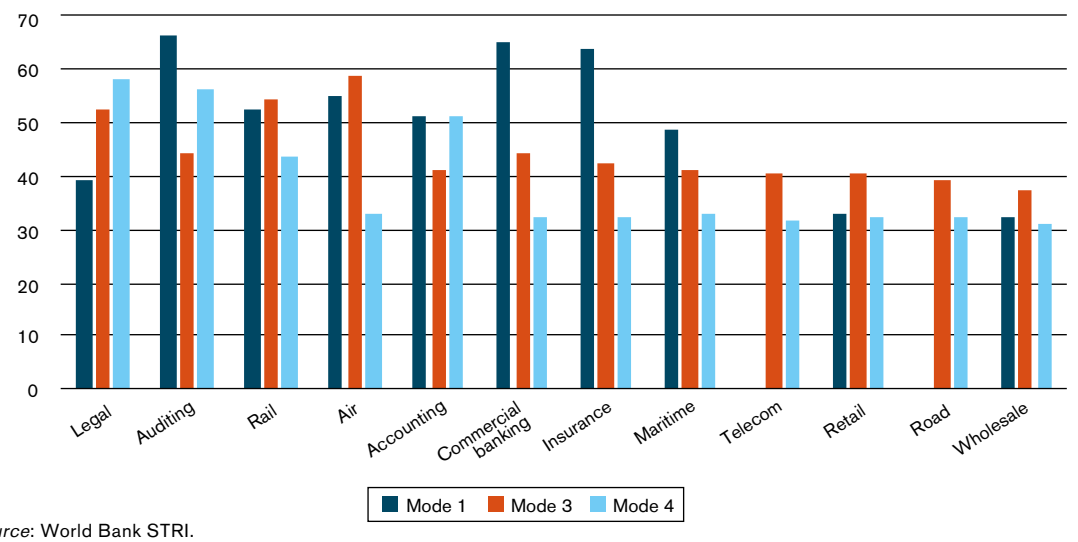
The STRI, and the accompanying STPD, covers five main services sectors – financial services (banking and insurance), telecommunications, distribution, transportation (air freight and passenger, rail and road freight, maritime freight and auxiliary services) and professional services (accounting and legal services) – further broken down into 23 subsectors. The STRI is computed for three out of the four modes of supply defined in the GATS, namely cross-border trade (mode 1), commercial presence in another country (mode 3) and presence of natural persons (individuals) (mode 4). Consumption abroad (mode 2) is a mode of delivery that is particularly important in services like tourism, education and health, but is not considered significant for the sectors covered in the database.

stringent requirements related to licensing and qualifications, e.g. relative to representing clients before a host country's courts, as well as other barriers affecting the international movement of professionals (GATS mode 4), which is critical for the supply of services in these sectors. The supply of rail and air transportation services is also quite restricted, reflecting in rail transport the difficulties of introducing competition, and in air transport the prevalence of policies traditionally aimed at protecting domestic suppliers from competition. On the contrary, the lowest relative policy restrictiveness is recorded for distribution (wholesale and retail trade services), telecommunications, maritime and road transportation services.[24] The generally lower level of trade costs for telecommunications (both fixed and mobile telephony) reflects the continuous opening up and regulatory reform of the sector across economies.

Not surprisingly, wholesale distribution is less restricted than retail distribution, where regulation in some countries tends to protect smaller retailers from competition. Commercial banking and insurance services – sectors that have gradually been opening up over the last two decades – constitute the midfield in trade restrictions.

Figure D.8 provides more information on service policy restrictions by sector and mode of supply. The level of restrictiveness of each mode varies significantly between and within sectors. This may reflect different technological feasibility (one mode of supply being more relevant than the other) and diverse regulatory concerns. Thus, cross-border supply of services (mode 1) is relatively more restricted in the case of auditing, maritime transportation, commercial banking and insurance services, while the other services

Figure D.8: Services trade restrictions vary by mode of supply
Services Trade Restrictions Index by sector and mode of supply, 2016



Source: World Bank STRI.

Note: The World Bank STRI ranges from 0 to 100. The STRI for mode 1 is not computed for the following sub-sectors: road transport, telecommunication, maritime cargo-handling, storage and warehousing, legal host country advisory and representation services. In other words, there is no mode 1 STRI for those subsectors.

sectors in transport, telecommunications, as well as retail and wholesale distribution services, face higher restrictions for supply through commercial presence in another country (mode 3). The presence of natural persons (mode 4) is highly restricted – relative to the other modes – in all the professions covered by the STRI, most notably in the case of legal services.

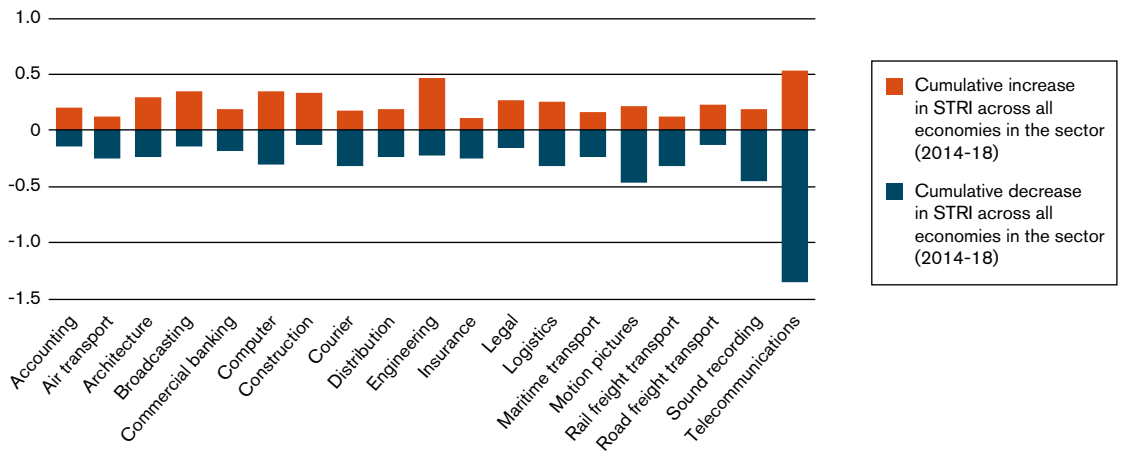
The question also arises of whether higher restrictiveness in one mode of supply leads to more or less trade in services via other modes of supply. Nordås and Kox (2009) find some evidence suggesting that the different modes are complementary or independent. They find that restrictions on cross-border trade have a negative impact on foreign direct investment, and that the reverse is also true: restrictions on foreign direct investment have a negative impact on cross-border trade, suggesting that the modes are complementary.

Higher restrictions in services trade can particularly penalize small firms. Recent empirical analysis shows that average services trade restrictions represent up to a 14 per cent additional tariff on small firms' exports compared to large firms that can absorb trade costs more easily (OECD, 2017b). Benz et al. (2019) show that smaller and less productive firms, as well as first-time exporters, are disproportionally affected by services trade barriers. Their analysis is based on micro-data from Belgium, Finland, Germany, Italy, Japan, Sweden, the United Kingdom and the United States. They found that, for these firms, both the propensity to export and volumes exported to less restrictive destinations are significantly higher than to more restrictive destinations. In contrast, policy barriers do not affect the export decisions of the largest, most productive and most experienced services firms. The pattern holds for two major modes of supply, i.e. cross-border services exports and foreign affiliate sales of services firms.

To illustrate the evolution of services trade policies, Figure D.9 compares the policy developments in all services sectors between 2014 and 2018 based on the OECD services trade restrictiveness index (STRI). The OECD index on services trade differs from the World Bank STRI in that it covers regulations affecting services trade in 44 economies and 22 sectors. Although the OECD index covers fewer economies, it has a broader sector coverage and provides a yearly update, therefore illustrating the development of services trade regulations.

Figure D.9 shows the cumulative change in the scores in each sector where policy changes occurred. Most opening reforms occurred in the telecommunications sector, motion pictures and courier services. For example, Mexico adopted a new telecommunications and broadcasting law in 2015, rolling back foreign equity restrictions in fixed-line and internet services segments of the sector. The law also introduced a new independent regulator and a series of pro-competitive measures to challenge the dominant position of

Figure D.9: Globally, services sectors saw changes in trade restrictions
Policy change in OECD services trade restrictiveness index (STRI) by sector, 2014-18



Source: OECD services trade restrictiveness index (STRI) 2014 and 2018.

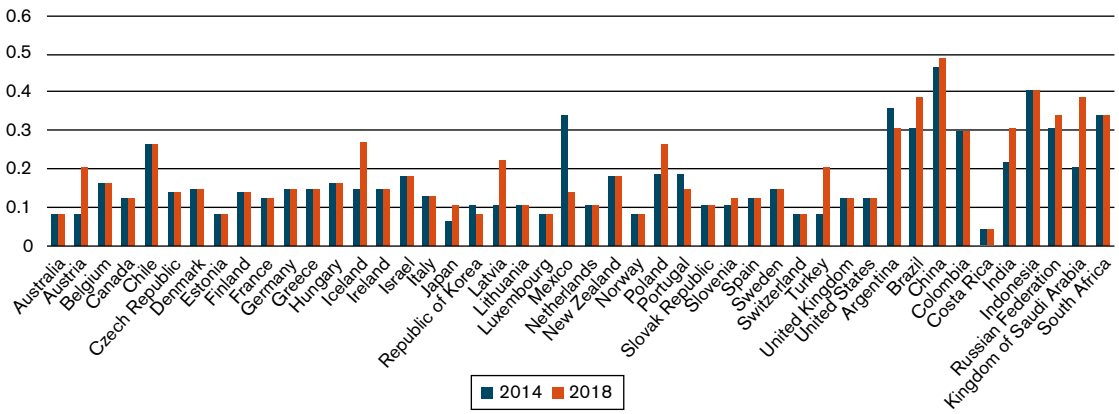
Note: The OECD STRI ranges from 0 to 1 for each economy and each sector.

incumbent telecommunications firms (OECD, 2017b). However, in some sectors, the policy changes have shifted in the opposite direction, raising services trade barriers in services sectors such as construction or engineering and in some professional services.

The rise of digital technologies provides new opportunities for services trade, but also creates new challenges for trade policies and regulations. The OECD Digital STRI, based on the OECD STRI, quantifies barriers that affect trade in digitally enabled services. It covers measures affecting trade in digitally enabled services such as infrastructure and connectivity, electronic transactions, payment systems, and intellectual property rights.

Figure D.10 illustrates the evolution of the OECD Digital STRI over the period 2014-18. As the years pass, the indices show that the regulatory environment is tightening. Compared to 2014, the first data point

Figure D.10: The digital regulatory environment has tightened
OECD Digital Services Trade Restrictiveness Index, 2014 and 2018



Source: OECD Digital Services Trade Restrictiveness Index (Digital STRI).

Note: The OECD STRI ranges from 0 to 1.

in the digital STRI, 10 economies have higher index values in 2018, and only three economies have lower values. The average rate of increase in the index among the 10 economies is 32 per cent between 2014 and 2018, with the highest being 50 per cent over the same period.

The results are driven by measures affecting infrastructure and connectivity. The lack of efficient regulation on interconnection as well as burdensome conditions on cross-border data flows beyond those imposed to ensure the protection and security of personal data tend to be the main barriers to trade in digital services. In 11 economies, certain types of data (such as financial or business data) must be stored locally, but the transfer of copies abroad is permitted as long as authorities can have direct access to the data upon request. Specific licenses or authorizations for e-commerce activities in addition to ordinary business licenses are required in six economies, and in four of them, discriminatory conditions apply for foreign entities seeking to obtain such licenses (Ferencz, 2019).

As noted above, the growing scope for digital delivery allows service providers increasingly to supply services cross-border, overcoming the proximity requirement and circumventing traditional barriers to trade in some sectors. Data policies are becoming much more important, and their restrictiveness may put a break on the fast pace of growth in services trade enabled by digital technologies.

Recent research by Ferracane and van der Marel (2018) assesses whether regulatory data policies implemented in 64 economies between 2006 and 2015 have had a significant impact on an economy's ability to import services over the internet. More specifically, they develop and use a regulatory index of data policies that measures how restrictive economies are in regulating the usage and cross-border movement of data. This index of data policies is then related to trade in services over the internet to study whether indeed restrictive data policies reduce digitally enabled imports of services. The authors estimate that, if economies lifted their restrictions on the cross-border flow of data, the imports of services would rise on average by 5 per cent across all economies, with obvious benefits for local companies and consumers who could then access cheaper and better online services from abroad.

Other than the absolute score of services restrictiveness, regulatory differences between countries can also affect the cost of services trade. Although differences in regulation may be the legitimate result of differences in political systems, societal preferences or governmental objectives, heterogeneity of regulations across borders can give rise to some unavoidable compliance costs when companies export to different markets.

The OECD indices of regulatory heterogeneity captures the regulatory heterogeneity in services. The indices are built from assessing – for each country pair and each measure – whether or not the countries have the same regulation. The regulatory heterogeneity indices take values between zero and one, where zero represents the same regulatory requirement and one indicates regulatory heterogeneity. To give an example, Australia and Austria do not have the requirement that the majority of board of directors must be nationals or residents, while Iceland and Norway do. The heterogeneity index will score the country pairs Australia/Austria and Iceland/Norway zero on this measure because they have the same answer, while Austria and Norway, Australia and Norway, Austria and Iceland, and Australia and Iceland will be scored one because they have different answers (Nordås, 2016).

Figure D.11 illustrates the average regulatory heterogeneity across all services sectors in the database. The average regulatory heterogeneity is the lowest between OECD countries, while the regulatory requirements of China and Russia are relatively different than other economies.

Nordås and Kox (2009) estimate that if all economies harmonized or recognized each other's regulation to the extent that the heterogeneity index took its lowest bilateral value for all country pairs, total services trade through commercial presence in another country could increase by between 13 and 30 per cent depending on the economy. More recently, Nordås (2016) shows that on average, a reduction in the regulatory heterogeneity by 0.05 points is associated with 2.5 per cent higher services exports. Furthermore, improved regulatory coherence has a larger trade impact when the level of trade restrictiveness is low. For economies with an average score of the regulatory heterogeneity index (i.e. a heterogeneity index at 0.26), the trade costs amount to an ad valorem equivalent trade cost of between 20 per cent and 75 per cent at low levels of the STRI.

(iii) Investment in infrastructure

As discussed earlier, transportation and infrastructure-related costs account for at least one-third of overall trade costs in services. Most of the new commercial and technological advances in services would not be possible without the transformation that has taken place in the world's communications infrastructure. Investments in physical and digital infrastructures,

Figure D.11: Regulatory heterogeneity is lowest among OECD countries
Regulatory heterogeneity index by pairs of economies, 2018

	OECD	Brazil	China	Colombia	Costa Rica	India	Indonesia	Malaysia	Russian Federation	South Africa
OECD	0.24	0.33	0.41	0.30	0.29	0.40	0.41	0.30	0.37	0.29
Brazil	0.33		0.41	0.31	0.27	0.31	0.35	0.34	0.40	0.34
China	0.41	0.41		0.41	0.44	0.39	0.38	0.45	0.40	0.32
Colombia	0.30	0.31	0.41		0.23	0.36	0.39	0.30	0.36	0.30
Costa Rica	0.29	0.27	0.44	0.23		0.38	0.37	0.29	0.42	0.32
India	0.40	0.31	0.39	0.36	0.38		0.33	0.35	0.41	0.42
Indonesia	0.41	0.35	0.38	0.39	0.37	0.33		0.34	0.45	0.38
Malaysia	0.30	0.34	0.45	0.30	0.29	0.35	0.34		0.42	0.32
Russian Federation	0.37	0.40	0.40	0.36	0.42	0.41	0.45	0.42		0.36
South Africa	0.29	0.34	0.32	0.30	0.32	0.42	0.38	0.32	0.36	

Source: Author's calculation based on OECD regulatory heterogeneity index.

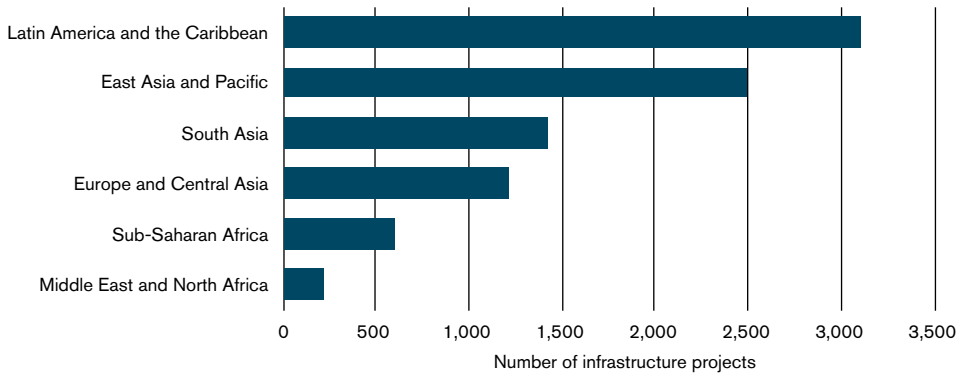
Note: The regulatory heterogeneity indices take values between zero and one. If two countries have the same answer on all the measures, their bilateral heterogeneity index is zero, and if they have a different answer to all measures, they have a heterogeneity index of one. The regulatory heterogeneity indices are aggregated by a simple average of the indices for different sectors. The indices for OECD countries are aggregated by taking the simple average of the indices for all OECD countries.

coupled with policies aiming at opening up to competition and liberalizing infrastructure-related services, could potentially reduce trade costs and foster services trade.

Infrastructure supports trade by reducing transport costs. High quality physical infrastructure – such as roads, railways, ports and airports – is crucial for the movement of both goods and people, bring services suppliers and consumers closer. The quality and the efficiency of the infrastructure system are important factors to boost trade and improve a country's trade performances. There has been a surge of studies documenting the importance of transport infrastructure. Several authors, such as Hummels (1999), Limão and Venables (2001), Glaeser and Kohlhase (2004), Redding and Turner (2015), find that transport infrastructure improvements have been the major cause of a general decline in direct transport costs. Although these studies mainly focus on trade in goods, the same trade costs would also affect services sectors and modes that involve movement of goods, consumers and services suppliers. The availability and quality of infrastructure are especially important in trade of services sectors in which mode 2 and mode 4 trade are important, such as tourism, education, healthcare and professional services.

According to the World Bank's Private Participation in Infrastructure (PPI) Database, close to 10,000 infrastructure projects were launched between 1990 and 2018 and only 2.2 per cent of these projects have been concluded. Figure D.12 shows the amount of investment in infrastructure in each region. Latin

Figure D.12: Investment in infrastructure differs across regions
Investment in infrastructure by region, 1990-2018



Source: Private Participation in Infrastructure (PPI) Database, World Bank

America and the Caribbean received 34.3 per cent of the total amount of investment in infrastructure, followed by East Asia and the Pacific (27.6 per cent), South Asia (15.8 per cent), Europe and Central Asia (13.4 per cent), sub-Saharan Africa (6.5 per cent) and the Middle East and North Africa (2.4 per cent).

ICT services are the main contributors to digital transformation. ICT services are provided via traditional copper wire technology, as well as mobile, fibre-optic, and satellite technologies. These technologies, individually and in combination, have enabled the internet to reach half the world's population. Cross-border trade in services largely depends on digital infrastructure as the channel for the transmission of information over the internet. Information and communications technologies are also the vehicles by which other innovative services, which deploy AI, cloud computing and the Internet of Things, can be delivered to businesses and ordinary consumers.

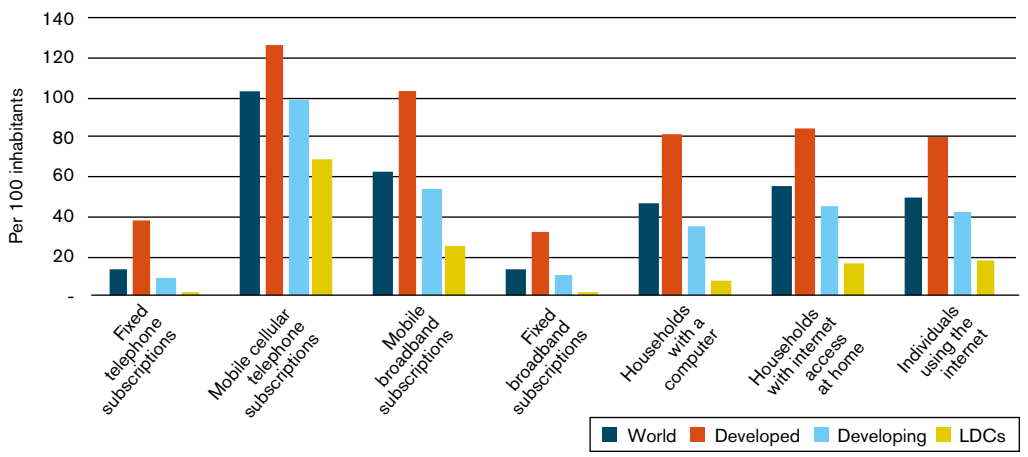
Digital development in developing and developed countries is based on the deployment of an internet infrastructure, but basic broadband coverage still constitutes a significant digital divide. Figure D.13 shows the access to digital infrastructure, such as mobile cellular, fixed broadband and mobile broadband, by development levels. Although connectivity has, in some respects, improved greatly over the past five to 10 years, major gaps still remain: while numbers of mobile cellular subscriptions are high in both developed and developing economies, mobile broadband subscriptions are at around 50 per cent in developing countries but at only 24 per cent in least-developed countries (LDCs). Only 42 per cent of individuals in developing countries and 18 per cent in LDCs use the internet, compared with more than 80 per cent in developed countries.

Developing economies hitherto not involved in services trade in a significant way can utilize investments in ICT infrastructure to make initial inroads into this increasingly important world market. Investments in telecommunications infrastructure can provide not only a short-term boost for the economy, but can also lay the groundwork for long-term improved growth and employment perspectives (Chavula, 2013; Wieck and Vidal, 2010). Investment in telecommunications infrastructure ranges from major long-term investments that include fibre-optic cables to connect a country or region, to fixed and wireless connections within a country, to connecting operators to each other, or to reaching end-users.

A reliable, comprehensive and affordable high-speed broadband network is central to competitiveness in the digital era. Developing countries have been fast catching up on broadband networks. Figure D.14 shows the evolution of mobile and fixed broadband subscriptions by development level from 2005 to 2017. Active mobile subscriptions in developing countries increased exponentially from 43 million to nearly 3,371 million between 2007 and 2018, and mobile subscription in LDCs also increased from nearly zero to 291 million during the same period. Similarly, from 2005 to 2018, fixed broadband subscriptions experienced an impressive growth in developing countries, from 71 million to 661 million.

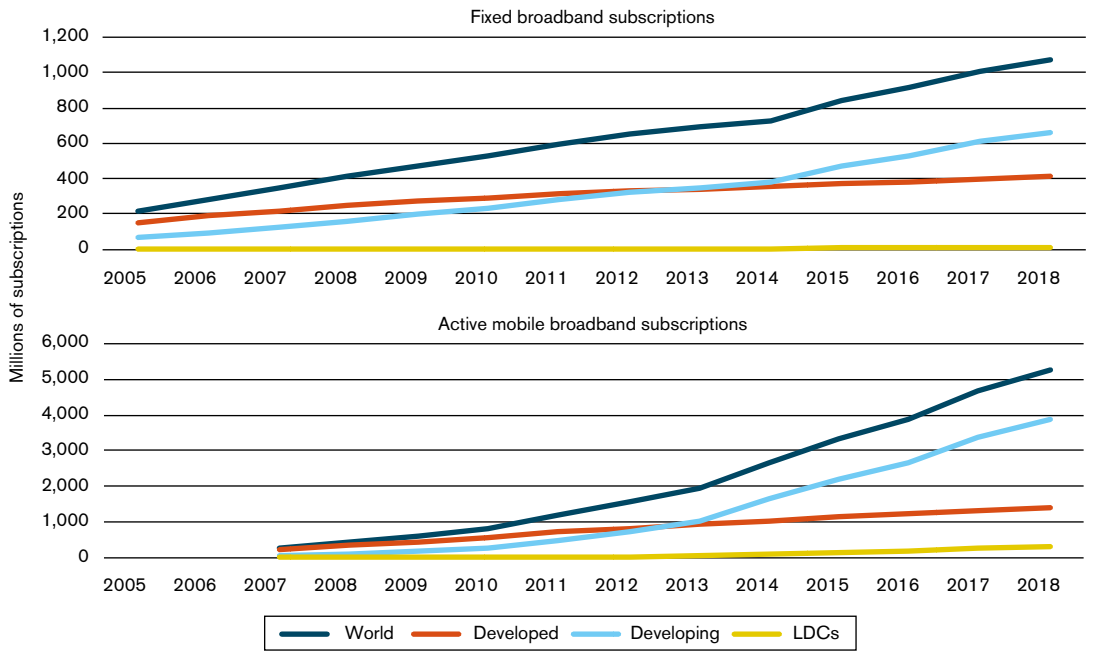
In 2018, fourth-generation (4G) services became the leading mobile technology, with 3.4 billion subscribers. As growth continues, particularly across

Figure D.13: Access to digital infrastructure differs according to development levels
ICT infrastructure per 100 inhabitants by development levels, 2017



Source: Author's calculation based on International Telecommunication Union (ITU) data.

Figure D.14: Broadband subscriptions grew exponentially over the past decade
Mobile and fixed broadband subscriptions by development levels, 2005-18



Source: Author's calculation base on ITU data.

developing markets, 4G is expected to reach 60 per cent of total mobile services in use by 2023. Meanwhile, high hopes are pinned on fifth-generation (5G) high-bandwidth mobile technology as a means of better quality connection of developing countries to the global economy that will allow them to enhance participation in e-commerce, trade in services and value-chains. Following commercial launches in the United States and South Korea towards the end of 2018, 16 more economies will have launched 5G networks by the end of 2019. By 2025, 5G services are predicted to be available in 116 markets (GSMA, 2019). The wide penetration of mobile devices, coupled with the development of mobile broadband, could bring new development opportunities.

Fibre-optic cables have been a significant enabler of connectivity, ensuring fast and reliable access to ICT and online services. As the majority of ICT services are at least partly delivered over fibre-optics, including mobile and fixed broadband, investment in and deployment of fibre-optics have become a policy priority for governments and mobile operators everywhere (Grijpink et al., 2018). The share of fibre-optic connections in total fixed-broadband subscriptions continues to increase in all regions, with the highest growth recorded in Asia and the Americas.

Technological advances in satellite technologies allows the provision of broadband capacity worldwide, permitting reliable connectivity to regions where other communication services are not readily available, and where the cost of their roll-out would be prohibitive. Satellites are an effective means of reaching remote and rural areas and can also be used by passengers in mobile environments, such as on aircrafts and ships. Once ranked as among the most expensive ICT services, the prices of satellite services have fallen as satellite construction has expanded and competitive pressures have taken hold.

However, investment in telecommunications infrastructure is not sufficient in itself to drive down the cost of digital transmission; government regulation plays an important role. Over the past decades, the telecommunications market has witnessed far-reaching changes, with the introduction of competition into a sector that was once principally a monopoly (ITU, 2016). Many WTO members have committed to allowing the establishment of new telecommunication companies, bringing foreign direct investment to existing companies and extending competition in basic telecommunications. Since the introduction of competitive markets for telecommunications, the availability of telecommunications services has increased, and costs have come down significantly over the past decades (Laffont and Tirole, 2001). For developing countries to reap the benefits of services trade, it is essential to provide digital infrastructure and maintain a competitive telecommunications market.

2. Major trends that will affect trade in services

Future patterns of trade in services will depend on what consumers will demand in the future, and on countries' patterns of specialization. Together with the future evolution of trade costs, digital technologies, demographic changes, predicted patterns of growth and climate change are some of the major global trends that will affect services trade. For each of these factors, this section will discuss how they can affect trade.

(a) How digital technologies will affect services trade in the future

As was discussed in Section D.1, digital technologies are the main force driving the reduction of trade costs in services, and they are fundamentally changing the ways in which business and trade are carried out. On the supply side, digitalization leads to a substantial decrease in the cost of entry, thus increasing contestability and spurring innovation. On the demand side, digitalization provides the consumer with a wider range of available varieties. All indicators point to the probability that digital technologies will continue to advance in the future (see Box D.4), thus raising expectations that these trends will continue to evolve in the future.

(i) Digital technologies will boost trade in services

Digital technologies have significantly contributed to the recent growth in trade in services (Loungani et al., 2017) and these trends are likely to continue in the future. In particular, in addition to reducing trade cost, digital technologies will boost trade in services through several channels.

Digital technologies will create new ways of delivering a service

As digital technologies evolve, traditional ways of delivering services are giving place to new ways of supplying services. As discussed in Section D.1, as trade costs in services fall, services that used to

Box D.4: Advancements in digital technologies are likely to continue in the future

Innovations in computer technology, digital communication and IT methods for management are growing at an impressive rate (see Table D.1). Over the last two decades, the global annual growth rate of patent publications for three digital technologies (computer, digital communication and IT methods for management) has been above the average growth rate of total patent publications. These trends were in parallel with the increasing use of these technologies and point at a further increase of their use in the future, as what is patented today will be used later.

Predictions on the future applications of 3D printing are going in the same direction. As the cost of 3D printing gradually decreases (WTO, 2018a), mainstream adoption of large-scale 3D printers (intended for use in enterprises) and small-scale desktop printers (acquired mainly by educational institutions and creativity hubs) is starting to take off (DHL, 2016).

As discussed in WTO (2018a), the exponential increase in the number of patents related to AI also suggests a large growth in the future use of this technology. Although many AI applications today are designed to perform relatively limited tasks (e.g. facial recognition or playing chess), the long-term goal is to create "general" AI which would outperform humans at nearly every cognitive task (WTO, 2018a).

Table D.1: Innovation in digital technologies grows fast
Patent publications, resident count by filing office

	Average annual growth rate 2000-17	Share of world total patent publication in 2000	Share of world total patent publication in 2017
Computer technology	8%	5.63%	7.72%
Digital communication	11%	2.20%	4.24%
IT methods for management	21%	0.52%	2.00%

Source: WTO Secretariat calculations based on the WIPO IP (i.e. intellectual property) Statistics Data Center, https://www3.wipo.int/ipstats/index.htm?tab=patent, accessed in March 2019.

Box D.5: Digital technologies give rise to new concepts, such as telemedicine and telesurgery

Telemedicine is the remote diagnosis and treatment of patients by means of telecommunications technology. Biometric measuring devices such as equipment monitoring heart rate, blood pressure and blood glucose levels are increasingly used to monitor and manage patients with acute and chronic illnesses remotely. This is likely to lead to healthcare services migrating from hospitals and clinics into patients' homes (WHO, 2009) and may increase the cross-border trade of healthcare services.

Telesurgery uses wireless networking and robotic technology to enable surgeons to operate on distantly located patients. This technology eliminates geographical and financial barriers that prevent timely and high-quality surgical intervention (Choi et al., 2018).

Avgousti et al. (2016) identify several challenges to telesurgery, such as the stability and security of networks, and legal and regulatory issues. Moreover, the current cost of acquiring and maintaining telesurgery systems is extremely high. However, as the challenges are resolved and the costs fall over time, such medical treatments are likely to flourish and benefit patients worldwide.

Unlike telesurgery, telepresence technology is already widely used in hospitals. Expert surgeons can mentor other surgeons in operating surgeries from a distance via cameras and microphones, thus allowing for higher quality medical treatments (Wall and Marescaux, 2013).

Fifth-generation networks (5G), by increasing internet capacity and improving data streaming, will enhance trade in services where data are time-sensitive, such as with telesurgery (ITU, 2018). This means that high-skill services such as medical services will be deployed faster and more accurately across borders through digital technologies. Not only will the services be of a higher quality, but some of the costs related to travelling will be unnecessary. Both of these trends point toward an increase in services trade.

be provided only through local presence in a single country begin to be supplied across borders. An increasing amount of professional services is being supplied across borders, and other services sectors may also benefit from digitalization. The advent of new digital technologies is likely to continue to allow more services to be delivered across borders, including services for which it was previously necessary to be face-to-face, for example telesurgery (see Box D.5).

Technological advancements may further bring down the information and transaction costs in international trade. Some researchers argue that blockchain technology, which provides a decentralized mechanism to verify the attributes of a transaction cheaply, promises to reduce networking and verification costs further (Catalini and Gans, 2016) and potentially reduce other trade costs, such as those related to coordination, transportation and logistics, financial intermediation and exchange rates (Ganne, 2018).

Digital technologies will create new services trade, often replacing goods trade

Digital technologies are blurring the distinction between trade in goods and services activities, while increasing the importance of data flows and intellectual property. We expect this trend to continue in the future as digital technologies develop and spread (Box D.6 discusses some of the challenges related to this trend).

First, digitalization has dramatically reduced the cost of creating, copying and accessing text, video content and music, leading to a gradual decline in the trade of physical products (WTO, 2018a).

In the music industry, consumer demand has shifted from physical records to digital downloads. There is a strong growth in subscription-based music-streaming services. The number of subscriptions quadrupled between 2014 and 2017 (WTO, 2018a). Goldman Sachs (2019) predicts that there will be 1.15 billion paying streaming subscribers globally in 2030, and that 68 per cent of those subscribers will come from emerging markets. According to the International Federation of the Phonographic Industry (IFPI, 2019), in 2018, 37 per cent of the recorded music industry (circa US$ 7 billion) was derived from paid streaming services. Goldman Sachs (2019) predicts that the overall annual global trade streaming revenues (including those funded by advertisements) will reach US$ 37.2 billion.

Second, platforms are increasing the demand for rental services. The current platform economy may be an intermediate phase between the traditional

Box D.6: Challenges to taxation arising from the digitalization of services activities

Issues raised by the digitalization of commercial activity have led to questions about the taxation, both domestic and international, of global service suppliers, particularly, but not only, in relation to international corporate taxation. The increasing use of digital technologies throughout the economy has given rise to the emergence of large firms that often provide services free of charge. Such firms are generally highly profitable, yet in many cases pay relatively little tax in any jurisdiction (IMF, 2019). Current discussions at the WTO offer another example. Some developing countries question whether the moratorium on applying customs duties to electronic transmissions should be maintained, due to concerns that, as cross-border trade in goods (e.g. books and CDs) gives way to digital downloads, they may be unable to make up for lost customs revenue.[25]

Features often associated with digitalization include a lesser need for physical presence, the provision of unremunerated services to customers, and hard-to-value intangible assets. Section C.1 showed how intangible assets have become an important source of value for many companies. In addition, user participation in social networks and users' generation of content, which are commercially valuable, have become increasingly common features of many digital companies. But if a digital company provides a service (e.g. via participation in a social network platform) without charging the user in return for personal information provided in the act of using it, the company makes no monetary gain from the consumer that is liable to taxation.

These features make it challenging for tax authorities to assess the tax liabilities of the individuals and companies concerned accurately and to collect revenues. However, these difficulties are not entirely new or unique, having long been a concern in non-digital contexts. For example, pharmaceutical companies traditionally have significant hard-to-value intangibles. Goods can be exported, and services provided, to a country in which an enterprise has no physical presence, without incurring any right for that country to tax the associated profits. Moreover, information about customers has long had commercial value (IMF, 2019).

Digitalization does not affect the nature of the problem, but it may exacerbate it, because digitalization further facilitates the internationalization of all aspects of business activities. In short, it becomes much easier for a company's shareholders, activities and customers to be located all over the world (Devereux and Vella, 2017). This raises the question of how taxing rights on income generated from cross-border activities should be allocated between different national authorities, and is a cause for concern about tax evasion or avoidance and possible erosion of tax bases. At the same time, in a cross-border setting, governments also face the complexity of trying to avoid double taxation and unintended non-taxation, for example arising from inconsistencies in the application of indirect taxes on services (Aslam and Shah, 2017).

In response to the emerging perception that digital companies are not carrying their fair share of the tax burden, governments are seeking to find equitable solutions. For instance, the European Commission estimates that the effective average tax rate for digital companies is 9.5 per cent in the European Union, which is less than half the rate for traditional companies (European Commission, 2018). As a result of these concerns, several economies have introduced digital services taxes (DST). For example, the European Union and the United Kingdom focus on social media, search engines and intermediation services; India, Chile and Uruguay have opted for withholding or equalization taxes on payments for advertising and other specified digital services made by residents to non-resident companies; and Benin, Tanzania, Uganda and Zambia have recently introduced taxes on the use of certain digital services (IMF, 2019). These DSTs aim at protecting and expanding the tax base in the country in which customers or users are located (OECD, 2018a). However, there is concern that such unilateral actions could reduce investment and innovation by technology companies and therefore adversely affect economic growth.

While tax authorities do face challenges, digitization can also contribute to expanding the tax base. For instance, online platforms that facilitate person-to-person services (e.g. Airbnb or Uber) can channel transactions that were conducted in the past from the informal economy to the formal economy and that make them more transparent to tax authorities (Devereux and Vella, 2017). Indeed, governments have become aware of the need to clarify tax obligations for users of person-to-person services, and some have already issued specific guidance. They have also recognized the potential benefits of access to the large amount of information held by digital platforms for enhancing compliance (Aslam and Shah, 2017).

Box D.6: Challenges to taxation arising from the digitalization of services activities *(continued)*

Digitalization can also help to alleviate information constraints that contribute to opportunities for tax avoidance and evasion. Governments can use digital technology to achieve better ways to verify the true income of taxpayers and to link existing information more easily in various parts of the tax system. In this way, digitalization can potentially improve tax enforcement. This can allow governments to raise the same revenue with lower taxes and more efficiently, or to raise more tax revenue with the same taxes. It can also allow governments to implement more sophisticated tax systems (Jacobs, 2017). Kenya, for example, has digitized its tax administration. The financial inclusion reforms in Kenya that were made possible by technology advances such as mobile money and banking, have also made possible the development of the iTax system adopted by the Kenya Revenue Authority (Ndung'u, 2017).

With the international tax system in a state of flux, ideas for far-reaching reform are gaining traction. Digitalization has probably increased the awareness of the authorities that the roots of taxation problems, e.g. vulnerability to avoidance and pressures from tax competition that pre-existed digitalization, need more urgently to be addressed. The destination-based cash flow tax has been widely discussed in the United States, and residual profit allocation schemes proposed by the European Commission, United Kingdom and United States (IMF, 2019). Also, countries are being encouraged to adopt an internationally coordinated response. This has led to on-going discussions in international fora such as the OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting (BEPS) Project, which currently involves 110 economies, to consider what changes in international tax rules may be necessary as a result of digitalization.

past model of ownership and a future model in which everything is a service. PwC (2016) estimates that total transactions for Europe's five key platform economy sectors – collaborative finance, person-to-person (P2P) accommodation, P2P transportation, on-demand household services and on-demand professional services – could see an increase from €28 billion in 2016 to €570 billion by 2025. Platform economy could replace traditional rentals and ownership of a wide range of goods (Wallenstein and Shelat, 2017).

For example, the growing expectation is that car ownership will decline as transportation becomes a widespread service-on-demand (Araya, 2019). Some survey results point out that the impact of platform economy on the demand of durable goods may be negative. For example, one YouGov survey (Smith, 2018) says that 43 per cent of Londoners believe that services like Uber are a genuine alternative to owning a car. Di et al. (2017) look at users' responses to an online survey completed by 1,840 former Uber and/or Lyft users in Austin, Texas further to the suspension of Uber and Lyft services. The survey revealed that the majority of respondents switched to a personal vehicle (45 per cent). Self-driving vehicles will further increase the likelihood of ride-sharing. According to Wallenstein and Shelat (2017), by 2030, one-quarter of the miles driven in the United States will be driven in shared self-driving cars, thus decreasing incidences of car ownership. Self-driven cars could potentially affect many services sectors, such as insurance, logistics, tourism, transportation and healthcare services (Garret, 2017).

Third, 3D printing is fostering trade in software design rather than final products. Through smart apps, firms can scan any product and turn it into a digital design file. Then the consumer can view and configure it before picking up the product, which is produced via 3D printing (A.T. Kearney, 2015). Increases in the cross-border transmission of data as a service to produce goods in a particular location with technologies such as 3D printing could spur services trade. As mentioned in Section B, the construction sector is increasingly making use of 3D printing by sending construction designs to distant locations through digital networks. In addition, some manufacturing-related services such as trade finance, transport and logistics may decline, but other 3D printer-related services like installation, repair and design could increase.

Digital technologies will allow firms to exploit economies of scale and scope

Digitalization allows firms to reach larger numbers of digitally connected customers across the globe and facilitates outsourcing of activities for easier scaling of production. Services based on digital content tend to

have near-zero or marginal costs of distribution, while firms selling such services can respond to the growing demand more easily than those engaging in traditional trade with physical production and delivery constraints.

However, there have been growing concerns about market concentration in the digital era. Digital markets differ from conventional markets due to three significant forces: network effects, switching costs and "scale without mass" (WTO, 2018a).

Network effects pertain to the increase in the value of the network for all participants that arises from each additional user, which makes large digital platforms indispensable to achieve an efficient utilization. Take the online social media platform Facebook as an example: a user's decision to join the social network will be based on the number of other users that are already using the platform.

High switching costs means that the more consumers use an online service and provide data to this service, the costlier and the harder for them to switch away.

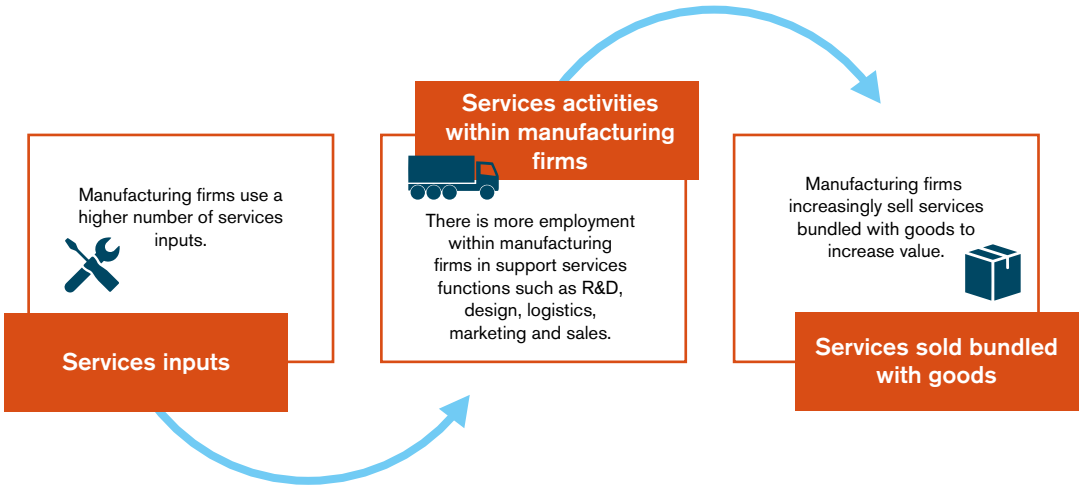
Finally, the "scale without mass" feature of digital platforms allows companies to add new users vastly at no cost (OECD and WTO, 2017). Once a platform reaches a critical mass of users and establishes a dominant position in a market, it is hard for new potential entrants to challenge its market power.

Digitalization is also changing the scope of the activities that firms undertake. Digital retailers, traditionally connectors of international demand and supply through matching services, are increasingly providing complementary warehousing, logistic, e-payment, credit and insurance services. Meanwhile, some ICT hardware firms are moving away from manufacturing activities to provide cross-border network-based services linked to the manufactured products. For instance, IBM sold its hardware branch to focus on the provision of services such as its AI solution, Watson. Since its introduction, Watson has been applied to almost everything, from customer service to scientific and business modelling. It is an innovative breakthrough that is paving the way for applied AI (McGregor, 2019). Although AI is currently confined to relatively narrow tasks, its importance is expanding globally. It has already been incorporated into many services, from online searches and translation services to real-time traffic predictions and self-driving cars (UNCTAD, 2017a). This means it is expanding the scope of services that firms can offer and will eventually stimulate trade in services.

(ii) Digital technologies will affect the services component of global value chains

Services make up an important component of manufacturing. In addition to services bought as inputs, there are also services activities within manufacturing firms (Miroudot and Cadestin, 2017). The manufacturing sector is increasingly reliant on services, whether as inputs, as activities within firms or as output sold bundled with goods (see Figure D.15). Services are redefining the way manufacturing companies produce value. In the

Figure D.15: The manufacturing sector is increasingly reliant on services
Services in global value chains: from inputs to value-creating activities



Source: Miroudot and Cadestin (2017).

digital era, services are part of a business ecosystem in which collaboration with customers, partners and contractors is the key to innovation and productivity (Miroudot and Cadestin, 2017).

Digital technologies will play an important role in the future of global value chains (GVCs) and services trade. They are likely to affect the nature, complexity and length of value chains in the future. Two opposing forces may affect GVCs in the future.

On the one hand, digital technologies can generate longer value chains and increase foreign services value-added component of trade. This is because digital technologies can reduce costs that negatively affect GVCs and can increase the quality and availability of services which are enablers of value chains. For example, the Internet of Things, AI and blockchain technology can lead to more efficient delivery and logistics services (Lund et al., 2019).

On the other hand, AI, 3D printing and advanced robotics could reduce the role of labour as a source of comparative advantage, thus reducing international sourcing with intermediates and services increasingly sourced domestically in developed economies. Consequently, international trade in services might decrease. From a global perspective, this may lead to a stronger regionalization of production and shortened global value chains or reshoring (OECD, 2017a).

Despite speculation about automation and reshoring, there is no sign indicating a shortening of GVCs. Figure D.16 shows that overall share of foreign services value-added in world gross exports shows no significant decline and is slightly increasing. The results of the simulations conducted in WTO (2018a) go in the same direction. To the extent that services trade goes hand-in-hand with the evolution of GVCs, this result implies that we should not expect a negative impact from reshoring of manufacturing activity on services trade.

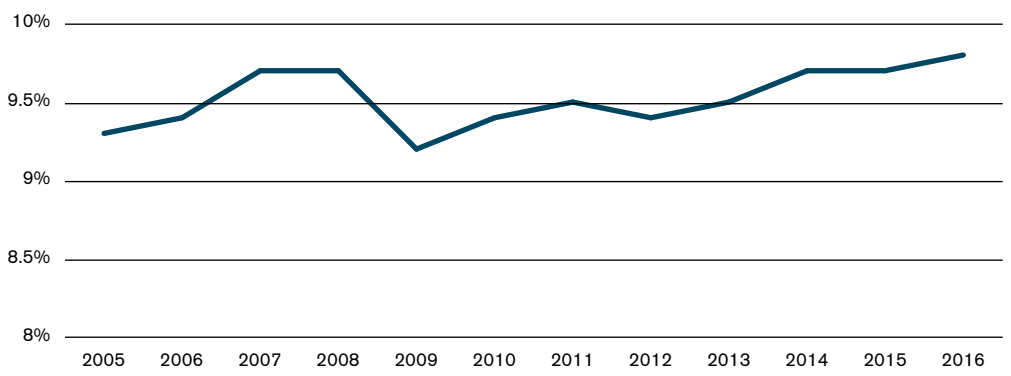
(iii) Digital technologies will create opportunities for inclusive trade

Digital technologies are helping countries to achieve inclusive growth by increasing services trade. Digitalization is an opportunity for many developing countries to overcome trade challenges with respect to their geographical, physical and locational conditions. New digital technologies have allowed some countries to overcome some traditional barriers. Landlocked developing countries are able to develop alternative areas of dynamic comparative advantage, such as modern business services, for which distance and physical conditions does not matter and which can bring economic growth, job creation and social development (UNCTAD, 2014). Border processes, geographical factors and physical infrastructure may become less relevant in the future, benefiting remote or landlocked countries aiming to enter new markets.

Ghani and O'Connell (2014) argue that, as services produced and traded across the world expand with advancements in technology and globalization, the possibility for low-income economies to grow faster increases. African countries can sustain service-led growth because there is enormous space for catching up and convergence (see Box D.7).

Figure D.16: The share of foreign services value-added in world gross exports is stable and is even slightly increasing

Share of foreign services value-added in world gross exports, 2005-16



Source: Trade in Value-Added (TiVA) database.

Box D.7: Fintech in sub-Saharan Africa

Financial intermediation and financial inclusion in sub-Saharan Africa remain low. However, mobile money has underpinned a radical change in the financial services delivery. Consequently, the region has become the global leader in mobile money innovation, adoption, and usage: around 40 out of 45 sub-Saharan African countries actively use this financial technology, or fintech (Lukonga, 2018). Mobile money account penetration in sub-Saharan African countries recorded a remarkable increase of almost 20 per cent between 2011 and 2014, largely driven by on-going financial innovation. Today, 12 per cent of adults (64 million people) in sub-Saharan Africa have mobile money accounts (compared to just 2 per cent worldwide), and 45 per cent of them have only a mobile money account. As the newly banked population becomes connected to mobile payments, it will become easier for them to participate in global trade, either as consumers or as businesses.

Today, Kenya is one of the economies with the highest use of mobile money, at 53 transactions per adult per year. This success is largely due to M-Pesa, a mobile phone-based money transfer system launched in 2007 by Safaricom and Vodacom. The service allows customers to deposit and withdraw money, transfer money to other users, or pay bills. The service quickly expanded to other countries in sub-Saharan Africa. As of end-2016, the service had almost 30 million users worldwide, of which 20.7 million are in Kenya. Several reasons contribute to the high success of this service. First, the low level of financial market infrastructure (branches, automatic teller machines, payment systems) generates a large unfulfilled demand for payment services in a market segment with a relatively large level of access to mobile devices. Second, an appropriate pricing strategy to attract customers and stores in tandem, and the deployment of a reliable and trustful network, are critical for success.

Digital technologies reduce information asymmetries, increase inclusiveness and encourage more services trade. Increasing the cross-border tradability of professional services and sectors such as healthcare, education and social work, where women are disproportionally employed (see section B.3), will allow more women to join the labour force (see Box D.8).

To conclude, digital technologies have the potential to benefit services trade in economies at all stages of development. Traditional factors such as geography and physical infrastructure, in which developing economies might lag behind, are likely to become less important for digitally enabled services. On the other hand, digital infrastructure, in particular a reliable and affordable high-speed broadband network will become a central factor for competitiveness, which can create opportunities for developing countries which invest in such digital infrastructure.

Regulations will also matter. Digitalization of trade can magnify the importance of institutions, in particular the regulation of data flows. Privacy, personal data protection and web content restriction policies will play an important role in this regard. The importance for intellectual property rights (IPRs) regulation for services trade is bound to increase in the digital age because many digital products are replicable at zero cost and are of a non-rival nature, i.e. they can be consumed by an indefinite amount of people at the same time without a loss of utility. The IPR regime is likely to be a key factor affecting countries' participation in the future of services trade.

(b) Demographics and new opportunities for services trade

The world's population is projected to reach 9.8 billion by 2050, concentrated mostly in developing countries (UNDESA, 2017). As shown in Figure D.18(a), low fertility rates and long life expectancy in developed countries will result in an ageing population (65 years and over) and shrinking labour force (20-64 years), while, as highlighted in Figure D.18(b), in developing countries, high fertility rates and low mortality rates will lead to growth in all population groups. In developed countries, the 65 years and older age group is set to constitute 27 per cent of the total population by 2050 compared to only 14 per cent for developing countries. These demographic changes will have a significant impact on global services consumption, production and trade patterns. A rapidly ageing population in developed countries is likely to require more healthcare services, while a growing young population in developing countries will require more education services. The change in global demographics will affect trade in services through two main channels: by changing the level and composition of import demand, and by changing comparative advantage.

Box D.8: Digital technologies provide new opportunities for women in services occupations

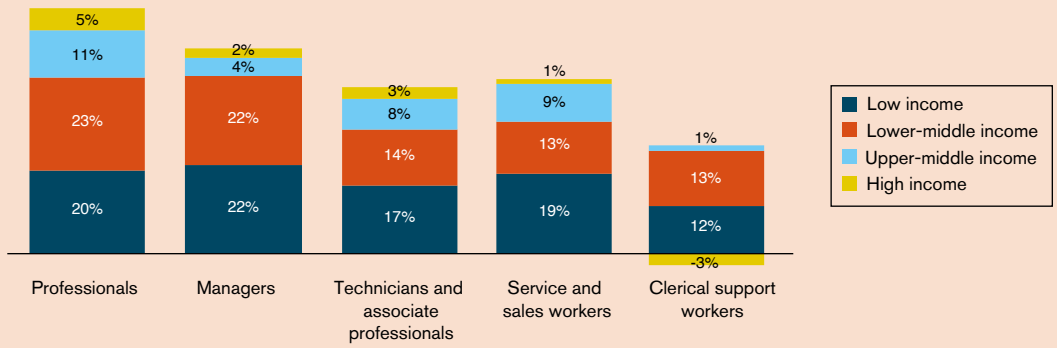
As women tend to work in the services sectors (see Section B), increasing women's participation in the formal labour force will increase services labour supply. Figure D.17, based on projection by the International Labour Organization (ILO), shows that increasing numbers of women will be working in high-skilled jobs in 2022 compared with today. In particular, more women will work in professional services such as accounting, law and medicine. On the other hand, the number of women working in low-skilled jobs, such as clerical support occupations, is likely to decrease in high-income countries, a decrease which could be attributed to the automation of clerical support occupations in high-income countries.

New technologies will also make the cross-border trade of professional services easier, which will bring more economic opportunities for women. In Upwork, an online marketplace for freelancers to provide services, 44 per cent of the workers are women, compared to an average of 25 per cent of the non-agricultural economy globally (World Bank, 2016). Airbnb, an online marketplace for hospitality service, estimates that more than 1 million women host on Airbnb, making up 55 per cent of the global Airbnb host community. In addition, women hosts on Airbnb rent out 20 per cent more lodgings than men, with a higher percentage of the women hosts reporting part-time employment and earning lower incomes outside of the hosting activity (Airbnb, 2017).

The kinds of services provided online extend to other areas such as medical and education services. In an analysis of online therapy services, Chester and Glass (2006) documented the rising number of female counsellors online relative to male counsellors. Female and male counsellors are now equally represented online. Such changing gender proportions may reflect the general increase in women's use of the internet over the years. Women are also discovering new opportunities in online teaching. Kim and Bonk's (2006) survey results showed that the number of female instructors online had increased dramatically over a few years. More than half of the respondents (53 per cent) were women, compared to a similar survey conducted a few years earlier, which was dominated by male instructors.

Figure D.17: The number of women in high-skilled jobs is increasing

Change in relative concentration of women, by services occupations and by income group, 2018-2022



Source: WTO calculations based on ILO (2019).

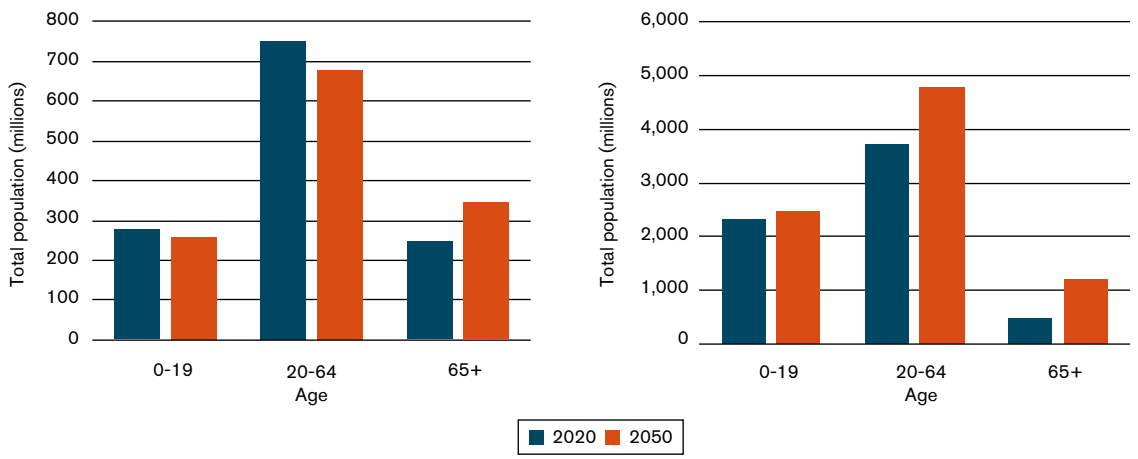
(i) Demographic structures and the composition of services demand

There is evidence that the contribution of a population's age structure on the aggregate preferences of households is nearly as important as income (Addessi, 2018). Given the significant changes predicted in demographic projections, we should expect demographic patterns to drive the composition of future demand for services, as per Figure D.19 which shows services expenditure by age group for the United States in 2017. The 65 and older age group, typically in retirement, spend more on real estate (29 per cent), insurance (22 per cent) and other services (17 per cent). Education expenditure decreases in the 65 and older age group (4 per cent) but is high for the under-25 age group (20 per cent).

Although it does not show in Figure D.19, which is limited to private household expenditure in the United States, the impact of ageing on health expenditure is evident when private and public aggregate

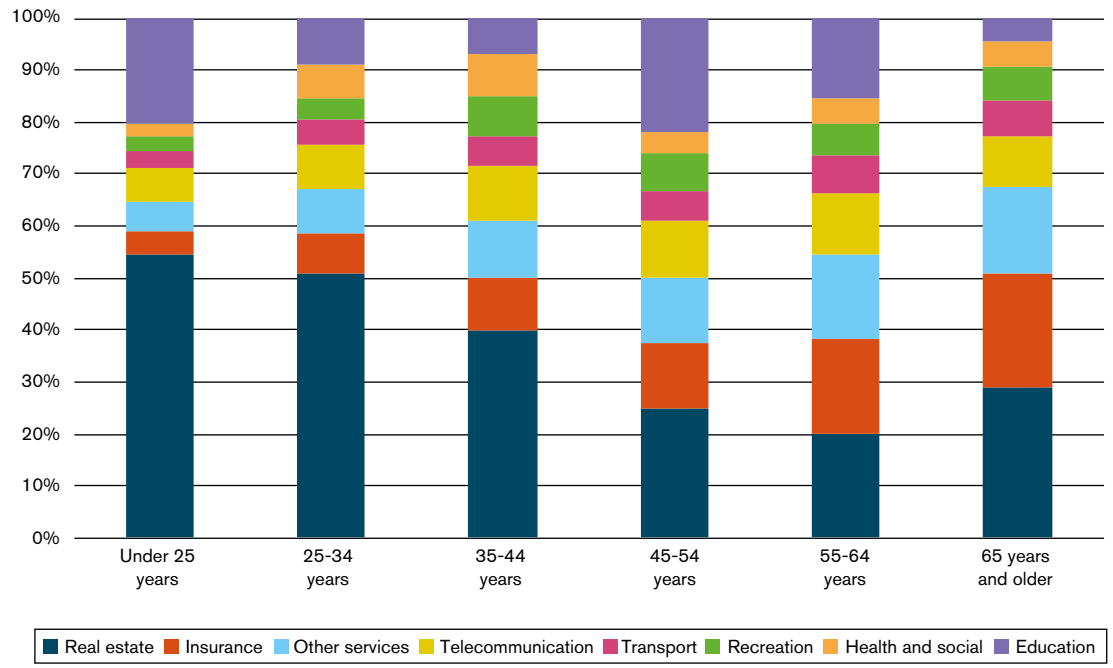
Figure D.18(a): The population in developed countries is ageing
Population demographic projections in developed countries, 2020 and 2050

Figure D.18(b): The young population in developing countries is growing
Population demographic projections in developing countries, 2020 and 2050



Source: WTO calculations based on United Nations Department of Economic and Social Affairs (UNDESA), Population Division data.

Figure D.19: Expenditure on services differs by age group
Share of overall household expenditure in the United States, 2017



Source: WTO calculations based on US consumer expenditure survey.

Note: "Other services" include financial and business services, hotels, restaurants, renting, motor vehicle maintenance and repair, construction and insurance services.

expenditure are taken into account. Figure D.20 shows the positive correlation between the old age dependency ratio[26] and the share of aggregate expenditure on health services for 40 economies between 2000 and 2014. As the old age dependency ratio increases, the share for aggregate health expenditure also increases. Colombier and Braendle (2018) provide robust evidence that population ageing is an important determinant of total healthcare services for Switzerland, but only when both private and social care are taken into account (Colombier and Braendle, 2018). Regression results presented in Table D.2 also highlight the impact of old age on aggregate health expenditure. The regression results show the impact of the old age dependency ratio on health and education expenditure. The regression was run on an aggregate share of health and education expenditure data collected from the World Input Output Database (WIOD) for 40 economies. The regression equation included population, GDP per capita, child dependency ratio and old age dependency ratio. The results suggest that, as the number of people aged 65 and above increases by 1 per cent, both the public and private share of health expenditure increases by 0.29 per cent.

Figure D.20: The correlation between the old age dependency ratio and aggregate health expenditure is positive

Relationship between old age dependency ratio and aggregate health expenditure for 40 economies between 2000 and 2014

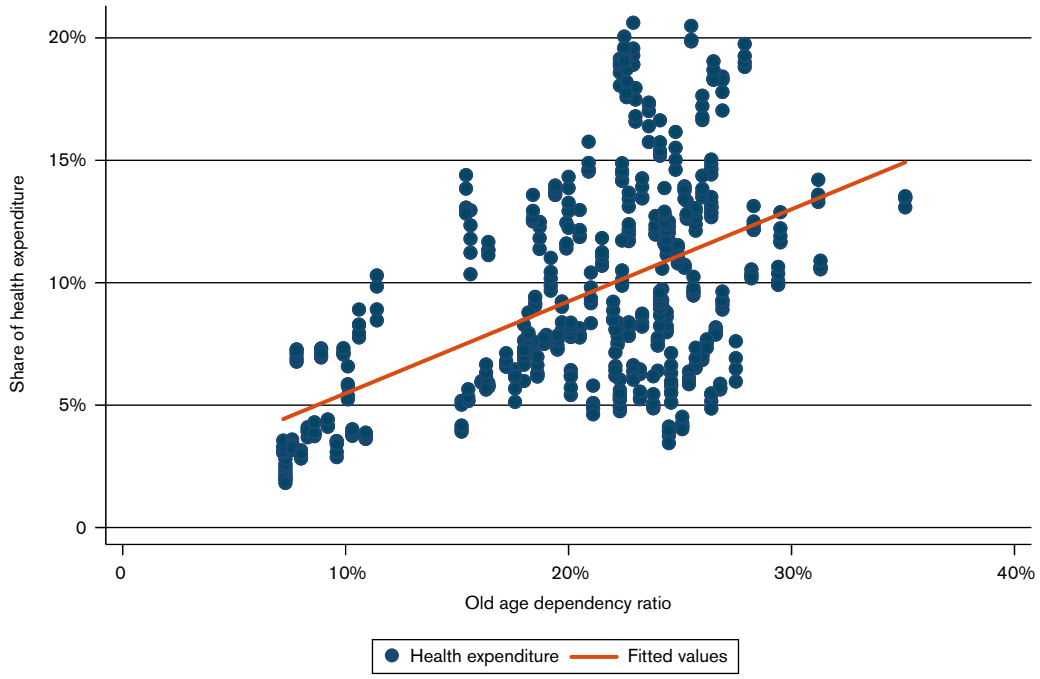


Table D.2: The old age dependency ratio increases the share of aggregate expenditure for health and education

Regression results

	Health	Education
ln GDP per capita	0.240*** (6.08)	0.124*** (3.97)
ln population	0.691*** (8.28)	0.585*** (8.90)
ln old age dependency ratio	0.289*** (3.87)	-0.0850 (-1.45)
R^2 N	0.500 560	0.244 560

t statistics in parentheses - * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: WTO calculations based on the World Input Output Database (WIOD), 40 economies between 2000 and 2014.

The growing demand for healthcare services is also reflected by the growth of health services occupations in developed countries. In the United States alone, five of the top ten fastest growing occupations are related to healthcare, and these occupations include home health aides, personal care aides, physicians' assistants and nursing practitioners (US Bureau of Labor Statistics, 2019), as highlighted in Figure D.21. A similar trend is also observed in the European Union, where employment of health associate professionals is expected to increase by 10.38 per cent between 2016 and 2030 (Cedefop and Skills Panorama, 2019).

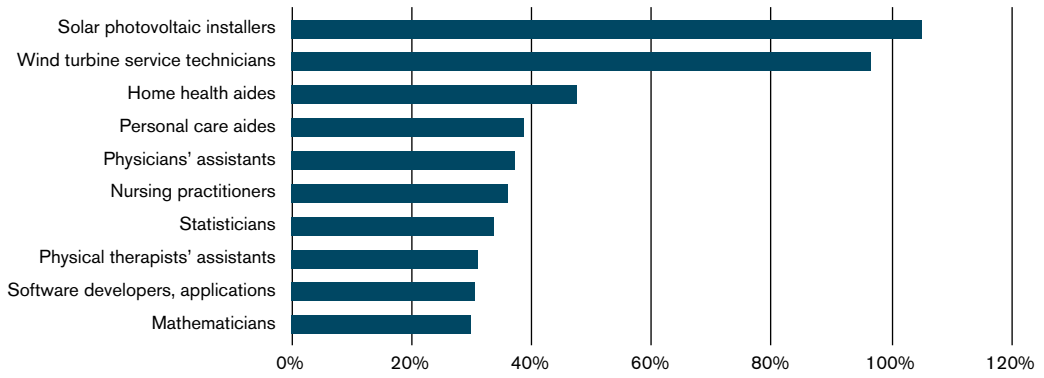
As healthcare demand outpaces healthcare supply in developed countries, supply of these services is likely also to come from developing countries where there is a large working-age population. Mobility of people and the increasing remote delivery of health services through digital technologies are likely to satisfy this demand. Currently, the mobility of health workers is satisfying this demand. Between 2010 and 2011, the Germany, the United Kingdom and the United States had a significant proportion of foreign-born nurses (over 10 per cent) (OECD, 2015). Asian economies were the world's top suppliers of emigrant doctors and nurses. Among these economies, small and island economies show the highest outflows of health services providers. Between 2010 and 2011, doctors and nurses who had emigrated to the OECD area accounted for 20 per cent of the estimated healthcare workforce needs in their countries of origin (OECD, 2015). This mobility trend for health workers is likely to continue and increase as ageing increases in developing countries and the movement of healthcare workers will depend on other factors such as immigration policies, which are further outlined in Section E (Box E.5).

While developed countries are experiencing rapid ageing, developing countries have a large young population and fast-growing working-age population. Demographics of developing countries are largely divided between countries in the first demographic transition stage (when mortality starts declining while fertility remain high, thus population increases and becomes relatively younger), mostly LDCs, and countries in the second stage (characterized by a declining fertility and an increase in the working-age population), that are now benefitting from the demographic dividend.[27] The population of LDCs is projected to increase from 1 billion in 2017 to 1.9 billion in 2050, with their populations largely skewed towards the younger age group. Developing countries in the second demographic stage have a growing working-age population and some of them are now benefitting from the demographic dividend.

Developing Asia has the largest working-age population. For example, China's consumer working-age group (15-59) is set to increase by 100 million people and will be one of the largest services consumer markets by 2030 (Dobbs et al., 2016). This age group in the wealthier category is already spending one-quarter of their consumption on dining out, recreation and education (Dobbs et al., 2016). Education expenditure is also increasing as this age group includes people who start having families and sending their children to school. Typically, in this age group, there are individuals who are starting families and moving away from their parents' homes, leading to an increase in the demand for housing and for the basic utilities that come with housing. As individuals find employment, demand for transport also increases as individuals commute to and from work and travel for other activities. Figure D.22 shows the household services consumption composition

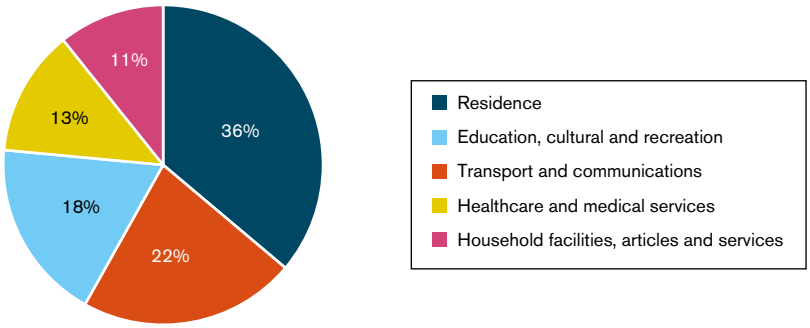
Figure D.21: Five of the top 10 fastest growing occupations in the United States are related to healthcare

Top 10 fastest growing occupations in the United States 2016-26, projected occupation growth



Source: WTO calculations based on 2019 data from the US Bureau of Labour Statistics.

Figure D.22: The most consumed services in China are housing, transport and communication
China's aggregate household services consumption, 2017



Source: WTO calculations based on data from National Bureau of Statistics of China.

for China in 2017, with the largest services consumption being housing, transport and communication.

Education expenditure is also increasing for some Asian economies. There is an increase in Asian students obtaining higher education in OECD countries, and one of the factors driving this demand from Asia is changes in export markets demographics. Most Asian students tend to study in the United States, which is the highest tertiary education exporter, but Australia, Canada, the Republic of Korea and New Zealand are also becoming common tertiary education exporters (Beghin and Park, 2019). In the future, as new technologies allow easier delivery of online education services across borders (see Box D.9), we should expect an increase in education services trade.

Box D.9: Trade in online education services will increase with more interactive digital technologies and a growing young population in developing countries

Education services have been affected by a reduction in trade costs and new technologies. Developing countries have a large young population and the demand for education services is higher in these countries. The low trade costs and new technologies will likely increase education services trade between developed and developing countries.

Online courses ensure open access and unlimited participation via the internet. In addition to traditional course materials, such as recorded lectures, readings and problem sets, many online course platforms provide interactive courses with user forums to support community interactions among students, professors and teaching assistants, as well as immediate feedback to quick quizzes and assignments. New technologies to improve broadband transmission and enhance personalized learning experiences will usher in a new wave of online education in the future. Students from developing countries and remote areas have the opportunity to learn from top university professors through online videos and interactive assignments, often at a fraction of the normal university tuition. The global online course market is projected to grow from US$ 3.9 billion in 2018 to US$ 20.8 billion by 2023, with an annual growth rate of 40.1 per cent (Docebo, 2016). Chuang and Ho (2016) report that 71 per cent of the students taking courses on Harvard's and MIT's online course facilities are from outside the United States.

Delivery of education services has already been heavily influenced by 4G networks, which has improved download speeds sufficiently to allow teachers to deliver online learning material, such as videos, and digital platforms. Broadband, mobile and internet services and the next generation of mobile broadband (5G) permit personalized online lessons to suit students' different learning styles. The addition of virtual reality and augmented reality technologies have the potential to engage and motivate learners to explore material from a variety of differing perspectives and could prove a key component in future learning environments (Kerawalla et al., 2006; Wu et al., 2013). As the quality of online education continues to improve, more individuals will enrol in online education, offering new opportunities for cross-border trade in education services. These new opportunities for cross-border trade in education service are likely to benefit developing countries through knowledge diffusion at low costs, and thus contribute to human capital development in developing countries.

(ii) Generational preferences and the Generation Z demand for online services

Along with changes in demographics, generational preferences will also play a significant role in shaping services consumption. Millennials (born between 1980 and 1996), Generation Z (born between 1997 and 2012) and the New Generation (born after 2012), having lived in a mostly digital world, are likely to increase the demand for online and on-demand services. By 2030, Generation Z and the New Generation will constitute more than 50 per cent of global population (see Figure D.23) and their consumption of social media and on-demand services will increase services trade through digital platforms.

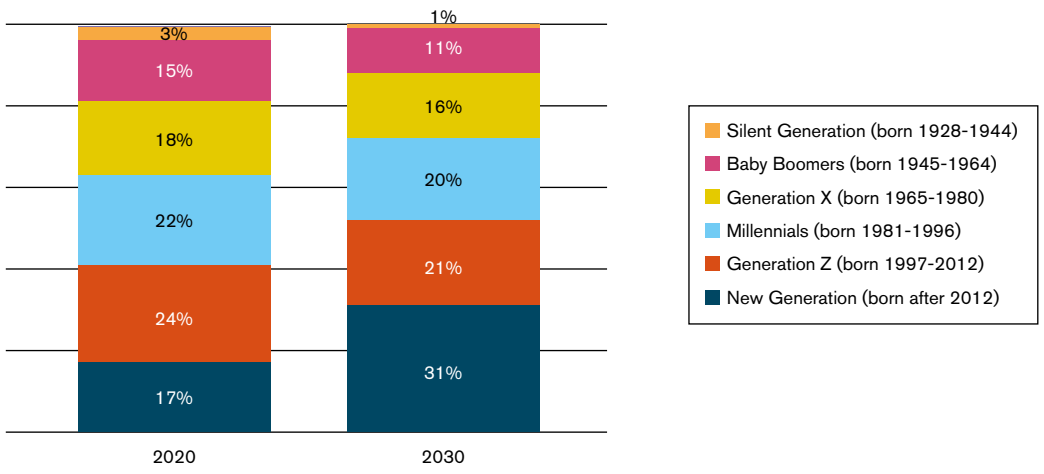
Past consumption trends show that Millennials and Generation Z tend to be the greatest consumers of digital services, in particular sharing applications, social media and on-demand services. According to a global survey by Nielsen (2014), 42 per cent of Millennial and Generation Z respondents are likely to rent products in shared communities compared to 17 per cent of global Generation X respondents (those born between 1965 and 1980) and 7 per cent of global Baby Boomers (i.e. those born between 1945 and 1964). The use of digital platforms will facilitate services trade, particularly in entertainment and renting services, allowing users to rent out their products and services on various platforms to consumers in different markets. If current generational trends persist, the consumption of social media services is likely to increase in the future. Currently nearly 98 per cent of digital consumers are social media users, which makes social media platforms influential in the consumption of services such as video- and music-streaming (GlobalWebIndex, 2018).

Figure D.24 shows the average number of social media accounts per internet user by age group. Millennials and Generation Z constitute, on average, have more than 9 social media accounts. They also represent more than 50 per cent of the users of major social media platforms and spend, on average, more than 2 and half hours per day on social media, compared to one hour for Baby Boomers (GlobalWebIndex, 2018).

As demand for these online services increases, cross-border services trade is also likely to increase in the future. Online video content streaming is a growing trend, largely among Millennials and Generation Z, but also in the other generational groups. There is an increased preference for streaming videos rather than using traditional video mediums such as DVDs. Netflix and YouTube are the largest video streaming services providers globally. Netflix offers its services to subscribers that pay a set monthly fee for their streaming content, while YouTube offers free access to its streaming service. Both streaming platforms have a wide global reach and are fast becoming the main exporters of creative content for various artists in both developed and developing countries. These streaming services are an opportunity for artists in developing countries, in particular, to export their creative content to international markets at low costs (see Box D.10).

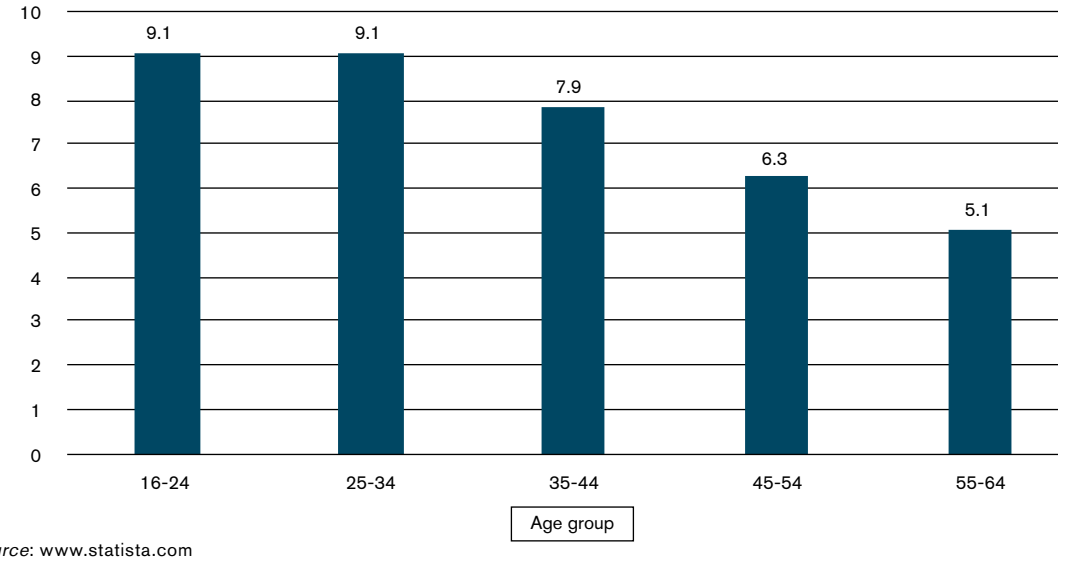
Figure D.23: By 2030, Generation Z and the New Generation will constitute more than 50 per cent of the global population

Population composition by age group in 2020 and 2030



Source: WTO calculations based on data from UNDESA.

Figure D.24: The New Generation and Generation Z are the most active users of social media accounts
Average number of social media accounts per internet user by age group, 2019



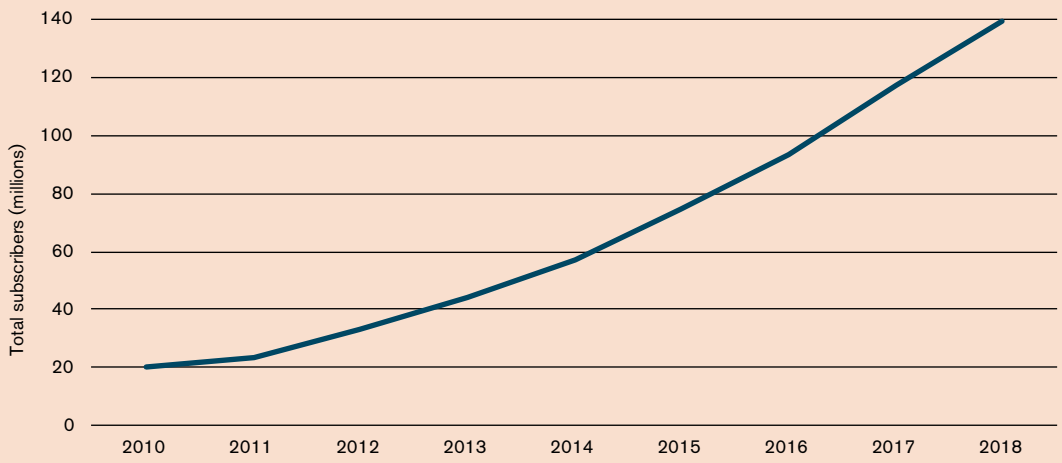
Source: www.statista.com

Box D.10: Online video content streaming

Netflix

Netflix is the largest global subscription internet television network. The streaming platform offers video entertainment streaming for a monthly subscription fee. Since Netflix launched in international markets in 2010, its subscriptions have continued to grow, from 20 million subscribers in 2010 to 139 million subscribers in 2018 (see Figure D.25). In contrast, traditional Netflix DVD rental services have declined over time as the number of online streamers increases.

Figure D.25: Total Netflix subscriptions have been increasing
Total Netflix subscriptions, 2010-18



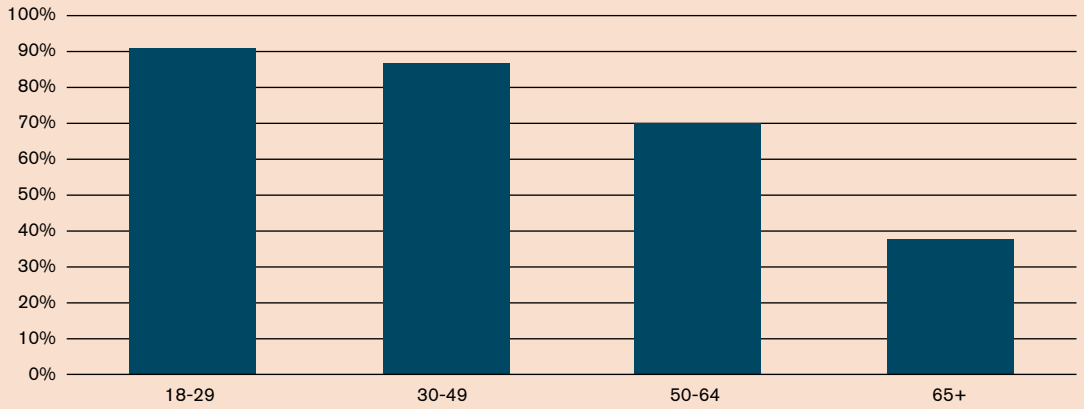
Source: WTO calculations based on data from Netflix.

Box D.10: Online video content streaming *(continued)*

YouTube

YouTube has over 1.9 billion logged viewers every month, viewing over a billion videos every day in 91 economies and 80 languages.[28] As per Figure D.26, younger age groups are the main users of YouTube video streaming services in the United States, with 91 per cent of the population between 18 and 29 years using YouTube compared to 38 per cent for the 65 and over age group. YouTube also offers content creation opportunities for individuals in both developed and developing countries. Artists in developing countries have been able to use YouTube as a platform to export their creative content to different countries. The platform is now offering streaming services for artists through its Official Artist Channels. YouTube also started the "YouTube Music Foundry" programme in 2016 to provide workshops to artists from various economies on content creation. This service has benefitted artists from various countries, including Belgium, Ghana, Japan, the Republic of Korea, Mexico, Nigeria, Puerto Rico and the United Kingdom.

Figure D.26: Younger generations make the most use of YouTube in the United States
Percentage of people in the United States that use YouTube by age, 2019



Source: WTO calculations based on data from the Pew Research Center.

(c) Rising incomes favour a shift towards services activities

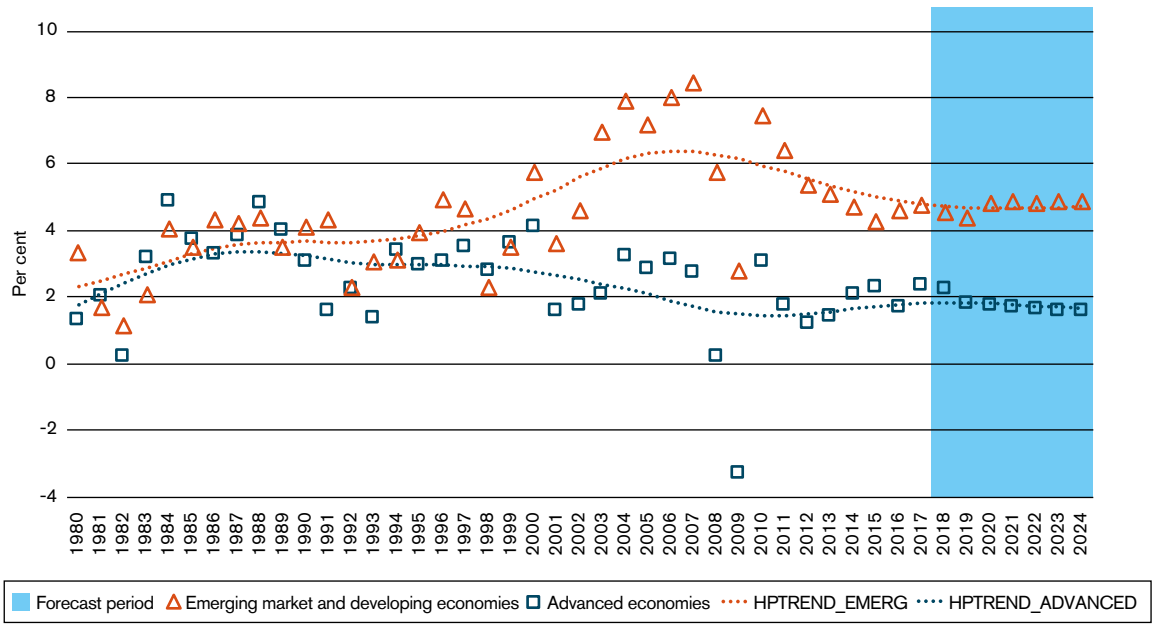
While an important income gap between high-income and low-income countries remains, a key pattern that has emerged since the beginning of the millennium is that of income convergence. Figure D.27 shows the GDP growth in advanced economies and emerging market and developing economies since 1980. Since 2000, developing economies have been growing at a much faster rate than developed economies, thus reducing the income disparities. Although the speed of convergence has been slowing in recent years, predictions suggest that this process of convergence will continue over the next five years, further closing the income gap.

Income level determines the composition of demand for goods and services as well as the demand for different types of services. Furthermore, the economic transformation that is behind growing incomes brings about changes in the production structure. Improvements in institutions, appropriate regulations and the development of human capital favour shifts towards services activities (Hoekman and Mattoo, 2008). As a result, rising incomes go hand-in-hand with changes in demand composition and countries' patterns of specialization.

(i) The growing demand for skill-intensive services

One general fact of economic development is that the share of services in GDP and employment rises as per capita income increases. Accordingly, research shows that the average income elasticity of the demand for services is higher than one, meaning that, as income per capita increases, services consumption grows more than proportionally. In contrast, the average income elasticity for goods is lower than one (Caron et al., 2014).

Figure D.27: Countries' GDP is predicted to converge
GDP growth by level of development, 1980-2024

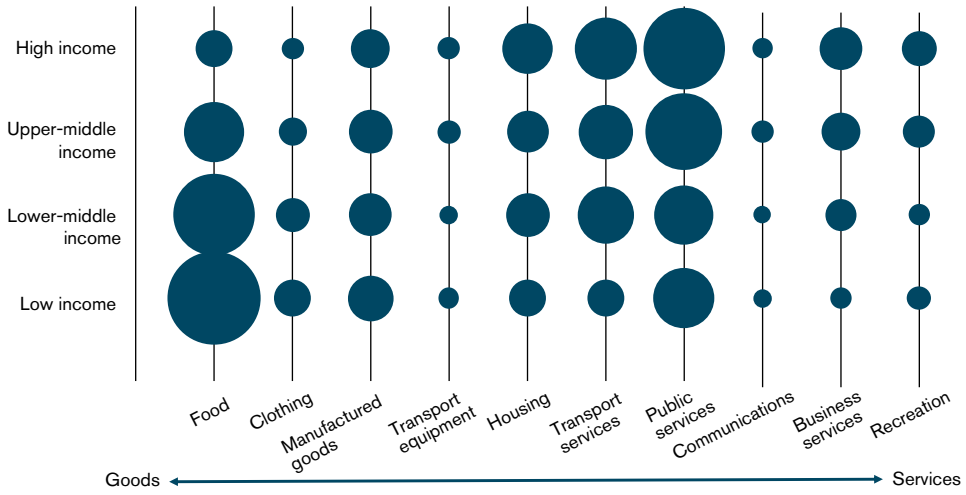


Source: IMF World Economic Outlook and WTO Secretariat calculations

Notes: Smoothed trends are estimated by applying the Hoderick-Prescott (HP) filter to annual growth rates at constant prices (percentage change). We denoted these trends as HPTREND in the figure, for advanced economies (in blue) and emerging economies (in orange).

Changes in the expenditure share of households at increasing levels of income is one explanatory factor behind this pattern. It is well known from the early work of Engel (1857) that, as income grows, the share of income spent on necessities such as food decreases. Figure D.28 shows the composition of consumption at different levels of income. The most evident trend is that food becomes a smaller share of consumption as income increases, and so does clothing. Conversely, spending on recreational services and business services increases with income.

Figure D.28: The composition of expenditure changes according to income
The composition of expenditure by country income level, 2014



Source: Authors' calculation based on GTAP data for 2014.

Notes: Income categories are based on World Bank country classifications in 2017.

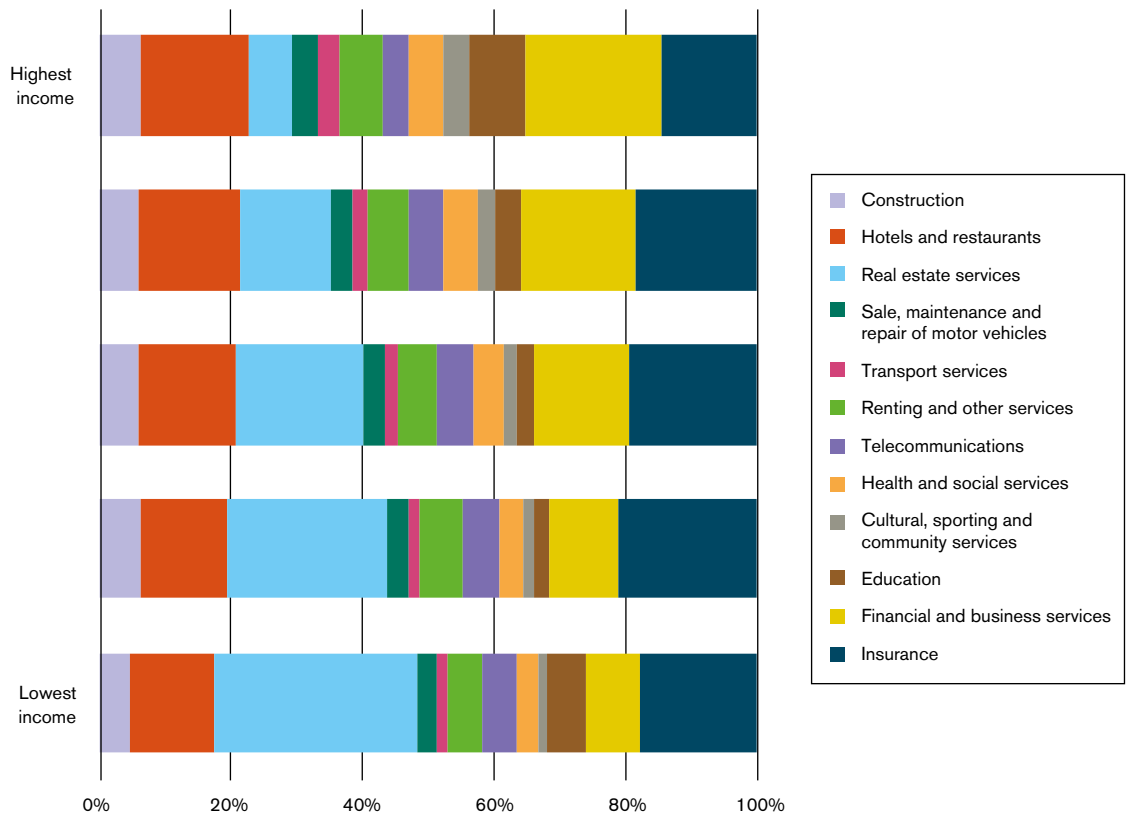
Looking specifically at services consumption by household income level, Figure D.29 clearly shows that the share of spending on hotels and restaurants, health and social, recreational, financial and professional services increases as the level of income increases. Conversely, the share of spending on construction services remains constant across income groups, while the share of real estate services, represented by expenditures on rent, steeply declines with income.

Overall, as income grows, countries increasingly consume services, especially skills-intensive services. Not only do services industries have a higher income elasticity than goods, but services that have higher income elasticity are also the most skills-intensive (Caron et al., 2014). This is illustrated in Figure D.30, which shows estimated income elasticities and skill intensities in the different services sectors, based on Caron et al. (2014).

(ii) Potential for the growing internationalization of services trade

On the supply side, economic development allows specialization in complex products that tend to be not only skills-intensive but also services-intensive. Firms in high-income economies tend to rely more on various ICT, business and professional services. In fact, the share of those services as inputs in total output is twice as high in high-income economies than in lower-income economies.[29] The skills content of occupations is not constant over time and across countries. As countries become richer, production

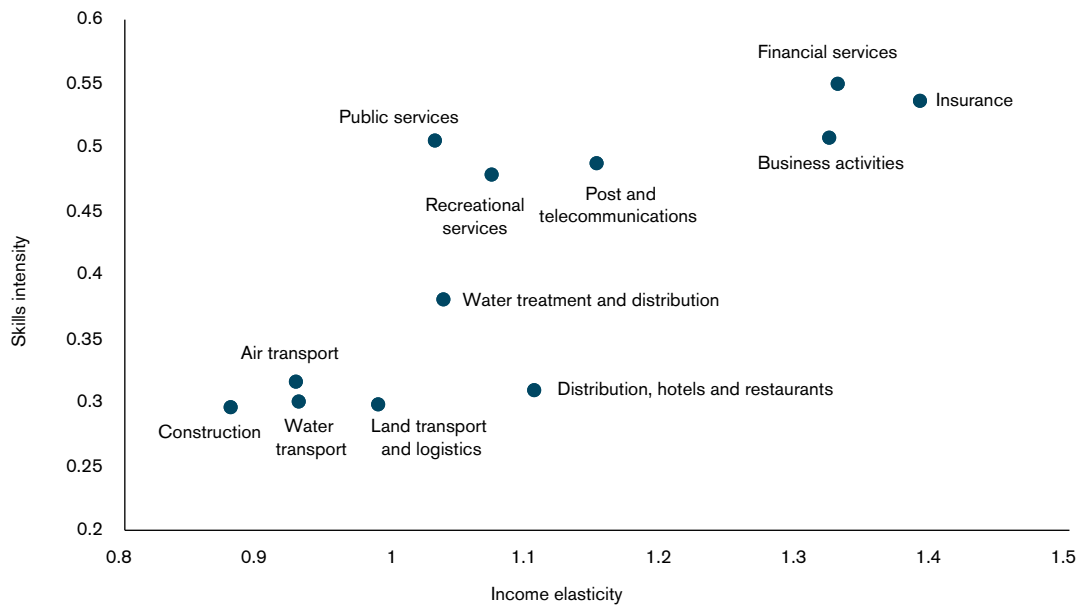
Figure D.29: The composition of services consumption changes according to income
Composition of services consumption in percentage by quintiles of household income



Source: Data from the US Bureau of Labor Statistics (2017), Table 1101.

Notes: Quintiles denote the five equal groups into which a population is divided according to the distribution of income. "Construction" also includes household insurance and expenses of materials for owner-performed repairs and maintenance. "Other services" include housekeeping services, gardening, laundry and dry-cleaning (non-clothing), termite and pest control products and services, and home security systems. "Education" includes school supplies. "Business services" include legal fees, accounting fees, funerals, cemetery lots, union dues, occupational expenses, expenses for other properties. "Insurance" includes vehicle, private health, and life and other personal insurance.

Figure D.30: As income grows, countries increasingly consume skills-intensive services
Positive relationship between income elasticity and skill intensity



Source: Caron et al. (2014)

Notes: Skills intensity is measured by the ratio of skilled labour to total labour input. It is computed including the factor usage embedded in the intermediate sectors used in each sector's production. "Distribution, hotels and restaurants" includes wholesale, retail and repair services. "Recreational activities" include cultural and sporting activities. "Public services" include public administration, education, health and social work, and sanitation activities.

and trade patterns change, causing a shift in economic production structures and consequently a variation of the type of skills required (Aedo et al., 2013). Countries display heterogenous skills content for similar occupations, which depends on the technologies available (Dicarlo et al., 2016).

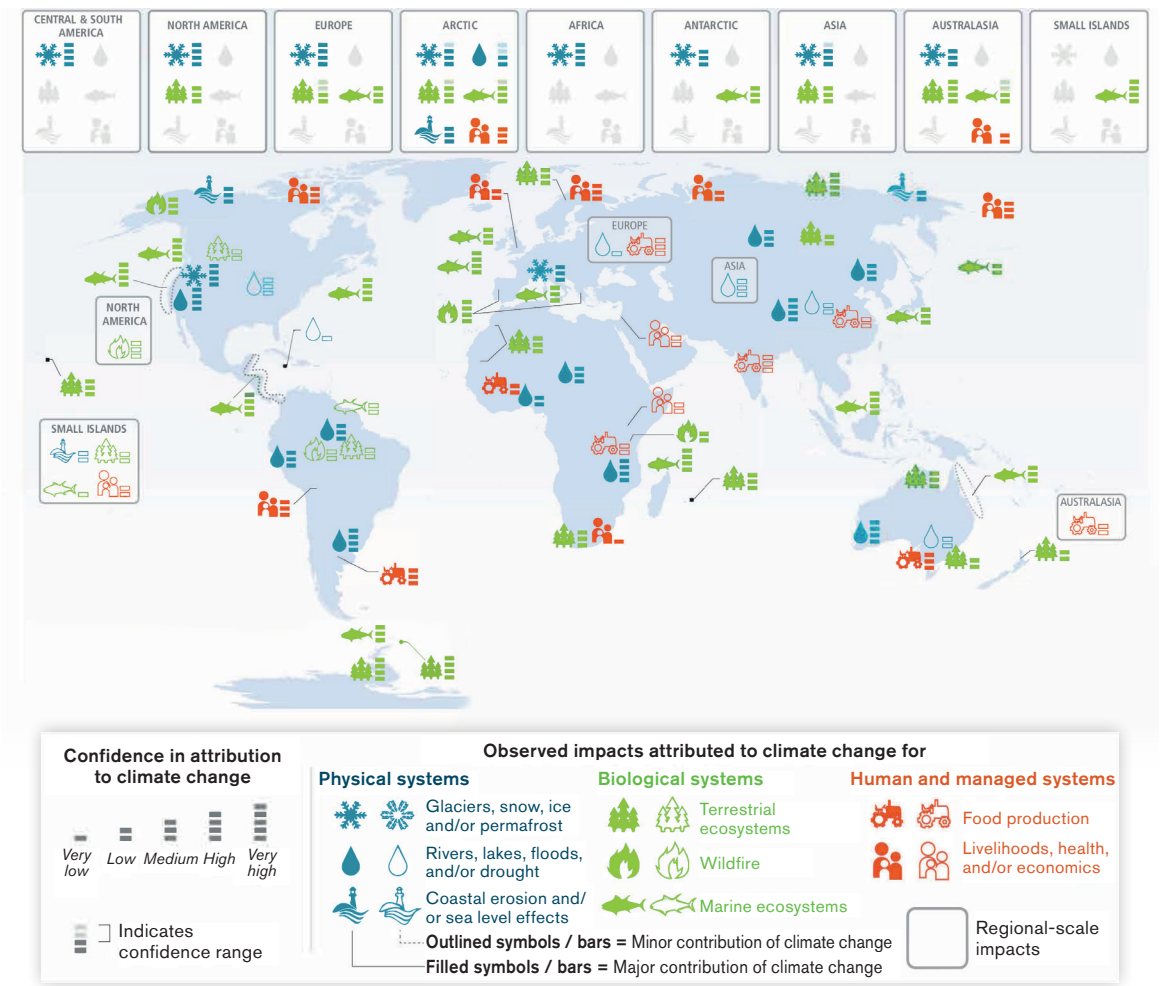
In addition, many services sectors are characterized by a pervasiveness of regulations and licensing, they are infrastructure-intensive, and many are knowledge-intensive. Comparative advantage in services trade is thus determined by factor endowments, infrastructure, but also an economy's governance, institutions and regulations, as discussed in Section C. Indeed, Amin and Mattoo (2006) affirm that regulatory and contract-enforcing institutions play a key role in the development of services sectors because these sectors enter into a more complex web of transactions with the rest of the economy and are more prone to market failure due to asymmetric information. Hence, better institutions are positively correlated with a higher size of the services sector relative to GDP.

Since rich countries consume relatively more of the skill-intensive goods and services that they are specialized in producing, they also trade more with one another than with low-income countries. It follows from above that increasing convergence in GDP is likely to drive up global demand for services, especially skills-intensive and institutional-intensive services. Since income growth is associated with better institutions and regulation, trade in services among growing economies is expected to increase. As countries converge in GDP, they will also trade more services.

(d) Climate change

According to the Intergovernmental Panel on Climate Change (IPCC) (2014), climate change refers to any change in the state of the climate, whether due to natural variability or as a result of human activity, that persists for an extended period, typically decades or longer patterns. These changes include increased temperatures, often referred to as global warming, as well as changes in atmospheric conditions, including humidity and rainfall patterns. Global climate change has already had observable effects on the environment, including a rise in sea levels, a loss of ice mass and increased frequency, duration and intensity of extreme weather-related events, such as floods, droughts, fires and pest outbreaks (see Figure D.31).

Figure D.31: Global climate change has already had observable effects on the environment
Observed impacts attributed to climate change



Source: IPCC (2014).

These events also affect the economy, including services trade. For instance, in January 2018, hundreds of flights from Toronto's Pearson International Airport in Canada were cancelled because of extreme wintry conditions and high winds (Global News, 2018). As the climate continues to change, the structure, composition and functioning of the global economy, including services trade, will have to change and adjust to new climate conditions (IPCC, 2014). In particular, climate change is expected to affect international trade through two main channels: countries' comparative advantages and trade costs, in particular transport and distribution costs (WTO and UNEP, 2009).

Despite improvements in data availability and models, there is to date no complete and comprehensive quantitative assessment of the impact of climate change on international trade, including services trade. The impact of climate change on services may have indirect effects on other economic sectors, which in turn may affect the supply and demand for services trade. One of the greatest challenges is to identify and assess the impacts of climate change in an integrated way so as to take fully into account the many complex interactions.

The literature has mainly identified and assessed channels through which climate change can affect specific economic activities, such as the agricultural sector (Moore et al., 2017; Nelson et al., 2013). Very few studies have systematically examined the effects of climate change on services trade, except for the tourism and transport sectors. In fact, many services are often viewed as less vulnerable to climate change than other economic activities, such as agriculture.

This is in part because of their lower sensitivity to climatic variability and change, and higher capacity to adapt to changes in climate (IPCC, 2014).[30]

Yet the services sector is not only expected to be affected directly by climate change through alterations in the supply and demand for goods and services, but also indirectly through the impacts of climate change on labour productivity and inputs, including energy and water supply (van der Mensbrugghe and Roson, 2010). In addition, the supply and demand of services may be affected by some climate change policies. Overall, the impact of climate change on trade in services is likely to be region- and industry-specific, depending on countries' vulnerabilities and sensitivities to climate-related events. The following sub-sections review some of the services sectors identified in the literature as likely to be affected by climate change.

(i) Tourism and recreation services: many destinations at risk, and a rise in ecotourism

Many types of tourism activities are weather-dependent and by extension, climate-dependent. Weather, including temperature, hours of sunshine and precipitation, is an intrinsic component of the tourist's experience. Rising temperatures and extreme weather events will have important impacts on many services of the tourism industry. Changes in the length and quality of seasons will affect the tourist offer and, in turn competitive relationships between touristic destinations, as well as inter- and intra-regional tourism flows. Coastal, island and mountain destinations are considered particularly sensitive to climate change. For instance, the rise in temperatures and rainfalls in certain areas, along with a reduction of snowfall and the melting of glaciers, will have a direct impact on winter tourism involving snow sports.

Climate change can also hinder the development of some tourist activities by increasing damage to infrastructure, business interruptions and operating costs, such as insurance, backup power systems and evacuation systems (Cashman et al., 2012; Uchegbu and Kanu, 2011). The profitability and attractiveness of nature-based tourism will also be affected by climate-induced environmental changes, such as water scarcity, the loss of biodiversity, higher sea levels, coastal erosion, an increased risk of flooding and natural hazards, degraded habitats, a reduced landscape aesthetic and an increased incidence of infectious diseases.

Tourists may be discouraged from visiting some destinations if their attractiveness or affordability decreases (WMO et al., 2008). Climate change mitigation policies aimed at reducing greenhouse gases could also impact travelling costs, which in turn could lead tourists to change their travel habits, including modes of transportation and destination. It is however, unclear how exactly tourists will respond to the effects of climate change. Some projections suggest that tourism from North to South, especially during the hotter seasons, could decrease while tourism from South to North may increase (Hamilton et al., 2005). At the same time, tourism in the South could become more attractive during cooler seasons (Amelung and Viner, 2006).

Some tourism services may, in some cases, be able to adjust to new climate and environmental conditions at a cost, for instance by investing in snow-making equipment, beach enhancement, additional air-conditioning or back-up water systems.[31] Diversifying the available recreational activities can also create new markets, for instance by developing trekking-related activities all year around in mountain destinations to compensate for a lack of snow.

In parallel, increased awareness of social, economic and environmental sustainability has given rise to a new type of tourist, characterized by environmental and cultural sensitivities, willing to pay between 2 and 40 per cent more on ecotourism or sustainable tourism (UNEP and UNWTO, 2012). Ecotourism encompasses all nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature and traditional cultures, while sustainable tourism refers to tourism that takes full account of its current and future economic, social and environmental impacts.

Although still a developing industry in some parts of the world, ecotourism and sustainable tourism are one of the fastest growing segments of the travel and tourism industry, particularly popular among Baby Boomer and Millennial generations (Orbis Research, 2019). The ecotourism and sustainable tourism markets are expected to keep increasing to meet ever more demand, including by complying with voluntary ecotourism and sustainability certification programmes. In many developing countries, these new market opportunities (that also represent employment and entrepreneurship opportunities) are often considered as a means to promote natural resources conservation, while improving the living conditions of local communities in terms of education, the empowerment of women, and health and income (ILO, 2018).

(ii) Transportation services: disruption of traditional routes

The transportation sector is already experiencing weather-related services disruptions, but with increases

in temperature and precipitations, the rise of sea levels and extreme climactic events, the frequency of damage to transportation infrastructures, including roads, airports and ports, will increase (Dellink et al., 2017; IPCC, 2014). Transport infrastructures are, however, vulnerable to climate change in different ways and to different degrees, depending on their state of development, resilience and adaptability to new weather conditions. In general, floods tend to induce more physical damage, while drought and heat waves tend to have more indirect impacts on infrastructure systems (Mills and Andrey, 2002).

Maritime shipping may experience more frequent port closures. Similarly, land-based transportation, including trucks and trains, and air transport may be impacted by climate change, through faster degradation of road and bridge infrastructure and impairment of the operation of airports (Dellink et al., 2017). This damage to transport infrastructure will result in an increase in maintenance, operation, rehabilitation and repair costs, as well as accelerated infrastructure replacement costs. In addition, climate change may indirectly cause losses of infrastructure service and activity disruption such as delays, detours and cancellations (Gelete and Gokcekus, 2018). For instance, climate change could have severe consequences for aircraft take-off performances, including regarding the number of passengers and volume of fuel airplanes are able to carry (ICAO, 2016). These climate-related impacts could ultimately impact the profitability, competitiveness and affordability of the different modes of transportation.

Similarly, climate change mitigation policies promoting the development and adoption of energy-efficient fuels and alternative fuel sources may have an impact on transportation costs. Such policies could lead economic operators to modify, if necessary, the choice of mode(s) of transportation to deliver goods and services in a timely manner and at the lowest cost. In fact, changes in transportation services are expected to have an important impact on other transportation-dependent services sectors, such as energy, tourism and wholesale and retail trade.[32] All other things being equal, higher transportation and shipping services costs drive a wedge between origin and destination prices, which results in a lower demand for transportation services, and ultimately changes in the direction and composition of trade (Koetse and Rietveld, 2009). In that context, some operators in the transportation industry have already invested in new, more resilient, transportation infrastructure and engines.

Although most climate impacts on transportation are expected to be negative, climate change could positively affect the supply and demand of some regional transportation industries. For instance, land-based transportation services may improve in regions experiencing milder winter conditions, because reduced snowfall and less frequent winter storms may lead to a lesser necessity to remove snow and ice, and less cold-weather damage to vehicles. Similarly, warmer winters could reduce the amount of sea ice in many important shipping lanes, extending the shipping season. In the Arctic, the loss of the ice cap caused by warmer temperatures could also open up the possibility of a northwest passage during portions of the year, which could reduce maritime shipping times and distances by up to 40 per cent between Asia and Europe (Rojas-Romagosa et al., 2015).

(iii) Energy services: distribution infrastructures at risk but rise in alternative energy services

Energy services can be particularly exposed to climate change, with risks of disruption of geological exploration and energy production, as well as risks of damage to energy transmission and transfer infrastructure (Hewer, 2006; Schaeffer et al., 2012). Power distribution infrastructures are vulnerable to climate change in different ways and to different degrees, depending on their resilience and adaptability to new weather conditions. Suspended overhead cables and transmission masts are particularly vulnerable to high winds and their effects, such as falling trees, ice storms, lightning strikes, avalanches, landslides and flooding, while transmission cables buried underground tend to be more resilient but significantly more expensive to install.[33] Gas transmission systems can also be affected by mud flows, floods, landslides and permafrost thawing.

Disruption and damage of this type to energy production and infrastructure will increase the operating costs of managing and maintaining energy facilities and networks, including the transportation, transmission and distribution of energy. Extreme weather events could further affect the wholesale marketing of energy and its retail and supply, causing greater price volatility due to sudden shorter or longer spikes in energy demand during cold waves (for heating) and heatwaves (for cooling), as well as shortages, production disruption, and storage and distribution difficulties.

The energy sector can increase its resilience to climate change by diversifying energy supply sources, including renewable energies, expanding its linkages with other regions and countries exposed to different

climate risks, and investing in new technologies to design and construct climate-resilient facilities to produce, transform, supply, transport and distribute energy. Climate change mitigation and adaptation policies can further impact the development and diffusions of alternative energies, which can in turn affect a broad range of energy services, including the distribution and retail supply of energy.

(iv) Environment-related services: new opportunities and emerging technologies

Efforts to mitigate and adapt to the effects of climate change, along with changing consumer preferences, have created new environment-related services, and stimulated existing ones (WTO and UN Environment, 2018; WTO and UNEP, 2009). Environmental services cover a wide range of activities related to infrastructure services, such as solid and hazardous waste management and water and wastewater treatment, and activities related to non-infrastructure services, such as engineering design, environmental consultancy services, environmental technology equipment installations and environmental remediation (Kommerskollegium, 2014; Steenblik and Grosso, 2011; USITC, 2013).[34]

The market for environmental goods and services is substantial (UNEP, 2018). Environmental services have been estimated to represent more than 65 per cent of the market value of environmental industry (EBI, 2017). It is however, often difficult to discuss environmental goods and services separately (Bucher et al., 2014). The provision of many environmental services often requires some environmental goods. Similarly, environmental goods often embed environmental services content or involve installation, maintenance service or monitoring. For example, the construction of wind power systems requires project consultancy services, transportation and the installation of wind turbines and towers, but also the construction of wind turbine foundations, control systems, access roads and other related infrastructure (IRENA, 2018).

The diversity and severity of impacts resulting from climate change will also create a need to develop new environment-related technologies, including goods and services, to address pressing environmental and climate concerns. The market for environmental goods and services is therefore expected to grow significantly in the near future. Although initially the development and diffusion of environment-related services technologies has been occurring in high-income countries, a number of emerging and developing economies are likely to experience a fast-growing market for environment-related services thanks to more investment in environmental infrastructure and stronger environmental and climate change policies.

New market opportunities and new technologies could change the structure of the market for certain environmental services, some of which are still largely concentrated in a single public company or a couple of large companies. For instance, although the water sector in many economies continues to be largely concentrated in a few multinationals, it could become more competitive as it becomes more responsive to innovative technologies (Le Vernoy, 2017). In that context, lower services trade restrictions on environment-related services could further facilitate the adoption and diffusion of more affordable environmental technologies and practices (Kim, 2011; Sauvage and Timiliotis, 2017).

(v) Insurance services: growing demand for insurance against climate risks

With rising socio-economic costs associated with more frequent extreme weather events, preventive risk management play an import role to build socio-economic resilience. The economic cost of natural disasters in 2018 reached almost US$ 160 billion, most of which was related to extreme weather such as blizzards, droughts, floods, heatwaves, hurricanes, and tornadoes (Munich Re, 2019).[35] This is particularly important in many developing economies, because they are likely to be most impacted by climate change (Stern, 2007). Insurance systems have been found to be an effective tool to reduce climate-related economic vulnerability (Golnaraghi, 2018; IPCC, 2014). In that context, the demand for insurance against the risk of extreme weather events will become increasingly important as the global economic cost of weather damage could reach US$ 1 trillion in a single year by 2040 (Dlugoleck, 2008).

Although many climate risk categories, such as windstorms and flooding, are already covered by private or public insurance companies, at least in many developed and emerging economies, other extreme climate risks, such as storm surges, are not subject to a risk-sharing arrangement. The supply of insurance for currently non-existing insurance markets could therefore increase in the future with the rise in economic losses caused by weather risks (Botzen et al., 2010).

However, the development of climate insurance markets could be hindered if weather risks become too high and economic losses too uncertain. Faced with increased climate risks, insurers could manage their exposure to natural hazards by limiting their risk and

excluding the coverage of specific weather events, but also by adjusting premiums, controlling the damage with lower economic compensations, or transferring the risks. Because of these difficulties, public initiatives and public-private partnerships have been developed and could be promising solutions for meeting the demands to compensate weather-related damage that is currently not covered by private insurances.

3. Quantifying services trade in the future

In this section, the analysis on changes in the patterns of services trade is complemented with quantitative projections on changes in the size and patterns of international trade in services. To this end, the Global Trade Model (GTM)[36] is employed, featuring multiple sectors and production factors, intermediate linkages, capital accumulation, a global transport sector and a host of taxes. Affiliate sales of services by multinationals (GATS mode 3) are not included in the model, and so the results reported below only refer to services trade through GATS modes 1, 2, and 4.

Three trends related to the earlier analysis on changes in the pattern of services trade are analysed quantitatively with the GTM: (i) changes in technology, (ii) the reduced importance of face-to-face interaction, and (iii) changes in trade policies. Changes in technology consist of three sub-trends, partially based on the analysis in WTO (2018a). First, tasks are reallocated from labour to capital because of digitalization, robotization and the development of AI. Second, changes in the production process will lead to a more intensive use of ICT services by other sectors in the economy. Third, digitalization will lead to a reduction in trade costs. These trends were introduced in WTO (2018a) and have been extended in this year's report.

The reduced importance of face-to-face interaction for economic transactions is inspired by the recent book *The Globotics Upheaval* (Baldwin, 2019),[37] which argues that with new technologies, many more services can be delivered remotely. To model changes in trade policies, estimates of the ad valorem equivalent (AVE) trade cost level of the recently released World Bank Services Trade Restrictiveness Index (STRI) are combined with scenarios on their expected reduction.

To analyse the three trends outlined above, a baseline scenario for the global economy is developed up until 2040 based on macroeconomic projections from the International Monetary Fund (IMF), the OECD and the United Nations (UN), starting from baseline data for 2014, and the baseline scenario is presented in the next section, with technical details delegated to Appendix D.2.

Three other phenomena relevant for the future pattern of services trade were discussed earlier in this section: demographics, income growth and changing preferences, and climate change. A quantitative analysis of climate change is beyond the scope of this report and would have to be studied separately. The other trends are part of the baseline scenario. In particular, three trends related to demographic changes described earlier in this section are included in the baseline scenario. First, changes in labour supply related to ageing are modelled based on demographic projections by the IMF and the World Bank. Second, changes in the savings rate imposed on the model are based on an empirically estimated model of the savings rate as a function of GDP levels, GDP growth rates and demographic factors. Third, changes in the number of skilled workers are modelled based on projections by the International Institute for Applied Systems Analysis (IIASA) (KC and Lutz, 2017).[38]

Changes in demand related to ageing are not incorporated in the model. Ageing is expected to affect mainly expenditures on education and healthcare, which are not recorded separately in the baseline database employed for our work. Finally, the role of income and changing spending patterns are also part of the baseline.

(a) Baseline of the global economy

The baseline development of the global economy is determined by macroeconomic projections, combined with four types of structural change.

First, based on empirical estimates with EU KLEMS (a statistical and analytical research project financed by the European Commission) and OECD-STAN (i.e. OECD Structural Analysis) data, differential productivity growth is imposed on the model. The estimates show that agriculture displays the fastest productivity growth, followed by manufacturing and services, although some of the services sectors such as telecommunications and ICT services display above average productivity growth as well.[39] These assumptions are in line with the findings in Box C.1, comparing productivity growth in selected services sectors with those in manufacturing.

Differential productivity growth is highly relevant for projections on the role of services in the economy. Given the limited scope for substitution between goods from different sectors, both for consumers demanding final goods and firms demanding

intermediate goods, above-average productivity growth of agriculture and manufacturing leads to a falling value share of these sectors in the economy. Correspondingly the value share of services tends to rise. Lower than average productivity growth of services raises the relative price of services, thus raising the importance of this sector in the economy, given the limited scope for substitution.

A second phenomenon also leads to a rising share of services in the economy: non-unitary income elasticities. As mentioned earlier in this section, services tend to display income elasticities above one, whereas particular goods, such as food, display income elasticities lower than one.[40] As countries grow, this tends to lead to a rising share of services in the economy.

The third and fourth types of structural change are both related to demographic change. Third, the savings rate adjusts in response the changes in GDP and demographics;[41] as populations age they tend to reduce the savings rate. Fourth, projections for changes in the number of skilled and unskilled workers are imposed on the model.[42] Emerging countries tend to display the strongest growth in the supply of skilled labour.

Besides these structural changes, an important policy change in the realm of international trade is also included in the baseline. Trade costs are projected to fall in the baseline as a result of the implementation of the WTO Trade Facilitation Agreement (TFA), which entered into force in February 2017.[43]

Table D.3 displays the baseline projections imposed on the model. The table shows that demographic changes are affecting the baseline and contains three main takeaways. First, the emerging regions are projected to grow more in terms of GDP than the developed regions. This reflects the assumption of convergence in income levels in the OECD GDP projections. Second, the projections on both population and employment growth show that ageing will affect some regions substantially. Population and labour force growth are projected to turn negative in China, Japan and Russia. Labour force growth is also projected to become negative in the European Union and the Republic of Korea. Although population growth does not become negative in these regions, the changing age structure is projected to turn labour force growth negative. Third, the projections on education indicate that there will be a large increase in the number of skilled workers. Whereas the number of unskilled workers is projected to fall in many regions, the number of skilled workers is expected to rise in all regions. Furthermore, the largest growth is projected to occur in the emerging regions, with the strongest projected GDP growth in the Asian LDCs, India and sub-Saharan Africa.

(b) Capturing three future trends

Three trends influencing the size and pattern of services trade are included in the simulations. Each of them will be discussed in turn in a non-technical manner in this sub-section, with technical details delegated to Appendix D.2 Since technological developments are highly uncertain, the trends modelled are an indication of the direction global trade is projected to take.

(i) Changes in technology because of digitalization

To model changes in technology we largely follow WTO (2018a). Three trends are included, all related to the digitalization of the economy: a reallocation of tasks from labour to capital raising productivity growth and the capital income share; a more intensive use of ICT services by other sectors; and falling trade costs. Digitalization (and robotization) are assumed to lead to a more intensive use of capital in the production process, leading both to higher productivity growth and to a higher capital intensity of production.

Second, the more intensive use of ICT services as intermediate input by other sectors was also part of the report last year. However, the modelling of this trend has been refined in two ways.

Third, trade costs are projected to fall because of the introduction of new technologies related to digitalization. Following the same approach as earlier in this section, in a first step, inferred trade costs are regressed on variables expected to change with new technologies and on a host of control variables for three broad sectors, primary (agriculture and extraction), secondary (manufacturing), and tertiary (services). In a second step, a scenario is formulated for the change in the variables related to new technologies, like that in WTO (2018a), based on the assumption that values converge to the level of the highest quartile (the 25 per cent highest value). For services trade, three variables drive the reduction in trade costs: common language (people speaking the same language), broadband coverage, and the credit and contract environment. First, the trade-fostering impact of common language on trade is assumed to fall because of new technologies.[44] Second, rising broadband coverage will reduce trade costs. Third, the development of blockchain will reduce the trade costs associated with bad credit and contract environments.[45]

(ii) Reduced importance of face-to-face interactions

Trade in many services sectors is hindered at present by the necessity for face-to-face interactions. Baldwin

Table D.3: Projected macroeconomic growth rates vary across economies
Projected cumulative growth rates of population, GDP, labour force and number of skilled and unskilled workers, 2018-40

	Population	GDP per capita	GDP	Labour force	Unskilled labour	Skilled labour
Asian LDCs	17	161	204	20	13	109
Australia	32	27	67	28	10	64
Brazil	11	41	56	9	-1	53
Canada	20	25	51	13	-7	31
China	-1	144	141	-14	-22	65
European Union (28)	4	40	45	-4	-16	37
European Free Trade Association (EFTA)	18	21	43	8	-8	44
India	23	166	226	23	14	106
Japan	-8	30	19	-14	-36	14
Republic of Korea	0	65	65	-17	-51	26
Latin America	16	58	83	16	3	71
Mexico	17	57	83	15	5	82
Middle East and North Africa	31	59	108	35	19	121
Russian Federation	-3	65	61	-8	-13	14
Southeast Asia	17	118	154	16	3	93
Sub-Saharan African LDCs	56	111	229	78	75	214
United States	15	28	47	10	0	35
Other Asian economies	31	52	99	31	26	73
Other sub-Saharan Africa	50	72	158	66	48	186
Rest of world	4	94	101	5	-3	35
Average	**19**	**51**	**80**	**17**	**8**	**71**

Source: Population numbers reproduced with permission from the UN (Medium Scenario), GDP per capita reproduced with permission from IMF (up until 2023) and OECD (shared socio-economic pathways (SSP) 2, a middle-of-the-road scenario for the future). Employment reproduced with permission from IMF (until 2023) and UN (Medium Scenario). Skilled and unskilled workers based on UN employment data, and shares of tertiary educated workers from KG and Lutz (2018).

Notes: The table displays cumulative growth rates from 2018 until 2040. The number of skilled and unskilled workers is calculated as employment times the share of tertiary educated workers in all workers. Global averages are calculated based on shares in 2018.

(2019) argues that new technologies are expected to lead to a strong reduction of trade costs in services, as they make it possible to circumvent the need for face-to-face interaction. We determine the potential reduction in trade costs because of new technologies by estimating the impact of the importance of face-to-face interaction on trade costs.

Employing data on the task intensity of occupations mapped to sectors and trade costs inferred from international relative to intra-national trade, provides support for the hypothesis that sectors with a large share of tasks requiring face-to-face interaction display higher trade costs.[46] Furthermore, we show that the face-to-face intensity can explain the difference in trade costs between goods and services. Phrased differently, although the data show that trade costs are significantly higher in services trade, this difference becomes insignificant after controlling for measures of face-to-face intensity.

With technological progress, it is likely that face-to-face interactions will become less important over time, which is likely to reduce trade costs. Furthermore, this reduction will be strongest for services, since face-to-face interactions matter more for services sectors. To determine the expected reduction in trade costs, we assume that the face-to-face task intensity of the different sectors will fall to the sector with the lowest face-to-face task intensity, motor vehicles. The intuitive idea is that new technologies will make production less face-to-face-intensive. As a result, trade costs in the different sectors fall.[47] This scenario is admittedly somewhat speculative and thus mainly serves to show

the potential impact of the scenarios described in Baldwin (2019) on the reduced importance of face-to-face interaction (see also the opinion piece by Richard Baldwin on page 126).

(iii) Changes in trade policies (STRI)

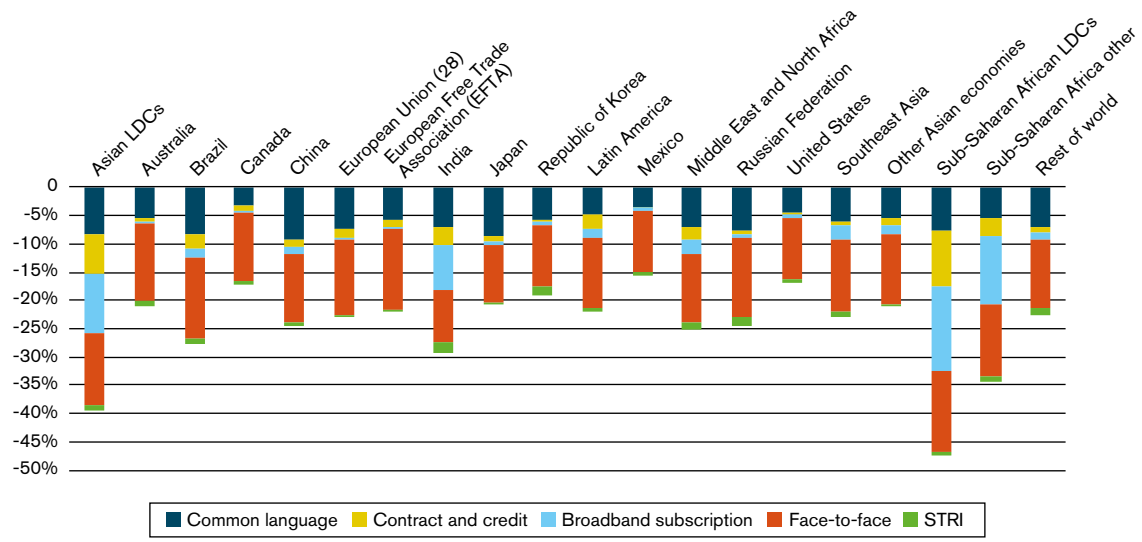
As described earlier in this section, the World Bank has developed a new services trade restrictiveness index (STRI). Gravity estimates on the impact of the STRI on trade flows are combined with a scenario for the reduction in the STRI to determine possible reductions in trade costs because of changes in economies' regulation of services trade.[48] To determine the impact of the STRI (a most-favoured-nation variable applying to all importers) on trade flows, an interaction term of the STRI is included with a trade-with-self dummy (technically a border dummy). This means that the impact of the STRI on trade flows is identified based on how much the STRI reduces international trade relative to domestic trade. Technical details are in Borchert et al. (2019b) and estimation results are in Appendix D.2.

Gravity equations are estimated for five sectors: telecommunications, transport, insurance, banking and professional services. For the other services sectors the STRI is not available or there is no good match between the sector on which STRI data are available and services trade data. The STRI interaction with the trade-with-self dummy is significantly associated with trade only for the first three sectors. This means that only in three sectors a lower level of STRI is associated with a significantly larger amount of international trade. For the other two sectors, services trade data do not align well with the STRI in terms of sectoral classification because sectoral definitions differ. The estimated STRI coefficients are mapped into ad valorem equivalent trade cost reductions based on the following scenario for the reduction in trade costs.[49] It is assumed that the STRI is reduced to the median economy of the quartile with the lowest level of STRI, which is considered to be a reasonable liberalization scenario.[50] This means that the STRI is assumed to fall to the economy with approximately the 12.5 per cent lowest level.

The fact that the impact of the STRI on trade costs is only estimated for five sectors and that the estimates generate significant effects only for three sectors, implies that the impact of the simulated changes in services trade regulations will be limited.

Figures D.32 and D.33 display the trade-weighted average reductions in trade costs. The figures show that the largest reductions in trade costs are expected

Figure D.32: New technologies are projected to reduce trade costs in least-developed economies
Ad valorem equivalent trade cost reductions 2018-40 – different trends (averages across economies)



Source: WTO calculations based on various methodologies as described in the text.

Notes: The figure displays the contribution of different variables to the reduction in trade costs in the different scenarios. Common language, credit and contract, and broadband subscription measure the reduction in trade costs because of a reduced impact of the absence of a common language, poor credit and contract environment, and a low number of broadband subscriptions, respectively. Face-to-face measures the reduction in trade costs due to a reduced importance of face-to-face contact for trade costs. STRI measures the reduction in trade costs due to an improvement in services trade regulation. The methodology is described in the text. Note that percentage reductions are not additive. The corresponding numbers are in Appendix Table D.5.

OPINION PIECE

By Richard Baldwin,
Professor of International Economics and Co-Director of the Centre of Trade and Economic Integration, Graduate Institute for International and Development Studies and Centre for Economic Policy Research

Digital technology and telemigration

Globalization is simple. Arbitrage drives globalization. When the cost difference across countries is larger than the trade cost, companies exploit the cost gap by buying low and selling high. Traditionally, this arbitrage mostly concerns trade in goods because it is easy to ship "things-that-we-make" across borders. It was much harder to ship across borders the "things-that-we-do" – what economists call "services". But why is that? Why is it easier to ship goods than services across borders?

The answer lies in the reality of services. For many services, the service-provider and service-buyer have to be in the same place at the same time. The technical difficulty of getting service-providers from one nation into a room with service-buyers from another nation is the reason why globalization, up until now, has mostly been about goods, not services.

Digital technology, however, is changing that reality. In a whole host of ways, digital technologies, or digitech, are making remote people seem less remote, making it easier for people sitting in one country to work in another country. But looking at how digitech is doing this, consider the international cost differences that make this profitable.

A professor of economics in Zurich, for instance, earns about 20 times what an economics professor earns in Manila. If we lived in a Star Trek world, where professors could teleport from Manila to Zurich and back, it is likely that the University of Zurich would engage in at least some arbitrage of professors. Of course, teleportation is not real thing, but digitech is moving reality in that direction. It is enabling what I call "telemigration" in my 2019 book, *The Globotics Upheaval: Globalization, Robotics, and the Future of Work*, namely people sitting in one nation and working in offices in another nation.

Putting it plainly, the incentives for telemigration are enormous, but so too are the technological barriers. I believe that emerging market exports of services will explode in coming years, since digitech is tearing down the barriers at an eruptive pace. I would focus on four aspects of this technological lowering of barriers to telemigration. First is domestic telecommuting.

Many have switched to telecommuting, and our companies are reorganizing things to make this domestic telecommuting easy. They are investing in new collaborative, cloud-based software packages as well as in in telecommunications hardware and services that make remote workers seem less remote. Having arranged things to make telecommuting possible, companies will find it profitable to use foreigner freelancers, at least for some tasks. Of course, using remote foreign talent might not be as good as using in-person domestic talent, but the foreign labour will be a whole lot cheaper.

The second is online freelancing platforms. These are like eBay, but for services, not goods. Just as eBay made it easy to buy and sell goods online, these platforms are making it easy to buy and sell services online in the form of freelancing. They will be like the "container ships" of telemigration. They are how companies in rich nations will find, hire, pay, manage and fire telemigrants from poorer nations.

The third factor is machine translation. It has improved radically. The key breakthrough was when, from 2016, the United Nations, the Canadian Parliament, and the European Parliament and European Commission posted online millions of human-translated sentences. This allowed the artificial intelligence geniuses at Google, Twitter, Facebook, Amazon and Microsoft to train AI models to translate text contextually, instead of word by word. That made a huge difference.

This is revolutionary. Hundreds of millions of talented, low-cost freelancers who have been excluded from telemigration by their lack of language skills will soon be able to communicate, via translation

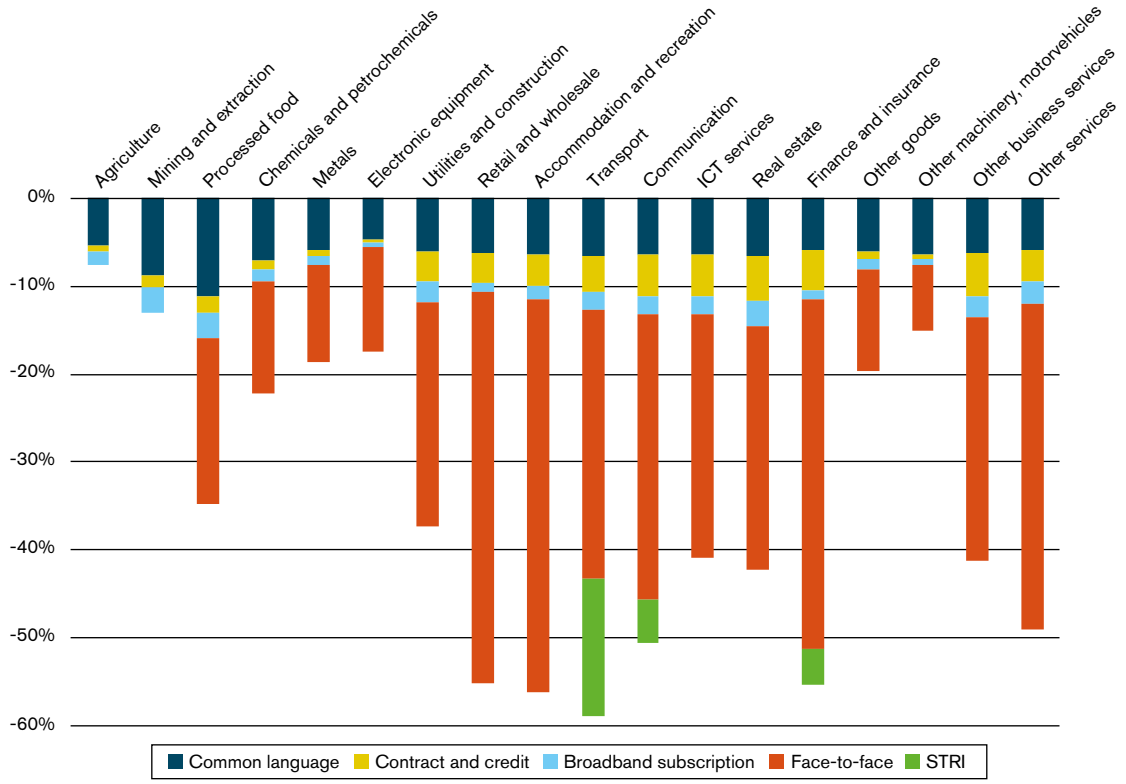
technology, in "good-enough" English, or French, or any other widely spoken language. And some of them will be able to do at least part of many service jobs for a whole lot less than the people doing them today. It will even have a big impact on goods trade, since standard estimates suggest that a common language boosts trade by more than 50 per cent.

The fourth factor is technologies creating ways to make it seem as if you are in the same room with colleagues or clients in a different country. One of the new technologies is called telepresence rooms. These are common in large banks, some large companies and in some government departments. Another is "telepresence robots". These are like a Skype screen on a simple robot body, where the robot is driven by the person on the screen. They are often used in US hospitals so that doctors can talk to patients without driving to the hospital. Some companies use them to allow managers to visit field offices without travelling. The telepresence robot remains in the field office and when the manager wants to interact with people in the field office, he or she fires up the telepresence robot and drives it around the field office. People say that the physicality of the robot really changes the quality of the communication. It boosts trust, understanding, and the authority of the telemigrant.

The progress to date is impressive, but it will accelerate radically in the next few years as 5G is implemented and raises transmission speeds by two orders of magnitude.

This development will be disruptive in advanced economies, where service workers have been mostly shielded from globalization, but it is a huge export opportunity for emerging market workers. In a nutshell, telemigration allows developing nations to exploit their comparative advantage directly based on low labour costs, without having to build a good with the labour and then export the good.

Figure D.33: New technologies are projected to reduce trade costs in different services sectors
Ad valorem equivalent trade cost reductions 2018-40 – different trends (sector averages)



Source: WTO calculations based on various methodologies as described in the text.

Notes: Figure D.33 displays the contribution of different variables to the reduction in trade costs in the different scenarios. Common language, credit and contract, and broadband subscription measure the reduction in trade costs because of a reduced impact of the absence of a common language, poor credit and contract environment, and a low number broadband subscriptions, respectively. Face-to-face measures the reduction in trade costs, because of a reduced importance of face-to-face contact for trade costs. STRI measures the reduction in trade costs because of an improvement in services trade regulation. The methodology is described in the text. Note that percentage reductions are not additive. The corresponding numbers are in Appendix Table D.6

in the transport sector and in the developing countries, which tend to start from a higher initial level of trade restrictiveness.

(iv) Comparison of trade cost reductions

Figures D.32 and D.33 contain an overview of the average ad valorem equivalent trade cost reductions associated with new technologies. The figures display the trade-weighted averages per importer and per sector and contain an overview of the contribution of the different variables to the total reduction in trade costs associated with the introduction of new technologies.

Inspecting the projected trade-weighted average trade cost reductions in the different scenarios in Figure D.32 and D.33 shows that the scenario on the reduced importance of face-to-face interaction for trade costs and the presence of a common language are expected to have the largest impact on trade cost reductions. The scenario on the reduced importance of face-to-face interaction is treated as a speculative scenario, showing what would happen if technological developments did indeed drastically reduce the importance of face-to-face interaction. Figure D.33 makes clear that the trade cost reductions associated with the face-to-face scenario are largest in the services sectors.

In comparison to the impact of new technologies, reduced trade policy barriers are projected to have a more limited impact. However, regulatory barriers are likely to affect the scope for trade cost reductions, because of new technologies. If countries impose policy barriers related to data localization, for example, the projected trade cost reductions are not expected to take place.

(c) Results of the simulations

This section presents the impact of the described trends on the global economy, focusing on changes in services trade. As the baseline contains important trends for services trade, such as demographic change, differential productivity growth and changing preferences, the baseline results are also discussed in detail where relevant. To summarize, the results of three scenarios are presented:

1. Technological changes because of digitalization, including reductions in trade costs
2. Reduction in trade costs because of a reduced need for face-to-face interaction
3. Lower trade policy barriers modelled through a lower services trade restrictiveness index (STRI).

The three scenarios are introduced cumulatively in the simulations in the order presented here. Hence, the third scenario (STRI) also contains the trade cost and technology changes of the other two scenarios.

(i) The role of services in output and trade

Table D.4 displays the share of services output in total output in 2018 and the projected values in 2040 in the baseline and in the digitalization scenario. The table shows that the share of services in the economy tends to increase in all regions. Whereas the share stays relatively low in sub-Saharan Africa (increasing from 55 per cent to 64 per cent in the baseline), it is projected to rise from 62 per cent to 75 per cent in China and increase from an already high 81 per cent to 87 per cent in the European Union.

Two mechanisms drive the rising share of services in the model. First, productivity growth is smaller in most services sectors (based on econometric estimates introduced above), making them more expensive and given the limited scope for substitution this raises their value share in the economy. Second, spending patterns of private households change as their incomes grow. Income elasticities for services tend to be above one, whereas they are below one in other sectors, especially food. As a result, the services share in output tends to increase. It is difficult to disentangle the importance of the two channels in the model. Additional simulation results show that the shares spent on services rise more sharply for private expenditures than for intermediate demand. This seems to indicate that both mechanisms are important. For intermediates demand, only differential productivity growth plays a role, whereas for private expenditures both mechanisms are at play.

The rising share of services in the economy has two important implications for services trade.[51] First, the fact that services are much less tradable than goods implies that a rising share of services in the economy tends to lead to a fall in the trade-to-output ratio through a composition effect. If relatively less tradable sectors in the economy become more important, the role of trade in the economy tends to decline through a composition effect through a changing sectoral composition of the economy. Lewis et al. (2018) use this insight to argue that trade growth would have been much stronger without differential productivity growth since the 1970s, since the relatively non-tradable sectors have become more important in the economy. Second, the shift towards services in the domestic economy implies that there should also be scope to augment the share of services in trade from its baseline level of about 21 per cent.[52] However, as will be discussed now, although the share of services

Table D.4: The share of services output in total output is projected to rise
Value share of services output in total value of output in 2018 and 2040 in the baseline and in 2040 under the digitalization scenarios

Region	2018 baseline	2040 baseline	2040 digitalization
Asian LDCs	64%	83%	86%
Australia	80%	85%	86%
Brazil	76%	84%	84%
Canada	80%	86%	88%
China	62%	75%	79%
European Union (28)	81%	87%	89%
EFTA	75%	82%	84%
India	71%	83%	86%
Japan	81%	86%	88%
Republic of Korea	69%	79%	81%
Latin America	69%	79%	80%
Mexico	72%	80%	82%
Middle East and North Africa	54%	64%	69%
Russian Federation	64%	71%	74%
United States	83%	88%	90%
Southeast Asia	61%	73%	76%
Other Asian economies	73%	80%	82%
Sub-Saharan African LDCs	55%	64%	70%
Sub-Saharan Africa other	49%	63%	65%
Rest of world	68%	78%	81%
Global average	**74%**	**82%**	**84%**

Source: Simulations with WTO Global Trade Model.
Notes: The table displays the share of services (net) output in total value (net) output.

trade in total trade is projected to increase, it will not come close to the share of services output in total output.

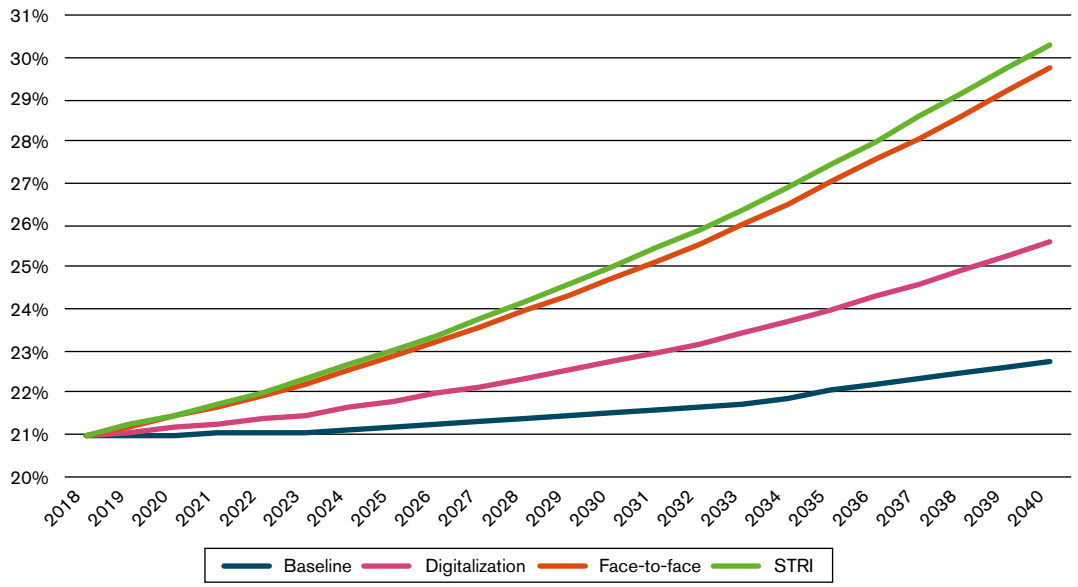
Figure D.34 displays the development of the share of services trade in total trade under the different scenarios. Services trade in the WTO Global Trade Model only contains trade through GATS modes 1, 2 and 4 and excludes mode 3 (i.e. sales by foreign affiliates). Therefore, services trade shares are smaller than in Section B. Figure D.34 shows that, in the baseline, the share of services trade is projected to increase only very modestly, from 21 per cent to 22 per cent. In the digitalization scenario, the share increases to about 26 cent. Adding the face-to-face scenario leads to an increase in the share of services trade of close to 30 per cent. This share is projected to exceed 30 per cent when trade policy barriers decline as well. This shows that the rising share of services in the domestic economy projected in Table D.4 does not trigger a corresponding rise in the share of services trade (see Figure D.34). The reason for this is that the services sectors whose shares in the domestic economy increase most (business services and health and education services) are relatively harder to trade across borders. Only a reduction in trade costs, as in the different scenarios, leads to an increase in services trade.

(ii) Macroeconomic effects on trade and GDP

In this section, we will present the projected changes in trade and GDP under the different scenarios. Figure D.35 displays the average annual percentage increase in real trade for goods and services and for the individual services sectors.[53] The scenario on change in services trade regulations (STRI scenario) is not displayed in this figure on sectoral changes, but is presented in a separate figure, as

Figure D.34: The share of services trade in total trade is projected to rise above 30 per cent in the scenario where all trade costs decline

Share of services trade in total trade in four cumulative scenarios, 2018-40

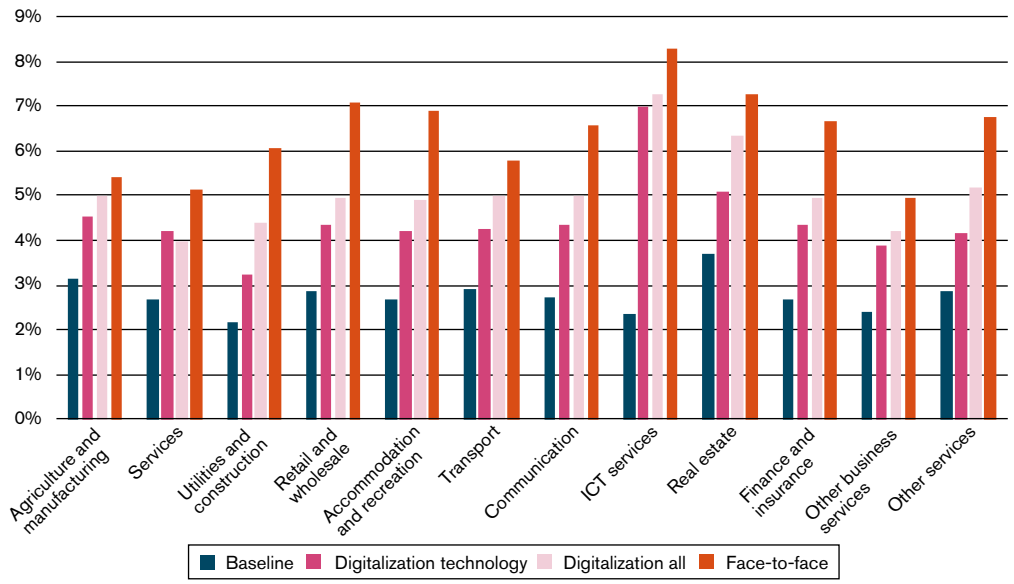


Source: WTO calculation with the WTO Global Trade Model.

Notes: The figure displays the share of exports in services (at free-on-board prices), inclusive of transport services sold to the global transport sector. The digitalization scenario contains additional productivity growth, a more intensive use of ICT services in production, and reductions in trade costs associated with the digitalization such as an extension of broadband coverage. The face-to-face scenario, which is cumulative to the first scenario, includes trade cost reductions because of the reduced importance of face-to-face interaction. The STRI scenario adds reductions in trade policy related trade costs.

Figure D.35: Projected trade growth is highest in ICT services

Annual real trade growth in different services sectors, 2018-40



Source: Simulations with WTO Global Trade Model.

Notes: The figure displays the average yearly real trade growth from 2018 until 2040 under the different scenarios in the different sectors. "Agriculture and manufacturing" and "Services" are calculated based on trade-weighted averages. The digitalization scenario has been split into two in this figure. The "digitalization technology" scenario contains additional productivity growth and a more intensive use of ICT services in production. The "digitalization all" scenario adds reductions in trade costs associated with digitalization, such as an extension of broadband coverage. The face-to-face scenario, cumulative to the digitalization scenario, includes trade cost reductions because of the reduced importance of face-to-face interaction.

it only plays a role in three of the services sectors. The digitalization scenario has been split into two in this figure. "Digitalization technology" includes only additional productivity growth and a more intensive use of ICT services, whereas "digitalization all" also includes reductions in trade costs.

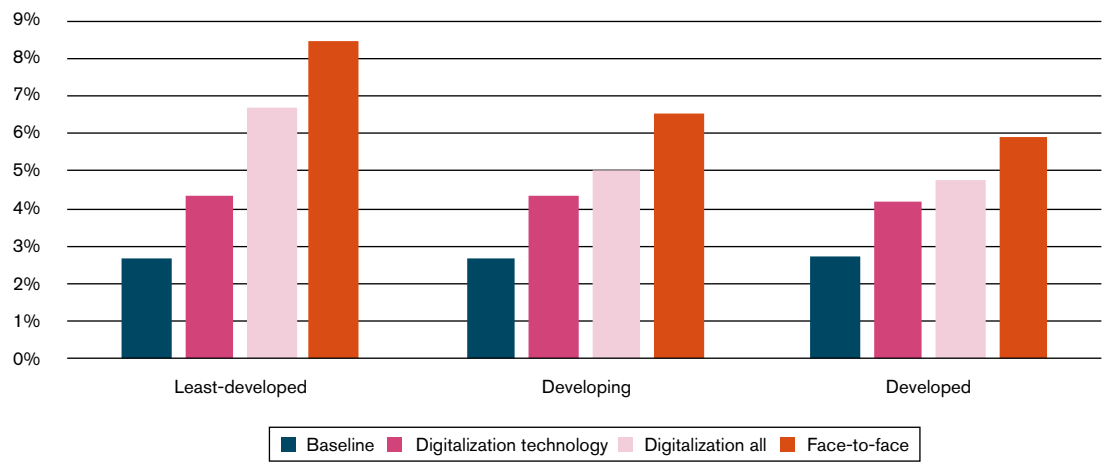
Although projected trade growth is higher in the baseline for agriculture and manufacturing, growth in services trade is almost identical to trade growth in agriculture and manufacturing in the digitalization and face-to-face scenarios. The figure also shows that the impact of reductions in trade costs because of the reduced importance of face-to-face interaction is much stronger for services than for commodities. In particular in the retail and wholesale, communications, and finance and insurance sectors, trade growth would be much higher.

Figure D.36 shows projected annual real trade growth for services in the three aggregate regions – least-developed, developing, and developed – for the different scenarios. The figure makes it clear that projected trade growth is comparable in the three regions in the baseline, whereas it is substantially higher in least-developed and developing countries in the "digitalization all" scenario. Higher assumed GDP growth in least-developed and developing countries is not translated into higher trade growth, because countries are also dependent on trading partners for their trade growth.[54] Least-developed countries in particular are projected to benefit from reductions in trade costs in the digitalization scenario, because reductions in trade costs associated with better broadband and the reduced impact of the credit and contract environment are larger for lower-income countries. The projected increase in trade growth in the face-to-face scenario is more equal across the different regions.

The additional trade growth in the different scenarios also leads to higher GDP growth. The developing and least-developed countries are projected to benefit more from reductions in trade costs associated with new technologies and from the reduction in trade costs in the face-to-face scenario. Annual growth of real GDP is projected to increase from 5 per cent to 5.3 per cent and from 6.4 per cent to 7.5 per cent in respectively the developing and least-developed countries with the trade cost reductions associated with new technologies, whereas real GDP growth in the developed countries would only increase from 3.3 per cent to 3.4 per cent. In the face-to-face scenario the different regions would benefit more proportionally with real GDP growth increasing further to 3.7 per cent, 7.9 per cent, and 3.7 per cent in respectively the developing, least-developed, and developed countries.

Finally, Figure D.37 shows the impact of the STRI scenarios on services export growth in the three sectors, with projected reductions in trade costs. The largest increase in trade is projected to take place in transport services in the least-developed

Figure D.36: Projected services trade growth is highest in least-developed countries
Annual real trade growth of services in different regions, 2018-40

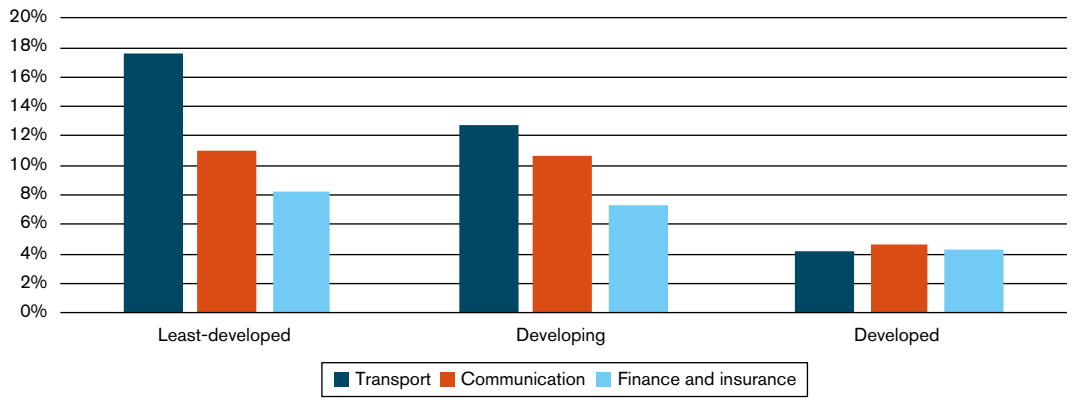


Source: Simulations with WTO Global Trade Model.

Notes: The figure displays the average yearly real trade growth of services from 2018 until 2040 under the different scenarios in the different regions. Region averages are calculated based on trade-weighted averages. See also the note to Figure D.35.

Figure D.37: Projected services trade growth associated with reductions in services trade barriers is highest in least-developed countries

Additional real growth of exports in three services sectors (cumulative) as a result of the reduction in STRI, 2018-40



Source: Simulations with WTO Global Trade Model.

Notes: The figure displays the cumulative additional growth in real exports from 2018 until 2040 under the scenario of a reduction in the STRI towards the median of the lowest quartile of STRI scores across economies. Regional averages are calculated based on trade-weighted averages. See also the note to Figure D.34.

countries. This pattern is driven by the scenario and the estimated impact of the STRI. Least-developed countries start with the highest levels of trade restrictions and thus will display the highest additional trade growth, and ad valorem equivalents of services restrictions are highest in the transport sector. However, Appendix Table D.12 shows that the additional growth in services exports of the United States in the three sectors with reductions in the STRI is above the average despite the fact that the reduction in the STRI is far below the average. The reason is that the United States tends to benefit from reductions in barriers of its trading partners.

(iii) Services trade by sector

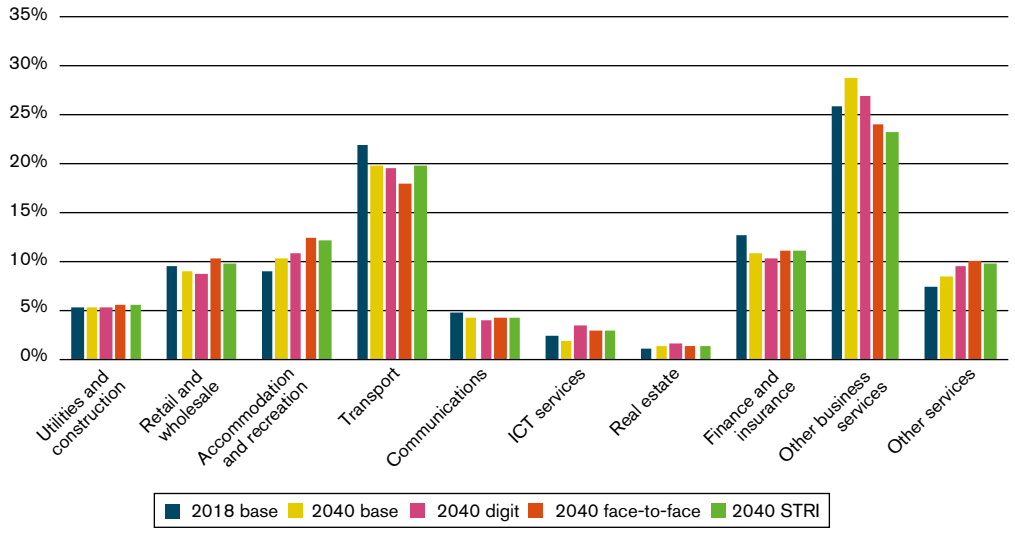
Figure D.38 displays the share of different services sectors in total services trade at a global level. The figure shows that the different scenarios generate considerable variation in the importance of different sectors in total services trade. In the baseline, the share of services sectors displaying lower productivity growth tends to increase ("Other business services" and "Other services"), whereas the share of sectors with high productivity growth ("Communications", "ICT services", and "Finance and insurance") tends to fall. In the digitalization scenario the share of ICT services is projected to return to its old level, because of the more intensive use of ICT services as intermediates in the other sectors) included in the model. In the face-to-face scenario, the relative importance of the transport sector tends to decrease, whereas the shares of "Finance and insurance" and "Other services" are projected to increase. In the face-to-face scenario, the share of transport falls, because of stronger reductions in trade costs in the other sectors. In the STRI scenario the share of transport returns to the 2040 baseline level because of the projected reduction of trade barriers in this sector.

(iv) Services trade by level of development

Figure D.39 displays the development of the share of developing and least-developed countries in total trade (upper panel) and services trade (lower panel). The upper panels of the figure show that the share of developing and least-developed countries in total trade is projected to increase in the baseline and more so in the different scenarios with only small differences between the different scenarios. The share of developing countries is projected to increase from 46 per cent to about 53 per cent in the baseline and about 55 per cent in the different policy scenarios, whereas the share of least-developed countries is projected to increase from about 1.3 per cent to respectively 2 per cent and 2.5 per cent in the baseline and the different policy scenarios. The main reason for a higher share of developing and least-developed countries in global trade in the different scenarios is the projection that less technologically advanced economies are expected to reduce trade costs more significantly (related to an improvement in internet coverage and a smaller negative impact of a low level of the credit and contract environment on trade costs). This convergence scenario is discussed

Figure D.38: The importance of different services sectors in services trade varies with different scenarios

Value share of services sectors in total services trade, 2018-40

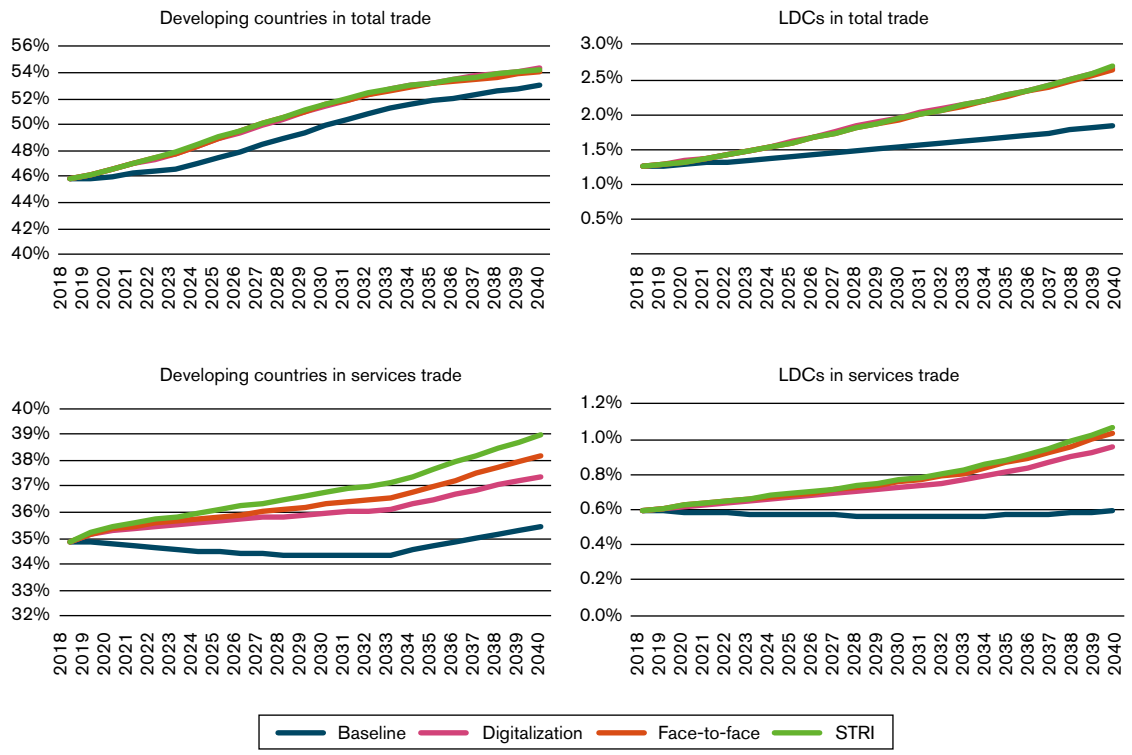


Source: Simulations with WTO Global Trade Model.

Notes: The figure displays the value share of global trade in different services sector in total global services trade. The scenarios are cumulative.

Figure D.39: The share of developing and least-developed countries in services trade rises in scenarios with trade cost reductions

Share of developing countries (left panels) and least-developed countries (right panels) in total trade (upper panels) and services trade (lower panels), 2018-40



Source: Author's calculation with the WTO Global Trade Model.

into more detail in WTO (2018a) and compared there with a scenario in which countries' technologies and trade cost reductions do not display convergence.

The share of developing countries in services trade displays much more variation across the different scenarios. Whereas the share is projected to stay roughly constant in the baseline scenario, at around 35 per cent, it is expected to increase to almost 40 per cent in the face-to-face scenario. The share of developing countries is projected to increase in the digitalization scenario for the same reason as described above for total trade: developing countries are expected to catch up in technologies impacting trade costs. However, both additional scenarios raise the share of developing countries in services trade more.

First, developing economies are expected to benefit more from the reductions in trade costs in the face-to-face scenario, despite the fact that the modelled reduction in trade costs in this scenario does not vary by country. The reason that developing economies benefit disproportionally from trade cost reductions is related to the fact that trade cost reductions are concentrated in the skills-intensive services sectors. And, as may be seen in Table D.4, the supply of skilled labour is expanding rapidly in developing economies. Hence, the demographic changes in the supply of skilled labour and the reductions in face-to-face related trade costs reinforce each other in their impact on a rising share of developing economies in services trade.

Second, the STRI-scenario of convergence contains a stronger reduction of trade policy barriers in developing economies, which tend to start with a higher initial level of trade restrictiveness.

(d) Overview of the simulation results

Bearing in mind that our model does not capture trade growth on the extensive margin (that is, growth generated by new trading relationships or new sectoral flows) and trade in services through foreign affiliates, our simulations give rise to three main conclusions:

1. The share of services output in total output is projected to increase substantially from 74 per cent to 82 per cent in the baseline scenario, whereas the share of services trade is projected to increase only marginally (from 21 per cent to 22 per cent based on GTAP data) in the baseline scenario. Digitalization will increase the share of services in trade to about 26 per cent. If the need for face-to-face contact becomes less of a barrier for trade and trade policy barriers are reduced, the share of services trade could increase further, to more than 30 per cent. This represents a 50 per cent increase in the share of services trade in global trade. Hence, new technologies and changes in policy are projected to bring the share of services trade closer to the share of services output in total output.

2. Whereas trade growth is projected to be higher in goods than in services in the baseline, services trade growth is projected to outpace trade growth in agriculture and manufacturing in the digitalization scenario. Trade growth is highest in least-developed countries, because of higher projected GDP growth and stronger reductions in trade costs in both the baseline and the digitalization scenario. Although reductions in trade barriers are modelled to occur mostly in lower-income countries, export growth in developed countries would also be promoted by it.

3. The share of developing countries in services exports is projected to stay around 35 per cent in the baseline scenario, although the share of developing countries in total trade is projected to become more than 50 per cent. Hence, the simulations do not provide support for the hypothesis that changes to demography and education incorporated in the baseline, such as the increasing supply of skilled labour in developing countries, raise the strength of developing countries in services trade. However, the interaction of demographic changes and technological changes will expand the role of developing countries in services trade. In the scenario in which all trade costs decline, the share of developing countries in services trade would rise substantially from 35 per cent to almost 40 per cent, representing an increase of about 15 per cent. Developing countries would benefit disproportionally from lower trade costs in services, because of the strong projected growth in the number of skilled workers in these countries.

4. Concluding observations

The future is going to change the quantity of services we trade, what services we trade, the ways we trade services, and who trades them. The evolution of barriers to services trade, technological developments, trends in demography and income growth, and climate change are some of the key factors that will drive future patterns of trade in services. This report looks at these trends and highlights some of the key channels through which the effects on trade in services may play out in the future.

Measuring trade costs using a novel approach, this report estimates that overall trade cost in services are

higher than in trade in goods, but that they have gone down over time. Regulatory barriers have fallen. Digital platforms and new technologies are likely to reduce the cost of services trade even further in the future. These trends are likely to boost trade and to increase the variety of services traded in the future. There is a potential for services to favour inclusiveness, as lower barriers to trade allow more small businesses and women to participate in services trade.

The future development of regulation in digital services trade and investment in digital infrastructures will be key in determining countries' comparative advantages in digitally enabled services sectors. On average, reforms have reduced policy barriers in some sectors over time, yet new trade restrictions in some sectors, especially in digitally-enabled services have emerged. Regulatory differences between economies can pose high compliance costs for firms, especially small enterprises. Without more cooperation in the area of services trade-restrictiveness, there is the risk that, while macroeconomic trends and technologies may provide for more inclusive services trade, policies may impede these gains.

Digital technologies will affect trade in services not only through their effects on trade costs. This report highlights three more channels. First, technological developments affect trade in services because they affect the productivity of the services sectors. ICT technologies are the main drivers of this phenomenon, and patterns of R&D and innovation suggest that they will continue to play a key role in the future. ICT-intensive sectors are likely to dominate the future of trade in services. Second, new technologies blur the difference between goods and services activities. Third, digital technologies affect trade in services through their effects on global value chains. The largest share of services trade is currently represented by the demand for services inputs by firms operating within a global value chain. Since there is no evidence of reshoring, we expect demand for services trade through this channel to be sustained.

Another global trend that will have a major impact on trade in services relates to demographic changes. A population's age structure plays a key role in affecting the composition of future services import demand and patterns of specialization. An ageing population in developed countries will demand more health services. A growing young population in developing countries will demand education and digital services. Trade in services will be key to satisfying these demands. Digital technologies may facilitate imports of educational services in developing countries, with potential positive development effects.

Millennials and Generation Z will represent an increasing share of the population. On average, they constitute more than 50 per cent of major social media platforms users and spend more than two and half hours per day on social media, compared to one hour for Baby Boomers. Demand for online services is therefore likely to increase in the future, providing new opportunities. For example, streaming services provide opportunities for artists in developing countries, for example, to export their creative content to international markets at low costs.

One of the most striking features of the global economy since the start of the millennium is the increasingly significant role played in it by developing countries. Developing economies have increased their rate of convergence with developed economies, and predictions are that this trend is going to persist in the future – although at a slower pace – with some developing countries converging toward the GDP of developed countries. As their income grows, consumers devote a larger share of it to services, especially skills-intensive services. And, in parallel, as their income grows, countries increasingly specialize in the production of skill-intensive services. We should expect increasing trade in services as economies converge.

Finally, the report turns to the phenomenon of climate change and the likelihood that it will disrupt some services and their trade. In tourism and recreation services, climate change is putting some destinations at risk. In transportation, climate change will disruption some of the traditional routes, and probably open new ones. But, pushed by the changing demand from consumers and government regulation, services industries are adapting to become more environmentally friendly. This is the case, for example, of the growing demand for ecotourism, especially from the Millennial generation. The market for environmental goods and related environmental services (such as project consultancy services, transportation and installation of wind turbines and towers required for the construction of wind power systems) is expected to grow significantly in the future. Trade in these environment-related services is likely to grow and provide helpful in adapting to and mitigating climate change.

In order to get a sense of the potential quantitative impact of these major trends on services trade, the report uses the WTO CGE model to run a number of simulations. The model does not capture trade in services through foreign affiliates and it can only partially account for the creation of new services trade relationships, therefore it cannot account for all the dynamics the Report discusses in relation

to major trends. Nevertheless, it provides some interesting insights. First, looking at the patterns of trade in services between 2019 and 2040, our simulation shows that the future expected patterns of demographic changes and income growth alone will only marginally increase the share of services trade in the global economy unless the effects take place through FDI or new trade relationships.

Then, having established this baseline scenario, we examine the impact of three trends: (i) general lower services trade costs due to technological innovation; (ii) reduced need for face-to-face interaction; and (iii) reduction of the policy barriers to services trade. Our simulations project that, under this scenario (where future technological changes are accompanied by a reduction of services trade barriers), the services sector's share of global trade will grow by 50 per cent. If developing countries adopt new technologies, their share in global services trade will increase by about 15 per cent.

While the discussion in this section about the future of trade in services tended to focus on the opportunities that future trade in services may provide, it also foreshadows issues related to social disruption, competition issues and security concerns, which the major trends may bring about and which may become important for the WTO and for international cooperation in the future.

Appendix D.1: Trade costs and their decomposition

Trade cost are estimated using a sector-level gravity model specification proposed in Egger et al. (2018). First, we obtain the coefficients on country-pair dummies $(\widehat{d_{ij}})$ from a fully saturated gravity model using a Pseudo Poisson Maximum Likelihood (PPML) estimator. The underlying international and domestic trade data come from the World Input-Output Database (WIOD) for 2000 to 2014, and from experimental multiregional input-output tables by the Asian Development Bank (ADB-MRIO) for 2015 to 2017.[55] We concorded the two datasets to ensure their consistency.

Second, to obtain trade costs (T_{ij}) we transform these estimates using a sectoral elasticity of substitution θ:

$$T_{ij} = (\widehat{d_{ij}})^{-1/\theta}$$

The parameter θ is estimated for each sector in Egger et al. (2018). A higher θ means a more elastic reaction of demand to prices, and hence a higher responsiveness of import demand to trade frictions. Generally, θ takes on a lower value for services than for manufactures, implying that trade in services reacts less to changes in trade costs. The use of sector-specific elasticities also means that the estimated size of trade costs differs from conventional estimates that typically use one uniform elasticity of substitution for all sectors.

In the subsequent analysis we identify the factors which explain T_{ij}, run a regression analysis with importer and exporter fixed effects, and use the results to decompose the bilateral variation in T_{ij} into different components.

The use of importer and exporter fixed effects precludes identification of factors that have the same impact on trade across all partners. However, we are still able to include several country-specific variables which are likely to drive bilateral trade costs. For instance, both partners need to a have good broadband coverage. Having fast internet access in the exporting economy does not help if nobody is connected in the importing economy. Hence bilateral trade costs will be determined by the minimum of the two partners.

The estimated equation is

$$\begin{aligned}\ln(T_{ij}) = \alpha + \boldsymbol{\beta} \cdot Transport\ and\ travel_{ij} + \boldsymbol{\gamma} \cdot Information\ and\ transaction\ costs_{ij} \\ + \boldsymbol{\delta} \cdot ICT\ penetration_{ij} + \boldsymbol{\varphi} \\ \cdot Trade\ policy\ and\ regulatory\ differences_{ij} + \boldsymbol{\rho} \\ \cdot Governance\ quality_{ij} + \varphi_i + \theta_j + \epsilon_{ij}.\end{aligned}$$

- To capture the impact of transportation and travel costs on total bilateral trade frictions, the set of variables in $Transport\ and\ travel_{ij}$ includes the log of population-weighted distance, a binary variable indicating whether the trading partners share a border and a binary variable indicating whether either of the trading partners is landlocked.[56] Additionally, it includes the minimum between the exporter's and the importer's quality of port infrastructure[57] and the minimum of trade- and transport-related infrastructure.[58]
- To capture the impact of information and transaction costs, the set of variables in $Information\ and\ transaction\ costs_{ij}$ includes having a common ethnic language, having a common religion, having a common legal origin, previously being in a colonial relationship, previously being the same country[59] and the historical stock of migrants (in 1970) from the exporting in the importing country and from the importing in the exporting country.[60]
- $ICT\ penetration_{ij}$ consists of the minimum of the exporter's and the importer's broadband coverage per capita, mobile phone subscriptions per capita and fixed line subscriptions per capita.[61]
- To capture trade policy barriers and regulatory differences, the set of variables in $Trade\ policy\ and\ regulatory\ differences_{ij}$ includes being in a free trade agreement, being part of the European Union and being part of the Eurozone.[62] It also includes the OECD's Services Trade Restrictiveness Index (STRI) heterogeneity, applied bilateral tariffs[63] and the burden of customs procedures.[64] Note that in services regressions, the STRI heterogeneity is at a sectoral level, while in goods regressions, we include the simple average of STRI heterogeneity across all services sectors. Similarly, tariffs are sector-specific in goods regressions, while in services regressions we use the simple average bilateral tariff.
- $Governance\ quality_{ij}$ includes differences in the rule of law, regulatory quality and corruption, as well as the minimums of these variables between the importer and the exporter.[65]

While trade cost trend figures are based on 43 economies, the regressions for the decomposition of trade costs are run on data from 2016 and include 30 economies (870 country pairs), as this is the latest year and the largest sample for which all variables are available.[66] The estimation is run separately for each two-digit sector. The R-squared decomposition is computed using the Shapley and Owen values.

Appendix D.2: Simulations

This appendix contains technical details about the different trends included in the quantitative simulation exercise. The size of the effects of different trends is based on econometric work, together with scenario-building (for falling trade costs as a result of new technologies, the rising share of e-commerce, falling trade policy barriers, and the reduced importance of face-to-face interaction), on predictions from the literature (for the productivity part of digitalization and robotization) and on trends in the past (for rising capital income shares and a more intensive use of ICT services).[67]

To construct the baseline, the GTAP10 (Global Trade Analysis Project) database (Version 3) for 2014 is aggregated to 20 regions, 16 sectors, and five factors of production (see Appendix Tables D.1 and D.2 for an overview of the aggregation).[68] Based on the 2014 baseline data, the development of the global economy is projected to 2023 using medium-run macroeconomic projections from the IMF on GDP per capita growth, population growth, employment growth and changes in the savings rate. From 2023 to 2040 the projections are disciplined by long-run projections from the OECD (shared socio-economic pathways, SSP2)[69] (Dellink et al., 2017) on GDP per capita growth and complemented by UN projections on population and labour force growth.

(a) Aggregation of regions and sectors

Appendix Tables D.1 and D.2 display the aggregation of regions and of sectors, respectively.

Appendix Table D.1: Aggregation of regions

Code	Region	Comprising
asl	Asian LDCs	Cambodia; Bangladesh; Lao People's Democratic Republic; Myanmar; Nepal; Rest of Southeast Asia
aus	Australia	
bra	Brazil	
can	Canada	
chn	China	
e28	European Union (28)	
eft	EFTA	
ind	India	
jpn	Japan	
kor	Republic of Korea	
lac	Latin America and the Caribbean	
mex	Mexico	
min	Middle East and North Africa	
oas	Other Asian economies	Hong Kong (China); Mongolia; New Zealand; Pakistan; Sri Lanka; Chinese Taipei; Rest of Oceania; Rest of East Asia; Rest of South Asia.
row	Rest of world	Albania; Armenia; Azerbaijan; Belarus; Georgia; Kazakhstan; Kyrgyz Republic; Tajikistan; Ukraine; Rest of Eastern Europe; Rest of Europe; Rest of Former Soviet Union; Rest of the world.
rus	Russian Federation	
sea	Southeast Asia	Brunei Darussalam; Indonesia; Malaysia; Philippines; Singapore; Thailand; Viet Nam.
ssl	Sub-Saharan African LDCs	Benin; Burkina Faso; Ethiopia; Guinea; Madagascar; Malawi; Mozambique; Rwanda; South Central Africa; Tanzania; Togo; Uganda; Zambia; Zimbabwe; Rest of Eastern Africa; Rest of Western Africa.
sso	Sub-Saharan Africa other	Botswana; Cameroon; Central Africa; Côte d'Ivoire; Ghana; Kenya; Mauritius; Namibia; Nigeria; Senegal; South Africa; Rest of South African Customs Union.
usa	United States	

Notes: 141 GTAP regions are aggregated to 20 regions. Only details for regions not unambiguously defined are included.

Appendix Table D.2: Aggregation of sectors

Code	Region	Comprising
agr	Agriculture	
ext	Mining and extraction	
prf	Processed food	
che	Chemicals and petrochemicals	
otg	Other goods	Leather products; manufactures nec; paper products, publishing; textiles; wearing apparel; wood products.
met	Metals	
elm	Electronic equipment	
otm	Other machinery, motor vehicles	Machinery and equipment nec; mineral products nec; motor vehicles and parts; transport equipment nec.
utc	Utilities and construction	
trd	Wholesale and retail	
acr	Accommodation and recreation	Accommodation, food and services; recreational and other services.
tra	Transport	
com	Communications	
ict	ICT services	
rsa	Real estate activities	
obs	Business services	
fin	Finance and insurance	
ots	Other services	Public administration and defence, education, healthcare and dwellings.

Notes: 65 GTAP regions are aggregated to 16 sectors. Only details for sectors not unambiguously defined are included. "nec" is "not elsewhere classified".

(b) Changes in technology because of digitalization

Three types of technological change because of digitalization are included in the simulations and the technical details of each of the three is discussed in turn.

(i) Reallocation of tasks from labour to capital

We follow the approach in WTO (2018a) to model the reallocation of tasks from labour to capital and thus refer for the technical details to Appendix C.3 of last year's report. The trend is modelled within the theoretical framework developed by Acomoglu and Restrepo (2018) of an optimal allocation of capital and labour to different tasks. Following Acemoglu and Restrepo we assume that the initial allocation of tasks is suboptimal. Therefore, reallocation leads to both higher productivity growth and a change in the capital share of production. Projections on higher productivity growth varying by sector are based on studies of the impact of digitalization on productivity growth. The rising capital income share is based on historical trends, and variation across economies in the reallocation of tasks towards capital is determined by variation in the Digital Readiness Index of the World Economic Forum (WEF). Based on the different studies, productivity growth is projected to increase by 1.25 per cent on average, and the labour income share is projected to fall by 0.02 (2 percentage points) per decade. However, these trends differ per sector and per economy, with the former determined by the studies on productivity growth, and the latter by the digital readiness index from WEF. The scaling factors of both the additional productivity growth and changes in the capital income share are displayed in Appendix Table D.3.

(ii) More intensive use of ICT services

To project the change in the share of ICT services, we combine empirical estimates using historical data from the WIOD between 2000 and 2014 and projections on the tendency for the share of ICT services to fall over time, given the above average productivity growth of ICT services in our model. More specifically, suppose the initial share of supplying sector k to using sector l in the data is s_{kl}^{in} in and the final share is s_{kl}^{in}. Based on the model without a more intensive use of ICT services, the share of sector k is projected to change from $\widetilde{s_{kl}^{in}}$ to $\widetilde{s_{kl}^{fin}}$ because of differential productivity growth. Then the projected change in the share of sector k is given by:

Appendix Table D.3: Scaling factors of regions and sectors for the calculation of productivity growth and capital income share changes due to new technologies

Regions	Scaling factor	Sectors	Scaling factor
Sub-Saharan African LDCs	0.64	Metals	0.64
Asian LDCs	0.69	Processed food	0.65
Sub-Saharan Africa other	0.77	Agriculture	0.65
Latin America and Caribbean	0.83	Other services	0.66
India	0.83	Transport	0.73
Mexico	0.88	Mining and extraction	0.86
Brazil	0.88	Other goods	0.87
China	0.92	Utilities and construction	0.87
Rest of world	0.95	Chemicals and petrochemicals	0.99
Middle East and North Africa	0.97	Real estate activities	1.05
Southeast Asia	0.97	Other business services	1.05
Russian Federation	0.99	Wholesale and retail	1.07
Other Asian economies	1.09	Accommodation and recreation	1.07
European Union (28)	1.15	ICT services	1.22
Australia	1.21	Communications	1.23
Canada	1.23	Finance and insurance	1.30
Republic of Korea	1.23	Other machinery and motor vehicles	1.56
Japan	1.23	Electronic equipment	1.64
EFTA	1.27		
United States	1.27		

Source: Own calculations based on empirical regressions and studies on productivity effects of digitalization.

Notes: Scaling factors determine both the additional productivity growth relative to the average (1.25 per cent per year) and the change in the capital income share relative to the average (0.02 per decade).

$$\Delta sh_{kl}^{proj} = sh_{kl}^{fin} - sh_{kl}^{in}\frac{\widetilde{s_{kl}^{fin}}}{\widetilde{s_{kl}^{in}}} = \Delta sh_{kl}^{emp} - sh_{kl}^{in}\frac{\widetilde{s_{kl}^{fin}} - \widetilde{s_{kl}^{in}}}{\widetilde{s_{kl}^{in}}}$$

(D.1)

For example, if the share of sector k in sector l has changed historically from 2 per cent to 2.5 per cent in the data, whereas it is projected to fall from 3 per cent to 2.5 per cent in the simulations, then the trend in the share of sector k, net of the influence of differential productivity growth, is:

$$\Delta sh_{kl}^{proj} = 2.5\% - 2\%\frac{2\%}{3\%} = 0.5\% - 2\%\frac{2\%-3\%}{3\%} = 1\frac{1}{6}\%$$

(D.2)

Table Appendix D.4 contains the observed change in the share of ICT services used in other sectors from 2000 to 2014 (over 15 years), the simulated change in the share of ICT services from 2018 to 2032 in the data, and the projected changes based on equation (D.1).

(iii) Trade cost reductions associated with technological change

Projected trade cost reductions associated with technological change are modelled in two steps following the same approach as in WTO (2018a). First, trade costs inferred from international relative

Appendix Table D.4: Estimation results share of ICT services used by different sectors as intermediate input in historical data and simulated data

	Agriculture	Business services	Chemicals and petrochemicals	Communications	Electronic equipment	Mining and extraction	Finance and insurance	ICT services
Historical data								
Average normal change in shares								
Coefficient	0.00987***	0.00382	0.00951**	0.08254***	0.00996	0.01684***	0.11100***	0.50010***
Standard error	-0.00325	-0.00571	-0.00374	-0.01579	-0.00779	-0.00467	-0.02634	-0.09197
Number of observations	600	586	600	600	600	600	600	586
Simulated data								
Average percentage change in shares								
Coefficient	-0.0829***	-0.9728***	-0.1617***	-0.7185***	0.0386	-0.6344***	-0.8842***	-0.7724***
Standard error	(0.0222)	(0.0184)	(0.0223)	(0.0160)	(0.0285)	(0.0165)	(0.0158)	(0.0156)
Number of observations	420	420	420	420	420	420	420	420
	Met	otg	othm	ots	Prf	tra	trd	Utc
Historical data								
Average normal change in shares								
Coefficient	0.01175***	0.01916***	0.01500***	0.02679***	0.01359***	0.01841	0.03498***	0.00614
Standard error	-0.00344	-0.00412	-0.00396	-0.0054	-0.00436	-0.0125	-0.00959	-0.0042
Number of observations	600	600	600	600	600	600	600	600
Simulated data								
Average percentage change in shares								
Coefficient	-0.4876***	-0.3112***	-0.3703***	-0.8699***	-0.1329***	-0.4800***	-0.7543***	-0.5618***
Standard error	(0.0205)	(0.0213)	(0.0183)	(0.0152)	(0.0225)	(0.0173)	(0.0163)	(0.0188)
Number of observations	420	420	420	420	420	420	420	420

Source: Own regressions using data from WIOD and simulation results with Global Trade Model.

Notes: Upper panel estimates report average yearly normal changes in shares of ICT services in different sectors with historical data from WIOD, and lower panel estimates report average yearly percentage changes in shares of ICT services with simulated data with the WTO Global Trade Model. *** p<0.01, ** p<0.05, * p<0.1

to intra-national trade, using the GTAP10 data also used in the simulations, are regressed on a host of determinants of trade costs. This is done for the three aggregate sectors: primary, secondary and tertiary. Second, a scenario is formulated for the change in the variables related to new technologies, as in WTO (2018a), based on the assumption that values converge to the level of the highest quartile (i.e. the 25 per cent highest value). Appendix Table D.5 contains the results of the regressions of inferred trade costs.

There are three changes compared to WTO (2018a). First, trade costs are calculated using GTAP data, in order to generate consistency between the data used for the simulations and for the estimation. Second, in line with the trade cost decomposition presented earlier in this section, more control variables are included in the regression of inferred trade costs on its determinants, in particular the World Bank measures Rule of Law and Quality of Regulation introduced in Appendix D.1. This reduces the risk of omitted variable bias and thus the risk that projected trade cost reductions may be overestimated.[70] Third, the variables included to capture the influence of digital technologies are changed. Five variables are included. To capture the influence of digital technologies on customs procedures, the lead time to export is included. This variable only affects trade costs for manufacturing sectors in the simulations and does not play a role for services in the scenario for changes in trade costs. Measures of the quality

Appendix Table D.5: Regression of inferred trade costs on measures of trade costs

Variables	Primary sector	Secondary sector	Tertiary sector
Dummy for FTA	-0.0880***	-0.0846***	-0.0167
	(0.0101)	(0.0118)	(0.0165)
Dummy for common colony	0.00935	-0.0831***	-0.0493**
	(0.0172)	(0.0205)	(0.0241)
Dummy for colonial relation	-0.176***	-0.225***	-0.258***
	(0.0274)	(0.0314)	(0.0527)
Log (distance)	0.0865***	0.144***	0.153***
	(0.00495)	(0.00586)	(0.00809)
Dummy for landlocked	0.181***	0.181***	0.164***
	(0.00661)	(0.00877)	(0.0120)
Dummy for common border	-0.237***	-0.266***	-0.332***
	(0.0207)	(0.0273)	(0.0361)
Log(credit environment)	-0.0697***	-0.110***	-0.0868***
	(0.00687)	(0.00831)	(0.0118)
Log(contract environment)	0.000986	-0.0251*	0.231***
	(0.0112)	(0.0133)	(0.0196)
Dummy for common language	-0.0677***	-0.141***	-0.0680***
	(0.0114)	(0.0119)	(0.0181)
Log(lead time to export)	-0.0100	0.0301***	0.0367***
	(0.00730)	(0.00907)	(0.0116)
Log(broadband connectivity)	-0.0493***	-0.0809***	-0.0988***
	(0.00370)	(0.00448)	(0.00646)
Log(rule of law)	-0.374***	-0.580***	-0.790***
	(0.0285)	(0.0344)	(0.0477)
Difference rule of law	-0.00353	-0.00755*	-0.00832
	(0.00326)	(0.00413)	(0.00614)
Log(regulatory quality)	0.280***	0.295***	0.439***
	(0.0270)	(0.0331)	(0.0442)
Difference regulatory quality	-0.00527	-0.00214	-0.0141**
	(0.00333)	(0.00411)	(0.00594)
Constant	0.538***	0.789***	0.921***
	(0.0908)	(0.110)	(0.156)
Observations	5,565	5,565	5,565
R-squared	0.426	0.568	0.455

Source: Dependent variable constructed based on GTAP-data. Explanatory variables from the Centre d'études prospectives et d'informations internationales (CEPII) and the World Bank, as described in Appendix D.1.

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table D.6: Ad valorem equivalent trade cost reductions different trends (averages across economies)

Regions	Common language	Credit and contract	Broadband subscription	Digitalization total	Face-to-face	STRI	Total
Asian LDCs	-8.15	-7.15	-10.55	-23.72	-12.74	-0.85	-34.00
Australia	-5.37	-0.59	-0.41	-6.31	-13.56	-0.99	-19.82
Brazil	-8.43	-2.52	-1.46	-12.04	-14.31	-1.04	-25.41
Canada	-3.11	-1.18	-0.24	-4.49	-12.19	-0.45	-16.51
China	-9.27	-1.27	-1.36	-11.63	-11.86	-0.74	-22.69
European Union (28)	-7.21	-1.59	-0.39	-9.04	-13.27	-0.37	-21.41
EFTA	-5.60	-1.30	-0.30	-7.10	-14.35	-0.58	-20.89
India	-7.05	-3.12	-8.00	-17.15	-9.15	-1.98	-26.22
Japan	-8.74	-0.87	-0.51	-9.98	-10.39	-0.01	-19.34
Republic of Korea	-5.89	-0.25	-0.41	-6.51	-10.90	-1.57	-18.01
Latin America	-4.86	-2.38	-1.65	-8.65	-12.40	-0.72	-20.55
Mexico	-3.54	-0.11	-0.45	-4.08	-10.87	-0.54	-14.97
Middle East and North Africa	-7.12	-2.18	-2.44	-11.36	-12.12	-1.43	-23.21
Russian Federation	-7.79	-0.55	-0.48	-8.73	-13.98	-1.76	-22.88
Southeast Asia	-5.98	-0.84	-2.47	-9.07	-12.73	-0.91	-21.37
Sub-Saharan African LDCs	-7.78	-9.89	-14.93	-29.31	-14.12	-0.80	-39.77
United States	-4.34	-0.52	-0.45	-5.27	-10.89	-0.57	-16.07
Other Asian economies	-5.46	-1.18	-1.71	-8.17	-12.24	-0.41	-19.74
Sub-Saharan Africa other	-5.50	-3.07	-12.13	-19.51	-12.67	-1.07	-30.46
Rest of world	-7.02	-0.86	-1.50	-9.20	-11.97	-1.37	-21.16
Average	**-6.62**	**-1.45**	**-1.47**	**-9.33**	**-12.29**	**-0.70**	**-21.03**

Source: WTO calculations based on various methodologies as described in the text.

Notes: The table displays the contribution of different variables to the reduction in trade costs in the different scenarios. "Common language", "Credit and contract" and "Broadband subscription" measure the reduction in trade costs because of a reduced impact of the absence of a common language, a poor credit and contract environment, and a low number of broadband subscriptions, respectively. "Face-to-face" measures the reduction in trade costs because of the reduced importance of face-to-face contact for trade costs. "STRI" measures the reduction in trade costs because of an improvement in services trade regulation. The methodology is described in the text. Note that percentage reductions are not additive.

of contracts and credit institutions are included, based on the assumption that their influence will be reduced if blockchain technologies are developed, which will make market participants less dependent on poor credit and contract institutions. Next, it is argued that the negative impact of common language on trade costs will fall because of the introduction of new technologies. Finally, regressions show that the number of broadband subscriptions has a negative influence on trade costs and it is assumed that lagging economies in terms of broadband subscriptions will catch up with the 75 per cent best-performing regions.[71]

(c) Reductions in trade policy barriers

Reductions in trade policy barriers are obtained in two steps. First, services trade flows inclusive of domestic flows in five sectors are regressed on an interaction term of the World Bank STRI with a trade-with-self (border) dummy and a host of control variables. Since the STRI is a most-favoured-nation measure applying to imports from all trading partners, the impact of the STRI is identified based on the difference between domestic purchases and imports, technically by including an interaction term of the STRI with a border dummy. Although the trade data consist only of balance-of-payments data (GATS modes 1, 2 and 4), for trade restrictiveness, the total STRI (a weighted average of the STRIs for all four modes) was included. The reason to do so is that restrictions to mode 3 trade will also affect trade through the other modes, both if the different modes are complementary or if they are substitutable.

Appendix Table D.8 contains the results of the regressions (using a Pseudo Poisson Maximum Likelihood) for the five sectors on which the STRI is available (see also Borchert et al., 2019b). The table shows that the STRI has a negative and significant

Appendix Table D.7: Ad valorem equivalent trade cost reductions different trends (sector averages)

Regions	Common language	Credit and contract	Broadband subscription	Digitalization total	Face-to-face	STRI	Total
Agriculture	-5.33	-0.82	-1.48	-7.49	0.00	0.00	-7.49
Mining and extraction	-8.82	-1.40	-2.84	-12.65	0.00	0.00	-12.65
Processed food	-11.21	-1.87	-2.79	-15.31	-18.95	0.00	-31.36
Chemicals and petrochemicals	-7.15	-0.95	-1.45	-9.36	-12.61	0.00	-20.79
Metals	-5.85	-0.70	-1.10	-7.55	-11.01	0.00	-17.73
Electronic equipment	-4.78	-0.35	-0.45	-5.54	-11.91	0.00	-16.78
Utilities and construction	-6.07	-3.47	-2.27	-11.38	-25.49	0.00	-33.97
Retail and wholesale	-6.20	-3.41	-0.99	-10.29	-44.53	0.00	-50.24
Accommodation and recreation	-6.49	-3.53	-1.54	-11.18	-44.53	0.00	-50.73
Transport	-6.61	-4.09	-1.94	-12.18	-30.55	-15.63	-48.54
Communications	-6.48	-4.63	-2.10	-12.68	-32.38	-5.03	-43.93
ICT services	-6.48	-4.63	-2.10	-12.68	-27.59	0.00	-36.77
Real estate	-6.59	-5.09	-2.90	-13.92	-27.59	0.00	-37.66
Finance and insurance	-5.97	-4.55	-0.92	-11.07	-39.78	-4.05	-48.62
Other goods	-6.09	-0.83	-1.15	-7.93	-11.65	0.00	-18.66
Other machinery, motor vehicles	-6.33	-0.58	-0.67	-7.51	-7.49	0.00	-14.43
Other business services	-6.30	-4.84	-2.44	-13.01	-27.59	0.00	-37.01
Other services	-5.96	-3.43	-2.59	-11.54	-37.11	0.00	-44.37
Average	**-6.62**	**-1.45**	**-1.47**	**-9.33**	**-12.29**	**-0.70**	**-21.03**

Source: WTO calculations based on various methodologies as described in the text.

Notes: The table displays the contribution of different variables to the reduction in trade costs in the different scenarios. "Common language", "Credit and contract" and "Broadband subscription" measure the reduction in trade costs because of a reduced impact of respectively the absence of a common language, poor credit and contract environment and a low number of broadband subscriptions. "Face-to-face" measures the reduction in trade costs, because of a reduced importance of face-to-face contact for trade costs. "STRI" measures the reduction in trade costs because of an improvement in services trade regulation. The methodology is described in the text. Note that percentage reductions are not additive.

Appendix Table D.8 Regression of services trade, measures of trade costs, and the interaction between STRI and a border dummy

	Transport	Insurance	Banking	Information and communications	Professional services
Ln(distance)	-0.2047***	-0.5427***	-0.1771*	-0.5160***	-0.0826
	(0.057)	(0.179)	(0.094)	(0.096)	(0.053)
Contiguity	0.5921***	-0.2377	-0.2016	-0.0171	0.4353***
	(0.138)	(0.394)	(0.225)	(0.206)	(0.127)
Common language	0.8739***	1.4100***	1.4235***	0.9552***	0.9797***
	(0.119)	(0.322)	(0.166)	(0.184)	(0.106)
Common religion	-0.3841*	-0.4881	-0.7664**	-0.0518	-0.2764
	(0.214)	(0.594)	(0.338)	(0.283)	(0.188)
Common legal origin	-0.0365	-0.2325	-0.0499	-0.2780*	-0.0174
	(0.095)	(0.273)	(0.144)	(0.154)	(0.088)
FTA dummy (WTO)	0.2605**	0.1392	0.1287	0.3104*	0.2482**
	(0.110)	(0.351)	(0.184)	(0.170)	(0.100)
Dummy both EU	0.8654***	1.2343***	1.0964***	1.0291***	1.1226***
	(0.126)	(0.355)	(0.226)	(0.183)	(0.111)
Border dummy	6.7516***	-0.8487	-4.0299*	-0.3701	-3.4687***
	(1.366)	(2.789)	(2.326)	(2.223)	(0.938)
Border dummy* STRI	-2.9917***	-1.3762*	-0.2896	-1.1997**	-0.3157
	(0.367)	(0.737)	(0.609)	(0.608)	(0.253)
Observations	2555	2358	2353	2524	2595

Source: Borchert et al. (2019b).

Notes: Standard errors in parentheses. Dependent variable: services imports in 2016. Estimation method: Pseudo Poisson Maximum Likelihood. Full sets of exporter-year and importer-year fixed effects included but not reported. * p <0.10, ** p<0.05, *** p<0.01.

impact on international trade flows in three of the five sectors: transport, telecommunication and insurance. In the other two sectors, business services and banking, the STRI is insignificant.

In the second step, a scenario is built for reduction of services trade restrictiveness in the different economies. In particular, it is assumed that the STRI falls to the median of the quartile with the lowest STRI. This implies that economies with the highest level of restrictiveness will display the largest trade cost reductions, whereas economies with the lowest level of restrictiveness will not display any trade cost reduction.

To map the changes in STRI in the described convergence scenario into reductions in trade costs, the ad valorem equivalent of the scenario is calculated based on the following formula with $STRI_k^{BM}$, the benchmark level of the STRI in sector k, β_k the coefficient on the interaction term of STRI and the border dummy, and σ_k the substitution elasticity used in the simulations and:[72]

$$AVE_{ik} = \left[exp\left(\frac{\beta_k \left(ln(STRI_k^{BM}) - ln(STRI_{ik}) \right)}{\sigma_k - 1} \right) - 1 \right] * 100$$

The trade-weighted average STRIs for the different economies and sectors are in Appendix Table D.9. It is assumed that the trade costs associated with restrictive trade policies are cost-increasing and changes are thus modelled as changes in (cost-increasing) iceberg trade costs. Although some modellers assume that trade restrictions are partially rent-increasing instead of cost-increasing, the fact that rents lead mostly to rent-seeking implies that also rent-increasing trade costs are resource-dissipating and thus cost-increasing.[73]

Appendix Table D.9: Ad valorem trade cost reductions in three services sectors associated with reductions in STRI

STRI	Transport	Communication	Finance and insurance
Asian LDCs	2.83	0.60	0.43
Australia	0.71	0.25	0.11
Brazil	0.75	0.59	0.27
Canada	0.42	0.88	0.09
China	1.47	1.30	0.79
European Union (28)	0.75	0.22	0.09
EFTA	1.16	0.51	0.13
India	3.09	0.74	0.46
Japan	0.00	0.10	0.02
Republic of Korea	1.85	0.33	0.00
Latin America	0.65	0.33	0.20
Mexico	1.94	0.39	0.77
Middle East and North Africa	1.97	0.68	0.57
Russian Federation	1.75	0.53	0.27
Southeast Asia	1.35	0.26	0.19
Sub-Saharan African LDCs	1.15	0.23	0.44
United States	0.62	0.00	0.22
Other Asian economies	0.44	0.23	0.05
Sub-Saharan Africa other	1.15	0.23	0.44
Rest of world	2.50	0.49	0.06
Average	**1.33**	**0.44**	**0.28**

Source: Borchert et al. (2019b).

Notes: The table displays the reduction in ad valorem trade costs associated with the reduction in STRI according to convergence of the STRI to the level of the median economy of the lowest quartile of the STRI.

(d) The influence of face-to-face interactions on trade costs

In our setting, trade costs are inferred from the amount of international relative to intra-national trade, following Head and Ries (2001) as well as Chen and Novy (2011). We refer to our measure of trade costs as the Head-Ries-Meissner or the HRM Index. To this end, we employ data from the most recent GTAP10 database, for the year 2014. Furthermore, for easier comparability, we set the substitution elasticity equal across sectors.[74]

We further calculate the importance of face-to-face interactions for different sectors using the US O*NET database.[75] This dataset contains measures indicating the importance of certain tasks for different occupations on a scale from 0-100. Following Blinder (2009), we make use of four task indicators, which are likely to capture the importance of face-to-face interactions. These are "Establishing and maintaining personal relationships", "Assisting and caring for others", "Performing for or working directly with the public" and "Selling or influencing others".[76] These variables are available at the occupational level and therefore must be mapped to the industry level. In doing so, we follow the methodology in Oldenski (2012) by using data on the shares of occupations used in each industry from the US Bureau of Labor Statistics Occupational Employment Statistics (2007, 2010). Unfortunately, it was impossible to match the task-based occupation data to certain agricultural and natural resource sectors, which fall out of the sample. We further omit all natural resource sectors, as face-to-face interactions are unlikely to play a role in their context. Lastly, we construct a composite measure, referred to as the face-to-face index, by taking the average of the four task related variables at the sectoral level. A larger value of the index indicates a stronger importance of face-to-face interactions for a certain sector.

We use two samples in the analysis. First, we construct the measure of trade costs for pairs of importer and exporter economies for each industry. This setting allows for variation across sectors that is specific to each bilateral country pair and we therefore refer to this case as the bilateral sample. Nevertheless, our face-to-face index varies only at the sectoral level, with no variation across economies. Therefore, we also conduct the analysis with data averaged across country pairs, which only contains sectoral variation.[77] This sample is referred to as the collapsed or sector-level sample. However, both our samples yield very similar results.

The first insights can already be inferred from Appendix Figure D.1, which plots our measure of trade costs, the HRM Index, against the importance of face-to-face interactions. We see that a stronger importance of face-to-face meetings is associated with larger trade costs in general.

Furthermore, compared to goods sectors, the face-to-face index seems to be more important for services sectors, which tend to appear on the upper right part of the figure.

To further explore this relationship, we also estimate OLS (i.e. ordinary least squares) regressions with three specifications. The results for the sample using bilateral data are reported in Appendix Table D.10.[78] In the larger sample, we include several controls at the level of individual economies, such as standard gravity variables, the credit and contract environments, a dummy for a common language, logistics efficiency, customs procedures and broadband subscriptions.[79] Since our controls do not vary at the sectoral level, they are excluded from the regressions using only sectoral variation.

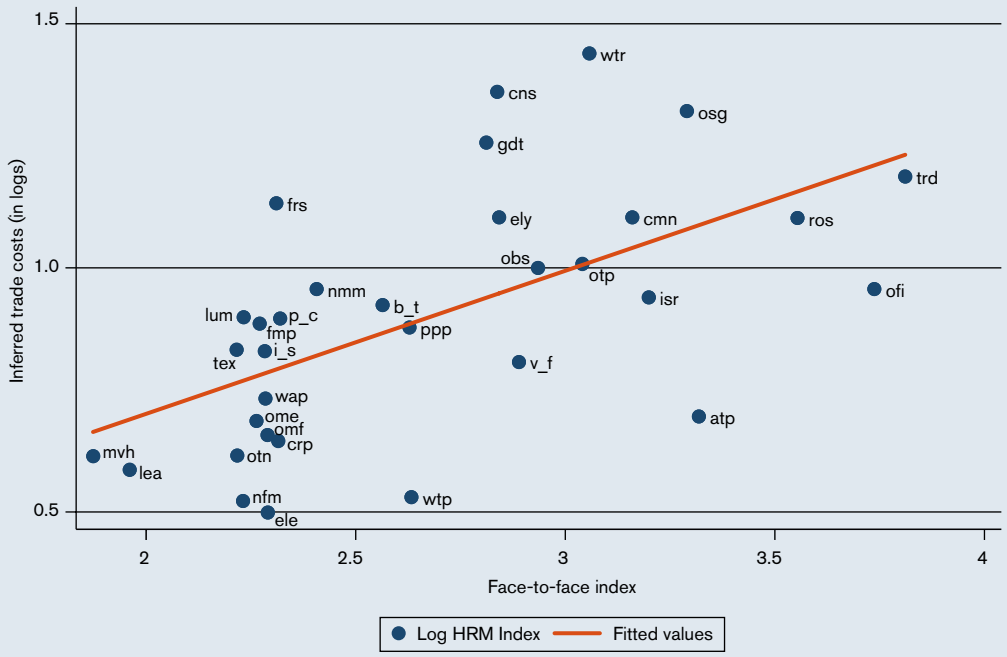
In the first columns, we focus on the effect of an indicator variable for services sectors on trade costs. Our second specification examines the effect of face-to-face interactions, while our last specification includes both the services dummy and the face-to-face index. Reassuringly, both samples yield fairly similar results.

On their own, both the services variable as well as the face-to-face index are highly significant and are associated with larger trade costs in both samples. Nevertheless, as specification (3) shows, once both variables are included in the regressions, the effect of being in a services sector is strongly reduced. In the bilateral sample, the coefficient for services sectors becomes very small, slightly negative and highly insignificant when the face-to-face index is included. In this case, the coefficient for the importance of face-to-face interactions remains significant at the 1 per cent level, with a similar magnitude to before. In the sector-level sample, however, the coefficients for services and the face-to-face index are insignificant, when both are included. Nevertheless, this is probably due to the low number of observations, resulting in a loss of statistical power. Importantly, the coefficient for the services dummy is strongly reduced when accounting for face-to-face interactions.

Therefore, these results indicate that face-to-face interactions are strong drivers of trade costs and that the channel driving the higher trade costs for services sectors seems to go through the importance face-to-face meetings. As technological progress reduces the need for face-to-face interactions, we can expect trade costs to fall in the future, especially for services.

Appendix Figure D.1: Greater importance of face-to-face communication is associated with larger trade costs in general

The importance of face-to-face interactions and trade costs



Note: The abbreviations used in this figure can be consulted at https://www.gtap.agecon.purdue.edu/databases/contribute/detailedsector.asp

Appendix Table D.10: Face-to-face interactions and trade costs – bilateral sample

	(1) Log HRM Index	(2) Log HRM Index	(3) Log HRM Index
Services	0.270***		-0.00164
	(0.0126)		(0.0228)
Face-to-face index		0.304***	0.305***
		(0.0102)	(0.0204)
Log Credit Environment	-0.0931***	-0.0868***	-0.0867***
	(0.0207)	(0.0198)	(0.0198)
Log Contract Environment	0.0575***	0.0573***	0.0573***
	(0.0219)	(0.0204)	(0.0203)
Common Language	-0.0596***	-0.0683***	-0.0683***
	(0.0181)	(0.0169)	(0.0169)
Log Logistics Efficiency	-0.146***	-0.149***	-0.149***
	(0.0143)	(0.0145)	(0.0143)
Log Customs Procedures	0.0494***	0.0488***	0.0488***
	(0.0180)	(0.0177)	(0.0177)
Log Broadband Subscriptions	-0.0498***	-0.0480***	-0.0479***
	(0.00861)	(0.00814)	(0.00814)
Constant	0.620***	-0.0849	-0.0880
	(0.216)	(0.211)	(0.211)
Gravity Controls	yes	yes	yes
Observations	135135	135135	135135
R^2	0.467	0.510	0.510

Source: Dependent variable: GTAP inferred trade costs. Explanatory variables from CEPII, World Bank and O*NET. The face-to-face index is based on the approach in Blinder (2009).

Notes: Robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table D.11 Face-to-face interactions and trade costs – sector-level sample

	(1) Log HRM Index	(2) Log HRM Index	(3) Log HRM Index
Services	0.303***		0.180
	(0.0767)		(0.161)
Face-to-face index		0.293***	0.145
		(0.0646)	(0.137)
Constant	0.768***	0.115	0.434
	(0.0387)	(0.165)	(0.319)
Observations	33	33	33
R^2	0.361	0.348	0.386

Source: Dependent variable: GTAP inferred trade costs. Explanatory variables from CEPII, World Bank and O*NET. The face-to-face index is based on the approach in Blinder (2009).

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

(e) Additional simulation results

Appendix Table D.12 Additional real growth of exports (cumulative) in three services sectors as a result of reductions in the STRI

Region	Transport	Communications	Finance and insurance
Asian LDCs	19.21	15.05	15.27
Australia	18.11	10.05	6.36
Brazil	14.26	9.59	7.92
Canada	11.5	8.27	7.78
China	6.65	9.54	6.8
European Union (28)	1.53	2.75	3.47
EFTA	1.84	3.4	2.82
India	11.5	14.12	9.93
Japan	3.82	9.74	6.36
Republic of Korea	6.4	7.22	5.1
Latin America	16.52	9	6.52
Mexico	16.37	9.49	8.89
Middle East and North Africa	18.31	11.88	8.86
Russian Federation	14.21	10.41	7.89
Southeast Asia	13.25	9.91	7.06
Sub-Saharan African LDCs	17.21	10.16	7.19
United States	14.52	10.29	5.86
Other Asian economies	13.21	7.71	4.47
Sub-Saharan Africa other	17.01	10.33	7.62
Rest of world	9.14	9.75	7.99

Source: Simulations with the WTO Global Trade Model.

Notes: The figure displays the cumulative additional growth in real exports from 2018 until 2040 under the scenario of a reduction in the STRI towards the median of the lowest quartile of STRI scores across economies. Region averages are calculated based on trade-weighted averages.

Endnotes

1 See Anderson and van Wincoop (2004); Novy (2013). Roughly speaking, the inferred trade costs can be considered as an equivalent of ad valorem tariff duties. An estimated trade cost of 3, for example, can be interpreted as an ad valorem tariff duty of (3-1) * 100%=200%.

2 The experimental WTO Trade in Services Dataset by Mode of Supply (TISMoS) dataset is not available at the bilateral level necessary for the inference of trade costs.

3 For instance, in the case of distribution and transport services or bundled products that have both a good and a service component (such as computers with after-sale services).

4 Roughly speaking, the inferred trade costs can be considered as an equivalent of ad valorem tariff duties. An estimated trade cost of 4.3 can be interpreted as an ad valorem tariff duty of 330 per cent. The formula is: ad valorem equivalent = (trade cost – 1) *100.

5 Conventional estimates of bilateral trade costs typically use one uniform elasticity of substitution. By contrast, our estimation is based on a new set of elasticities, estimated in Egger et al. (2018), which varies with each sector and thus provides a more precise measure of bilateral trade costs. A higher elasticity of substitution means more competition through the more elastic reaction of demand to higher prices on output. The elasticity of substitution tends to take on lower values for services than for manufactures, implying that services are more differentiated and face less competition.

6 Emerging economies are those classified by the World Bank in the year 2000 as low- and middle-income; developed economies are those classified as high-income. In our sample, emerging economies are represented by Brazil, Bulgaria, China, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, India, Indonesia, Latvia, Lithuania, the Republic of Korea, Malta, Mexico, the Russian Federation, Turkey, Romania, Poland, Slovak Republic and Slovenia. Developed economies are Australia, Canada, EU15, Japan, Norway, Switzerland, Chinese Taipei and the United States.

7 See Appendix D.1 for a technical explanation of the trade cost decomposition.

8 More precisely, the governance quality index captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development; perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests; and perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.

9 According to UNCTAD (2015), potentially ICT-enabled services include financial and insurance services, telecommunications, computer and information services, charges for the use of intellectual property, business services and personal, cultural and recreational services.

10 Also see Section B.

11 https://gocatalant.com/

12 https://www.comatch.com/de/

13 https://www.worksome.dk/

14 https://outsizedgroup.com/

15 https://www.flexport.com/

16 https://www.uship.com/

17 https://freighthub.com/en/

18 https://www.saloodo.com/

19 https://www.dbschenker.com/global/drive4schenker

20 https://www.twill.net/

21 https://www.tradelens.com/

22 In 2013, the World Bank and the WTO signed a Memorandum of Understanding concerning the establishment a unique database on services policies, covering commitments taken by WTO members in various agreements, applied regimes and services statistics. The memorandum focused in particular on the increased cooperation of both agencies for the collection and dissemination of information on applied services trade policies in WTO members. I-TIP Services, the services component of the Integrated Trade Intelligence Portal (I-TIP) was released in 2013. The main objective of the integrated database is to make it easier for WTO members and other stakeholders to access the various types of information relevant for services trade policy-making. I-TIP Services can be consulted at http://i-tip.wto.org/services/

23 The OECD has also been producing a STRI and an accompanying regulatory database since 2014 (http://www.oecd.org/trade/topics/services-trade/). Regulatory information for 43 economies in the World Bank STRI is sourced from the OECD database to avoid any duplication of data collection efforts.

24 Maritime covers maritime freight transport and auxiliary services (agency, freight forwarding, cargo handling, storage and warehousing).

25 In addition to corporate tax and customs duties, governments are also exploring ways to equalize and apply value-added and general sales taxes.

26 The old age dependency ratio used in this report is defined by UNDESA as the number of persons aged 65 years or over in a population relative to the number of persons aged 15-64 years.

27 According to the United Nations Population Fund, demographic dividend is the economic growth potential resulting from the share of the working-age population being larger than the old and young age groups.

28 https://www.brandwatch.com/blog/youtube-stats/

29 Calculations based on the WIOD database for the year 2014. The measure is calculated as the sum of intermediate input sourcing from sectors 39-50 of the ISIC Rev. 4 classification as a share of total output. High-income economies are Australia, Canada, EU15, Japan, the Republic of Korea, New Zealand, Norway, Switzerland and the United States. Lower-income developing economies are Brazil, China, Indonesia, India, Mexico, Russia and Turkey.

30 Overall, the impacts of changes in population, age structure, income, technology and public policy on most economic sectors, including many services industries, will be large relative to the impacts of climate change (IPCC, 2014).

31 Such responses will also increase the demand for different services, including installation- and safety-related services.

32 Wholesale and retail trade is likely to adapt to climate change by changing storage and distribution systems to reduce vulnerabilities, and by changing the consumer goods and services offered in particular locations. Some of these adaptations could increase prices of goods and services to consumers.

33 Although the impact of climate change on the telecommunication sector is not discussed in detail here, communication infrastructures can also be exposed to climate change. For instance, overhead cables and cell phone transmission masts are vulnerable to high winds and ice storms.

34 There is no widely accepted definition of environment-related goods and services. According to the General Agreement on Trade in Services (GATS), environmental services include sewage services, refuse disposal, sanitation and similar services, reducing vehicle emissions, noise abatement services, nature and landscape protection services and "other" environmental services. In this section, environment-related services include services used for climate change adaptation or mitigation.

35 Natural disasters also include non-weather events such as earthquakes, tsunamis, mudslides, volcanoes and wildfires.

36 The GTM is a recursive dynamic computable general equilibrium (CGE) model.

37 See the opinion piece by Richard Baldwin on page 126.

38 The impact of ageing on sector-specific skills, as identified by Gu and Stoyanov (2019), are not included in the model by lack of estimates on differences in sector-specific labour productivity growth related to ageing.

39 This ordering of productivity growth across the three broad sectors (highest productivity growth in agriculture, followed by manufacturing, and then services) is in line with the literature on structural change (Herrendorf et al., 2014).

40 Technically, non-unitary elasticities are modelled through non-homothetic preferences in which spending shares change with income. In the model we work with the constant distance elasticity (CDE) utility function, adjusting the parameter determining the income elasticity as a function of GDP per capita.

41 Based on an empirically estimated equation following the approach in Foure et al. (2013).

42 The projections are based on KG and Lutz (2018).

43 Based on the approach in Moise and Sorescu (2013) and WTO (2015), the country-specific OECD trade facilitation indicators are converted into ad valorem trade cost reductions, leading to trade cost reductions of about 15 per cent globally. These trade cost reductions are phased in over a period of 15 years, starting in 2019. The reductions are phased in over a longer period, as countries will need time to implement the TFA.

44 Empirical research shows that the presence of a common language in two countries makes it easier for countries to trade with each other.

45 In economies with bad credit and contract environments, it is more difficult to obtain loans and to enforce contracts.

46 The task intensity of face-to-face interaction is measured following the approaches in Blinder (2009) and Oldenski (2012). We map these measures of task intensity to Global Trade Analysis Project (GTAP) sectors using occupation data.

47 Further details about the modelled reduction in trade costs are in Appendix D.2.

48 In a gravity estimation, trade between two economies is explained by the forces of gravity, trade costs, economic size and the attractiveness to trade with other regions.

49 The ad valorem equivalent trade cost reduction is the trade cost reduction expressed in ad valorem terms which is equivalent to a certain change in the STRI.

50 This liberalization scenario is proposed by the authors of this World Trade Report and should not be attributed to Borchert et al. (2019b).

51 As emphasized before, we do not include services trade in the form of commercial presence in another country (GATS mode 3), as this is not part of our model. Furthermore, a proper evaluation of the share of services trade in total trade would require us to include affiliate sales in both services and manufacturing.

52 As discussed in Section B, the share of services trade in total trade would be larger if GATS mode 3 were taken into account.

53 The reason, as mentioned when the STRI was introduced, is that data on services trade restrictions do not exist for some of the services sectors and that for other services sectors the STRI is not significant in gravity regressions because of the lack of good correspondence between the coverage of services trade data with that of the STRI.

54 Total trade does display higher growth in the baseline in least-developed and developing countries because of the stronger reduction in manufacturing trade costs associated with the introduction of the WTO Trade Facilitation Agreement (results not displayed).

55 The authors of this report remain responsible for the use of these experimental data for the estimation of trade cost.

56 Source: Head and Mayer (2014).

57 Source: World Economic Forum, Global Competitiveness Report and data files, retrieved from https://data.worldbank.org/indicator/IQ.WEF.PORT.XQ.

58 Source: World Bank, Logistics Performance Index, retrieved from https://data.worldbank.org/indicator/LP.LPI.INFR.XQ.

59 Source: Head and Mayer (2014).

60 Source: World Bank (2019), Global Bilateral Migration Database.

61 Source: International Telecommunications Union (ITU), ICT Statistics, retrieved from https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

62 Source: Mario Larch's Regional Trade Agreements Database from Egger and Larch (2008), 2018 update.

63 Source: World Bank, World Integrated Trade Solution (WITS).

64 Source: World Economic Forum, Global Competitiveness Report and data files, retrieved from https://data.worldbank.org/indicator/IQ.WEF.CUST.XQ.

65 Source: World Bank, Worldwide Governance Indicators (WGI).

66 Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta are not included due to their small size. Belgium, Hong Kong (China), Ireland, the Netherlands and Chinese Taipei are not included due to their high share of re-exports.

67 Basing trends on the past is a conservative approach for rising capital income shares, given that technological changes leading to rising capital shares such as robotization and AI are expected to accelerate. Also, for the more intensive use of ICT services, the use of trends in the past is probably a conservative approach, given the trends described earlier in this report, such as digitalization and AI.

68 Two sectors, "ICT services" and "Other business services" emerge from splitting up the sector "Business services", employing SPLITCOM (a program to split up sectors) and information about spending and cost shares from WIOD.

69 SSP2 is a middle-of-the-road scenario. The projections for GDP are based on this scenario.

70 The methodology to infer trade costs earlier in the chapter deviates from the approach in WTO (2018a) and the approach followed here. Differences are discussed in Egger et al. (2019).

71 The variable Logistics Performance Index, included in WTO (2018a) is omitted from the scenario this year because of endogeneity with the size of trade flows and thus inferred trade costs.

72 This formula follows Benz (2017) and Bekkers and Rojas-Romagosa (2018).

73 Rent-increasing trade costs raise the costs of trading goods by generating excess profits (rents) for various economic agents, such as importers or exporters. Iceberg trade costs raise the costs of trading goods by dissipating scarce resources.

74 We employ the trade-weighted average substitution elasticity in the GTAP database, which is equal to 6.88.

75 O*NET Resource Center (2012).

76 Blinder (2009) additionally includes an indicator referred to as "Social perceptiveness", which we omit due to its apparent absence in our database.

77 We construct averages weighted by bilateral trade flows.

78 For the bilateral sample, we employ a weighted regression, with bilateral trade flows serving as importance weights. This mirrors the weighted averages constructed for our smaller, collapsed sample.

79 The included gravity variables are distance as well as dummies for the presence of a free trade agreement, for having a common colony, for having had a colonial relationship since 1945, for landlocked countries, and for contiguity.

E

What role for international cooperation on services trade policy?

Trade in services continues to evolve. Technology and regulatory reforms are driving a fundamental transformation, creating new demand while simultaneously helping to reduce trade costs and opening further opportunities to trade services. Under the impetus of global value chains, demographic trends, rising per capita incomes in emerging markets and environmental concerns, demand for foreign-supplied services is on the rise. The evolving avenues, actors and composition of services trade increase its potential to contribute to inclusive economic growth and development, but also present a number of challenges that need to be addressed to fulfil this potential.

Contents

1. Introduction 154

2. Why governments cooperate on services trade policy 154

3. How countries collaborate in the services sphere 165

4. Prospects for future cooperation 184

5. Concluding observations 193

Appendix Table E.1:
Overview of relevant work of other international organizations 194

Some key facts and findings

- Policy barriers to trade in services are more complex than in goods trade, as they are essentially regulatory in nature.
- Over the past decades, most countries have opened up their services markets to competition. However, undertaking such reforms unilaterally does not allow economies to reap all potential benefits.
- Economies have cooperated on lowering services trade barriers and on regulatory measures, both in the WTO and in regional trade agreements. Yet, thus far, such collaboration has not been fully exploited.
- Using trade agreements to drive services trade reforms has proven difficult, possibly because of the pervasive role that regulation plays in services markets.
- Accompanying market opening negotiations with greater international cooperation focused on domestic regulatory measures may be one way to harness the potential of services trade. Technical assistance and capacity building would be crucial in this regard.

1. Introduction

Over the past three to four decades, most countries around the world have embarked on far-reaching reforms targeted at increasing competition in their service markets. Many of these initiatives were undertaken by governments in an autonomous manner, generally motivated by expectations of significant welfare benefits, particularly in terms of overall economic competitiveness. In the meantime, services began to account for an ever-increasing share of GDP, at first in industrialized countries and later in developing countries as well.

This transformation proved a driving force behind increased international cooperation in the services arena, which culminated, in 1995, in the entry into force of the General Agreement on Trade in Services (GATS). By adopting a wide definition of trade, the GATS captures virtually all possible ways to supply services internationally and creates a rule-based, transparent and predictable environment in which services firms can operate. It also offers WTO members the possibility of locking in existing trading conditions, thus protecting market participants against economically costly policy reversals, and provides a locus for monitoring, benchmarking and sharing knowledge on services trade policy.

Nevertheless, in certain sectors and areas, trade barriers remain considerable and have proven difficult, if not impossible, to remove based on purely domestic processes. This suggests the limits of what governments can achieve autonomously in terms of opening services markets. It also points to the constraints on the benefits of reforming services unilaterally, in terms of a greater latitude for policy reversals and the unintended trade costs that may arise from regulation being set in isolation. Such drawbacks may be particularly felt nowadays, as governments begin to grapple with the implications of rapid and far-reaching changes induced by digital technologies.

Greater international cooperation on services trade policy would offer governments the possibility to secure more fully both their unilateral reforms and those of their trading partners by binding them in trade agreements, thereby guaranteeing that global services markets remain open. Although this is one of the roles the GATS was designed to fulfil, in light of the fact that no further services negotiations have been concluded in the WTO since the late 1990s, over the past 20 years or so most services trade-openings have been bound in regional trade agreements (RTAs), rather than in the WTO.

Against the backdrop of rapidly evolving trade patterns and the associated opportunities these offer, it may nevertheless come as a surprise that, apart from deeper integration efforts such as in the European Union, both multilateral and regional services trade agreements have locked in unilateral reforms to a degree, but have not driven entirely new trade-opening. One likely explanation for this state of affairs is the pervasive role that regulation plays in services markets and the essential role that well-designed regulatory policies and adequate domestic capacity play in delivering welfare-enhancing trade-opening.

To explore these issues, this section is divided into three parts. Section E.2 briefly discusses the motivations for international cooperation in services policy-making. It outlines the changing landscape of trade in services, the rationale for and design of governments' interventions in services markets, and the reasons why governments choose to collaborate on services trade policy. Section E.3 examines how countries engage in international cooperation in the services sphere, with regard to services trade barriers and domestic regulatory measures.[1] Starting with the barriers, it describes how cooperation has evolved and is evolving, both in the WTO and in RTAs; it then moves on to a similar analysis for collaboration regarding domestic regulatory measures. It also provides an overview of the regulatory cooperation activities of other international organizations that are most relevant to services trade. Section E.4 considers the prospects for further collaboration on services trade policy and Section E.5 offers concluding observations.

One message that emerges from the discussion is that enhanced international cooperation will be essential to respond adequately to the opportunities and challenges generated by the many factors shaping world services trade.

2. Why governments cooperate on services trade policy

(a) The landscape of services trade is evolving and transforming

Under the impetus of diverse forces, trade in services is being transformed. Existing demand for internationally supplied services is growing, new demand is emerging, and more avenues are being unlocked to supply services internationally.

Thanks to technology, shifts are taking place in means of delivery, i.e. the increased ease of

cross-border trade in services, accompanied by a reduction on what was once the essential importance of commercial presence. Shifts in the composition of trade are observed in higher growth rates for ICT and ICT-enabled services compared to other services. Moreover, contrary to popular perceptions, the data presented in this report show that developing countries are not being left out of these transformations. Rather, they are becoming more integrated into global supply chains and are contributing more to value-addition. While large global internet-based companies make the headlines, micro, small and medium-sized enterprises (MSMEs) in developing countries are successfully exporting a wide range of business services online, collaborating with foreign partners to supply software for new technologies, and in some cases spearheading technological innovation adapted to the needs of developing country realities. The increasing feasibility and importance of cross-border supply brings with it challenges for governments and for international trade. One such challenge is the risk of marginalization of those developing economies that do not manage to gain access to new technologies. It is precisely these trends that make collaboration and cooperation across borders significantly more important and necessary than in the past.

Technological advancements, such as those reviewed in previous sections, are affecting regulatory frameworks and creating significant dilemmas for regulators in their quest to find a balance between fostering, innovation, protecting consumers and other public policy objectives, and keeping markets open. Technology may challenge traditional regulatory models because regulations are not easily changed and adapted either within or across national jurisdictions.

As explained in Eggers et al. (2018), the assumption that regulations can be crafted slowly and then remain in place, unchanged, for long periods of time, has been called into question. As new business models emerge and modes of services supply shift, government agencies must respond by creating or modifying regulations, enforcing them, and communicating them to the public at a much faster pace than before. Existing regulatory structures are often slow to adapt to changing societal and economic circumstances, and regulatory agencies tend to be risk-averse.

While the policy cycle may take several years, digitally-enabled service industries can emerge and grow very quickly. New companies may become multinationals in much less than a decade. Airbnb, for example, was founded in 2008 and has grown into a global platform with hosts across more than 191 economies and 81,000 cities (Airbnb, 2019). Uber is another case in point: founded in 2009, 10 years later it has an estimated 110 million users worldwide and is present in 63 economies and more than 700 cities.[2] Yet another example is M-PESA, launched in 2007 and processing 1,200 transactions per second by 2018.

Technology also allows services and service suppliers to cross traditional industry boundaries. Telecommunications companies, for example, now supply payment and money transmission services (e.g. Vodafone through M-PESA and OrangeMoney), as well as more traditional banking products such as savings accounts and loans (OrangeBank). Uber acts as an intermediary not only for passenger transport services but also food delivery. Alibaba has evolved from being an online distributor to also providing financial services. These drastic and fast-paced changes render the domestic coordination of regulatory agencies unavoidable. However, many national regulatory systems are complex and fragmented, with various responsible agencies exercising overlapping authority.

Traditionally, regulators have adopted a "regulation-first" approach, i.e. regulation had to be in place before services could start to be supplied. Even within that framework, the regulation-making process has increasingly allowed for dialogue with stakeholders (e.g. industry and consumers), not only domestically but also internationally. Regulators, therefore, would first conceptualize new rules and regulations in response to market developments, then spend months or years drafting rules and sharing those drafts with stakeholders for public comment. Finally, after examining those comments – a task that could be time and resource-consuming depending on the number and extent of the comments – the regulation would be finalized.

However, when confronted with the rapid pace of change imposed by technology, this approach has proved problematic. First, for all the insights they can gain by interacting with the private sector, regulators often cannot fully anticipate how the market will react to new regulations; and second, regulations may not be reconsidered once in effect. For these reasons, regulators have started to move towards more adaptive approaches to regulation. Innovation offices and "regulatory sandboxes" are examples of the approaches adopted, as illustrated in Box E.1.

Box E.1: Fintech, regulation and international cooperation: the case of innovation offices and regulatory sandboxes

Technology-enabled innovation in financial services (so-called Fintech) has grown rapidly in the past decade, allowing for the emergence of such services as mobile payments and peer-to-peer lending. The rise of Fintech presents many challenges due to regulators' limited technological expertise (which makes it difficult to assess innovative business models and practices, and their impact), the existence of financial innovators which are not traditional financial services providers, the need to balance innovation and financial stability, limited human and financial resources, and the pressure from incumbent financial services providers to maintain the status quo.

An increasing number of regulators in developed, developing and least-developed economies are responding to such challenges by introducing innovative regulatory approaches, including so-called innovation offices and regulatory sandboxes.

Innovation offices are often the first approach to improve regulator-innovator dialogue and are a good first option for resource-constrained regulators in emerging and developing economies, since they are easier to implement and operate than other regulatory initiatives. They can further evolve or be complemented by other approaches, such as regulatory sandboxes (see below). Innovation offices may serve not only to educate innovators on the regulatory environment in which they operate but also to improve the regulator's understanding of Fintech, thus supporting appropriate regulatory responses. More than 30 jurisdictions around the world are currently operating this type of office. Innovation offices may also facilitate international cooperation on regulatory matters through bilateral cooperation agreements. A case in point is the UK Financial Conduct Authority (FCA)'s Innovate, which was established in 2014 and has signed cooperation agreements with counterparts in Australia, Canada, China, Hong Kong (China), Japan, the Republic of Korea, Singapore and the United States. These agreements promote information-sharing on emerging trends in financial innovation between authorities and facilitate referrals of innovators from one market to another, thus reducing regulatory barriers to entry in foreign markets.

A regulatory sandbox is a formal programme, typically summarized in writing and published, that allows live and time-bound testing of innovations (e.g. new financial products, technologies, business models) with actual customers, subject to regulators' oversight. This testing takes place at the edge or even outside of the existing regulatory frameworks, allowing regulators to gain a better understanding of Fintech and to decide whether further regulatory action is necessary. A successful test may result in several outcomes, including authorization of the innovation, changes in regulation, or a cease-and-desist order. A common feature of regulatory sandboxes, which may be resource-intensive, is that they facilitate dialogue between market participants and regulators, allowing for better informed regulation and helping to strike the right balance between innovation and risk.

The first regulatory sandbox became operational in 2016 in the United Kingdom. At the beginning of 2019, there were almost 30 jurisdictions actively implementing them. The sandbox concept is being explored to promote cross-border regulatory cooperation and enable innovators to gain economies of scale more rapidly on a regional or global basis. Multi-jurisdictional sandboxes may therefore facilitate cross-border expansion through shared testing programmes and reduce the potential for regulatory arbitrage across individual sandboxes. Two initiatives for multi-jurisdictional sandboxes are currently under way: the Global Financial Innovation Network (GFIN), proposed in 2018 by the UK FCA, together with 11 financial regulators around the world, and the API Exchange (APIX), launched by the Association of Southeast Asian Nations (ASEAN) Financial Innovation Network (AFIN) (UNSGSA and CCAF, 2019).

(b) Market failures – and private interests – drive governments' intervention in services

The services economy has undergone a major transformation over the past three to four decades. It has evolved from a model where governments were solely and uniquely in charge of supplying many infrastructural and social services to one where these services are provided also, or predominantly, by private actors in competition with each other.

Dornbusch (1992) notes that widespread disappointment with the results achieved by market restrictions and the poor performance of services activities led many economies in the 1980s and 1990s to introduce ambitious domestic reform programmes

aimed at boosting services efficiencies. Starting in the early 1980s, all Organisation for Economic Co-operation and Development (OECD) countries implemented, to differing degrees, pro-competitive structural reform programmes. They were prompted, for example, by the efficiency losses resulting from reduced output levels and high prices induced by restricted entry, a reassessment of whether, and how, to regulate natural monopolies in light of technological advances, and the need for economies to adjust to an increased degree of international competition in many service industries (Hoj et al., 1995). Countries also undertook services reform, particularly in financial and telecommunications services, within the broader framework of "Structural Adjustment Programs" implemented to qualify for World Bank and International Monetary Fund loans and make debt repayments (Busari, 2010).

In some instances, services markets were initially unlocked only for domestic firms, but they were often progressively and steadily opened up also to foreign suppliers. These reform initiatives, which were undertaken virtually universally, albeit at varying speeds and to different extents, in essence opened up trade via commercial presence in many infrastructural and producer services. They also altered the role that governments play, from that of primary supplier to that of regulator of competitive markets. Furthermore, even in those services sectors where competitive pressures had always existed, technological developments have increased the need for, and intensity of, regulation. Contrary to general perceptions about deregulation, therefore, the services transformation required new and adapted government regulation.

Two forces guide governments' regulatory interventions in services markets: public interest considerations and private interest factors.[3] From a public interest theory standpoint, intervention may be justified on either efficiency or equity considerations (Joskow and Noll, 1981). Efficiency concerns relate primarily to the existence of market failures, i.e. the inability of unchecked markets to deliver a socially efficient allocation of resources. As discussed in Section C.1, market failures in services markets tend to be more pervasive than in goods industries. They concern instances of asymmetric information, for instance when suppliers are better placed than consumers to assess the quality of the service they provide, imperfect competition, as with the natural monopolistic/oligopolistic structure of network industries, and externalities,[4] such as the environmental consequences of heavy road transport. Equity considerations may also motivate governments' regulation of services industries, to avoid the unrestrained operation of markets leaving certain areas or groups of consumers underserved, for instance in sectors such as health services or telecommunications.

The private interest theory of regulation posits instead that government intervention is driven by the concerns of special interest groups, rather than by the pursuit of the public interest. Furthermore, even when acting in the pursuit of public policy considerations, governments will be guided by private interests in their choice of regulatory instrument (Stigler, 1971; Posner, 1974; Peltzman, 1976; Becker, 1983).

WTO (2012) provides further insights into the significance of private interest considerations in the regulation of services industries. First, as virtually all services trade barriers are regulatory measures, the most transparent form of trade intervention in goods trade, i.e. tariffs, is not applied to services markets. This opaqueness of services measures provides greater opportunity to mask any private interest rationale in regulatory intervention. Second, because of the intangible nature of services, regulation tends to be less often based on technical or scientific evidence than in the case of goods, and this further facilitates the masking of private interest motivations.

Finally, the high degree of complexity of much services regulation facilitates the "capture" of the regulators by incumbent domestic suppliers. As Laffont and Tirole (1991) show, regulatory capture – and thus inefficient regulation – is likely to occur when interest groups are highly concentrated and organized, and the degree of informational asymmetry between the regulated industry and the regulator is high. Fung and Siu (2008) argue that, when analysing the rationale for services trade liberalization, an explicitly political-economy model, which factors in private interest considerations, is more appropriate than a welfare-maximizing one.

The public interest and private interest views of policy-making also suggest possible explanations for governments' decisions to open up some sectors and not others. From a public interest perspective, governments open up given sectors so that competition may bring about efficiency benefits. In contrast, from a private interest perspective, incumbent service suppliers' ability to become organized and oppose policy changes that could adversely affect them results in little or no market-opening. Liberalization, or the lack thereof, may therefore be explained as the result of the interaction of these two forces, the one prevailing over the other at a certain time and place determining the policy outcome.

Box E.2: The GATS in brief

The WTO's General Agreement on Trade in Services (GATS) entered into force in 1995, at the end of the Uruguay Round of trade negotiations. The GATS is the first and only set of multilateral rules covering international trade in services.

Underpinning the GATS is the acknowledgment that, contrary to traditional perceptions, all services are tradable, but that such trade cannot be fully appreciated by drawing exclusively on a cross-border perspective. The intangible nature of many services implies that suppliers and consumers often have to be in physical proximity for services to be supplied. As a result, to capture all instances of services being supplied internationally, the GATS identifies four different "modes" of trading services. In addition to the traditional cross-border supply of services (mode 1), such as consultancy services provided to foreign clients over the phone, the GATS also encompasses instances when a consumer purchases a service abroad (consumption abroad, or mode 2), such as in the case of international tourism, as well as when services are traded through the supplier being present in another country, either via a commercial presence (mode 3), such as establishing an affiliate, or the temporary presence of natural persons (mode 4), such as consultants.

The GATS applies this comprehensive definition of trade to all services, with only two exceptions: "services provided in the exercise of governmental authority" and the bulk of air transport services (although the latter exclusion is subject to review). Counterbalancing this wide scope of application, the GATS provides for the across-the-board application of only very few obligations, most importantly most-favoured-nation (MFN) treatment, transparency (publication of measures) and the review of administrative decisions. MFN treatment (Article II of the GATS) requires that all foreign services and service suppliers be granted substantially the same treatment; the transparency obligation provides for the publication of all services measures that are generally applicable; and the rules on review of administrative decisions require members to maintain tribunals or procedures that enable foreign suppliers to seek review of, and redress for, administrative decisions affecting trade in services. At the end of the Uruguay Round, and later on, at the time of joining the WTO, nevertheless, members had the possibility of taking exemptions to the MFN obligation, for instance to protect a preferential treatment granted to one or several trading partners, including partners that were not WTO members, or to continue enforcing reciprocity requirements.

When it comes to its market-opening disciplines, the GATS stipulates that "market access" (Article XVI) and "national treatment" (Article XVII) apply only to the services sectors that each WTO member has inscribed in its own schedule of specific commitments, and only to the extent that no relevant limitations have been listed for any of the four modes of supply.

Commitments on market access delineate conditions regarding the permitted number of suppliers, volume, assets or value of services, the number of foreign employees, legal forms and foreign equity participation. It is noteworthy that several of these conditions are not predicated on the foreign nature of the service or the supplier, and hence market access commitments may apply in an origin-neutral manner. National treatment commitments lay down conditions with regard to non-discriminatory treatment of foreign services and service suppliers vis-à-vis their like domestic counterparts. Schedules provide legal guarantees that the access and non-discriminatory conditions bound therein will not be worsened. Moreover, "additional commitments" (GATS Article XVIII) allow members to undertake legally binding guarantees with regard to services trade-facilitating measures. All conditions listed in schedules constitute minimum levels of treatment guaranteed by each member to all other members and may hide, in practice, a laxer applied regime, which must also be applied on an MFN basis.

The GATS also contains a number of "good governance" provisions. In services sectors for which a member has made commitments, Article VI on "domestic regulation" requires, for example, that all measures of general application affecting trade in services be administered in a reasonable, objective and impartial manner. Moreover, Article VI:4 of the GATS calls upon WTO members to develop any necessary disciplines to ensure that measures relating to qualification requirements and procedures, technical standards and licensing requirements and procedures do not constitute unnecessary barriers to trade in services.

Trade policy interventions in services markets may not be immediately understood by non-trade audiences. Given their intangible, non-storable nature, services are not traded through custom posts and this renders tariffs largely inapplicable. Thus, trade policy tools in services are essentially regulatory in nature. However, as discussed in WTO (2012), only a limited number of services regulations may be categorized as trade barriers, namely those that cannot be justified on public interest grounds, or that pursue public policy rationales in a socially inefficient manner. WTO (2012) contends that discriminatory measures are trade restrictions practically by definition. When it comes to non-discriminatory measures, those that limit market entry/establishment are also difficult to justify on efficiency grounds as, by affording protection from competition to incumbent suppliers, such measures diminish markets' overall contestability. Finally, non-discriminatory instruments that, instead, impact suppliers' operations appear to be those furthest removed from protectionist intents.

This assessment is broadly reflected in the way that services trade agreements, and the GATS first and foremost, are constructed (see also Box E.2). These agreements are premised on the key distinction between regulations that are "trade barriers", which are meant for eventual elimination, through negotiation, and all other relevant "domestic regulatory measures", which are only subject to some, more or less developed, good governance obligations.

Trade barriers have been defined in the GATS to encompass all discriminatory measures, as well as an exhaustive list of so-called market access limitations, such as non-discriminatory quotas that limit the number of suppliers or the quantity of output supplied in a market. Because services trade involves different modes of supply, barriers to trade, which are mostly behind-the-border measures, span a much broader set of policies than is the case for goods trade.

Measures referred to as "domestic regulation", on the other hand, are not considered barriers to trade. However, services trade agreements recognize that, in their pursuit of legitimate public policy objectives, such measures may nevertheless have trade-restrictive effects. Yet again, in view of the extended definition of services trade, a broad array of measures that govern how services are produced and consumed in an economy and that are not "trade barriers" may fall within this category. Services agreements also implicitly acknowledge that trade may be affected by the absence, rather than the presence, of a measure; to that effect, they enable governments to undertake positive regulatory actions and commit themselves to implementing them.

(c) "Going it alone" does not allow all potential benefits to be reaped

Most of the services trade reforms introduced over recent decades have emanated to only a limited extent from bilateral or multilateral trade negotiations. Governments have undertaken the vast majority of transformations, particularly with regard to trade via commercial presence (mode 3), largely unilaterally, driven by expected economic and development gains. They have only subsequently bound these reforms, to a greater or lesser extent, in trade agreements (Hoekman et al., 2007; Roy et al., 2007; Marchetti, 2009; Fink and Jansen, 2009; Adlung and Morrison, 2010; Miroudot and Shepherd, 2014; Mattoo, 2015; Balchin et al., 2016). The only exceptions are the phased-in commitments made during the extended negotiations on basic telecommunications and financial services (see Box E.3) and the services bindings undertaken by acceded members[5] (Adlung, 2009).

The benefits of opening services markets have been estimated to be high and diffused across the entire economy (Asian Development Bank and OECD Development Centre, 2002). As illustrated in Section C, opening up services trade creates welfare gains by producing a more efficient allocation of resources, increasing the variety of services on offer and allowing the more productive services firms to expand. In addition to these "standard" trade benefits, however, the liberalization of trade in services also offers further potential benefits, given how important access to social services like health and education is to human capital development, and how vital the performance of intermediate services is to the competitiveness of all firms. Insofar as inefficient services entering firms' production functions generate costs for all downstream sectors, trade barriers, including non-discriminatory restrictions on market entry, and trade-restrictive domestic regulatory measures that protect incumbent suppliers, have wide economy-wide repercussions.

Yet, as shown in Section D, several services sectors, including a number of key infrastructural and producer services, are still heavily restricted in a number of economies. Examples include several transport and professional services, to name a few. Services liberalization in these contexts is limited; barriers to entry remain considerable, even for potential national competitors, and have proven difficult, if not outright impossible, to remove based on purely domestic processes. Thus, unilateral efforts at reform can be a challenge, as they are often not sufficiently strong and entrenched stakeholders are not easily won over. The regulatory intensity of many services sectors and

Box E.3: Extended negotiations on basic telecommunications and financial services

The WTO negotiations on basic telecommunications and financial services in the late 1990s are two services examples of how plurilateral negotiations dedicated to a particular sector or topic can succeed, be integrated into an existing agreement (the GATS) and be applied on an MFN basis. They are an illustration of the new negotiating dynamic that services agreements offer.

These negotiations, which led, for basic telecommunications, to the Fourth Protocol to the GATS and, for financial services, successively to the Second and Fifth Protocols, were borne out of initiatives taken towards the end of the Uruguay Round of multilateral trade negotiations. At the time, the extent of commitments in these sectors was deemed insufficient to provide for a meaningful outcome.

For basic telecommunications, although the initiators of the negotiations were initially mainly smaller industrialized economies, the trend in sector reforms ultimately attracted not only the larger industrialized economies, but also a great many developing countries that found the negotiations useful to catalyse debate on reform of the sector, as well as an opportunity to lock in reforms in the GATS to avoid back tracking once reforms had been put in place. Broader participation was also due, in part, to the flexibility offered by the GATS to allow members, including developed and developing countries, to take commitments on partial liberalization or to take commitments that would be phased-in on a specified, and committed, date in the future.

Turning to financial services, the negotiations were initially planned to be held during a six-month period following the entry into force of the GATS, that is until the end of June 1995. They were finally concluded at the end of July 1995, albeit on an interim basis, and those results were incorporated in the Second Protocol to the GATS. While many members had improved their previous commitments, the results were still considered unsatisfactory, and members decided to renew negotiations on financial services two years later. Negotiations were successfully concluded in December 1997. The improved commitments entered into forced (for most of its signatories)[6] on 1 March 1999.

The Fifth Protocol proved to be a landmark agreement, achieved at the – critical – time of the Asian financial crisis, which had broken out around July 1997 and raised fears of a worldwide economic meltdown due to financial contagion. Nevertheless, pushed by a unique dose of determination and political will, WTO members, representing over 95 per cent of world trade in financial services, remained faithful to their negotiating mandates and commitments. It was, additionally, proof of how critical mass-based plurilateral negotiations within a multilateral setting could deliver a solid MFN-based outcome.

The results achieved in – basically – three years of negotiations were outstanding: by the entry into force of the WTO in 1995, 66 members had made commitments on financial services, of which 29 were improved during the 1995 negotiations and incorporated in the Second Protocol to the GATS. The 1997 negotiations brought the number of improved schedules of commitments to 56. By the end of 1997, 89 members had commitments on financial services, including those contained in the Fifth Protocol, those arising from the end of the Uruguay Round that remained unchanged throughout negotiations, and others incorporated in the meantime through new members' accession processes.

the resulting relative ease with which private interests may capture regulators provide possible explanations for the challenges governments encounter in opening services markets, and point to the limits of what they may be able to achieve autonomously, as Section E.4(a) will discuss.

In addition to the difficulty of overcoming private-interest-motivated resistance to market openings in certain areas, there are other downsides to governments executing reforms autonomously. First, when reforms are not anchored internationally, the possibility of policy reversals remains significant. This is also the case for areas that have always been competitive and open to foreign suppliers, and where no policy changes are necessary, as the introduction of new trade restrictions at a future point in time can less easily be forestalled. This challenge may be particularly acute nowadays, as governments ponder whether and how to respond to the opportunities, but also the challenges, of the digital economy.

Another disadvantage of countries setting domestic regulation completely independently of one another is that any negative externalities on foreign suppliers are not typically considered in national regulatory processes, resulting in an increased likelihood of regulatory heterogeneity (Hoekman et al., 2007). Diverse rules across jurisdictions are a source of trade costs, in that they imply the need for suppliers to comply with different domestic regulatory requirements in different countries to supply the same or similar services. Although not rooted in protectionist intents, by segmenting international markets, regulatory differences also prevent the exploitation of economies of scale.

Against this background, international cooperation on services trade policies has an important role to play. As illustrated in Box E.4, the main theories of international trade agreements go some way towards explaining various, though not necessarily all, of the reasons why economies cooperate by concluding services trade agreements.

Box E.4: What explains services trade agreements?

Two main rationales, which may be complementary, have been put forward by economists to explain the existence of trade agreements: the terms-of-trade theory and the commitment theory.

According to the terms-of-trade model, trade agreements can be used to avoid a non-cooperative and inefficient situation in international trade (Bagwell and Staiger, 1999, 2002; Staiger, 2015). In the absence of an agreement, governments may face incentives to implement trade policies that protect local producers at the expense of foreign exporters with the objective of altering the terms of trade (i.e. the price of exports relative to the price of imports) and thus increasing their national income. However, if all governments decided to impose such trade policies, not only would relative prices not change, but overall economic activity would fall. Thus, in a situation that is known as the "Prisoner's Dilemma", all governments would all end up being worse off. By giving exporters a "voice" in the trade policy choices of their trading partners and making foreign governments responsive to the costs resulting from the restrictions they impose, trade negotiations can resolve this problem, to the benefit of both consumers and domestic producers (WTO, 2012 and Copeland and Mattoo, 2008).

However, there are reasons to question the usefulness of the terms-of-trade theory when it comes to services trade. This is essentially because that theory is premised on trade agreements having a unique – cross-border – mode of trading and on protection being afforded through border measures. When it comes to services trade, however, the modes of supplying services are multiple, and may be complements or substitutes. In that regard, although not referring to services agreements directly, Blanchard (2007) argues that a country that could have manipulated border protection to improve its terms-of-trade will have no incentive to do so if the imports originate from its own investors with ownership interests in the exporting countries and sectors. Moreover, tariffs or equivalent import charges are largely irrelevant to services trade: they are hardly ever applied to services imported cross-border but are replaced by quantitative and other import restrictions and are totally inapplicable when services imports are supplied directly within national boundaries by foreign suppliers that are locally present, without crossing international borders (Staiger and Sykes, 2017).

Taking a commitment approach to trade agreements instead explains the main rationale for governments to engage in trade negotiations by the need to sustain and enhance the credibility of national regulatory reform programmes (Maggi and Rodriguez-Clare, 1998, 2007; Matsuyama, 1990; Staiger and Tabellini, 1987). Policy-makers need to convince firms and consumers that trade reforms will be lasting, but the commitment to reform cannot be identified ex ante by the private sector. Thus, if the adjustment costs entailed by the reform are high, and both domestic and foreign service suppliers suspect that the government may re-impose restrictions in the future, they will refrain from investing in the country, with the result that the benefits of the reform will not fully materialize. Trade agreements provide useful instruments to anchor unilateral policy reforms and can therefore address this problem, although pre-existing autonomous action by governments to enact national liberalizing reforms seems to be a necessary step toward trade negotiations (Marchetti, 2004).

The commitment theory presumes that trade agreements bind actual levels of market openness, immediately or on the basis to a pre-set timetable. However, as Marchetti and Mavroidis (2012) point out, the bindings undertaken under the GATS, in particular, anchor less than actually applied regimes. As such, the commitment theory offers only a partial explanation for trade negotiations in the WTO.

The lock-in mechanism provided by services trade agreements offers an important rationale for economies to collaborate with each other. As Copeland and Mattoo (2008) note, trade agreements present important commitment advantages, domestically and internationally. At home, signing a trade treaty helps governments stand up to local protectionist interest groups. By putting governments under certain obligations and raising the costs of their acquiescing to requests for higher trade barriers, trade agreements ensure that levels of protection stay lower and that fewer resources are dissipated on lobbying efforts. In the international context, binding policies in a trade agreement enhances the credibility and predictability of those trading conditions. It offers guarantees to services suppliers that the fixed costs of establishing a commercial presence in a foreign market, passing local qualifications or acquiring local knowledge will not be negated by the local government, e.g. suddenly blocking access to their market or imposing restrictive conditions with the aim of extracting rents from the services supplier. Although commitments that bind less than actually applied regimes provide governments with some margin to partially reverse reforms, they still guarantee against extreme policy reversals.

Moreover, even when markets are already open, and where there is no need for further lobbying efforts by exporting firms, there is still scope to negotiate the binding of the status quo. Indeed, Hoekman et al. (2007) argue that, when services regimes are already fully liberalized, governments may still invest political capital in the WTO negotiating process in order to lock in existing levels of openness.

(d) Services bindings are valuable… and interdependent on domestic regulation

It is empirically demonstrated that unpredictable trade regimes and the perils of policy changes are an important source of costs for traders and that the predictability of multilateral bindings has commercial value in itself (WTO, 2014; Osnago et al., 2018). This is particularly true for services trade, especially in the case of infrastructural services that are traded through the establishment of a commercial presence (mode 3), as their supply tends to imply high sunk costs[7] (OECD, 2017b). Therefore, guarantees afforded by trade agreements against arbitrary policy reversals provide an important incentive for service providers to supply their products internationally. OECD (2017b) finds that even when trade agreements bind existing levels of services openness, the reduction in uncertainty furnished to service traders by these legal commitments has a positive and significant effect on bilateral trade volumes.

Ciuriak and Lysenko (2016), Albert and Tucci (2016) and Lamprecht and Miroudot (2018) also find a positive and significant impact of services commitments on services trade. Although the effect of new liberalization on trade is, predictably, estimated to be higher than that of binding pre-existing services policies in WTO commitments, the latter still accounts for half of the impact that the actual increase in the level of services openness has on trade flows (Ciuriak and Lysenko, 2016). Lamprecht and Miroudot (2018) find that increasing the average policy bindings under the WTO to the levels bound in RTAs, without any actual new opening, still increases trade by between 8 per cent and 12 per cent depending on the sector.

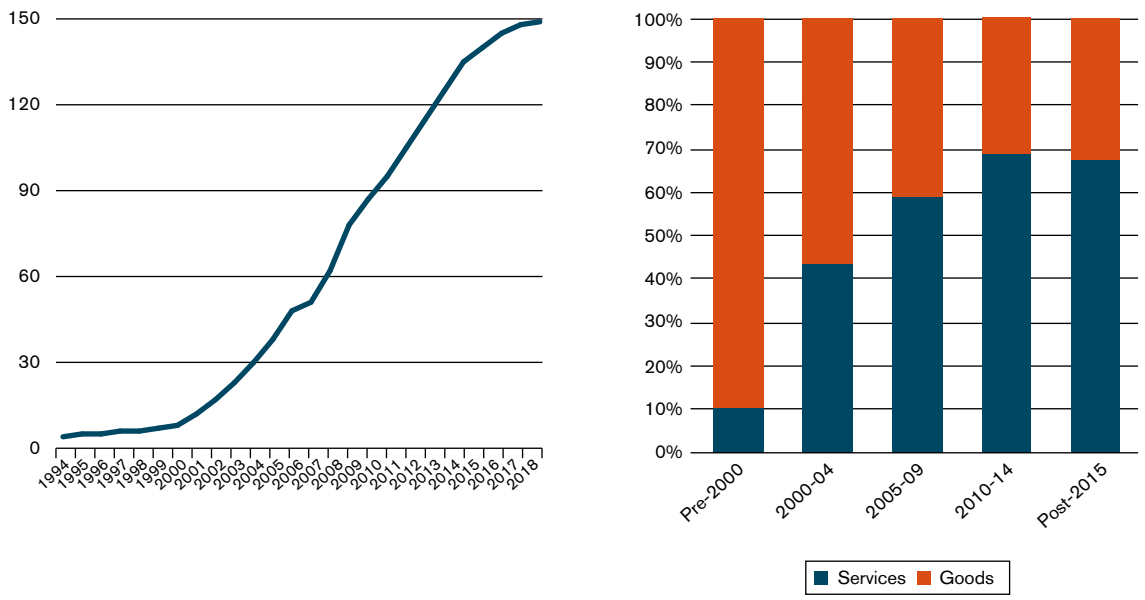
As Section E.3(b) will illustrate, the policy bindings in RTAs are appreciably higher than those under the GATS. This is largely a reflection of the fact that most GATS commitments date from 1995. With the exception of the 1995-97 extended sectoral negotiations in telecommunications and financial services,[8] and aside from the process of individual economies acceding to the WTO, no further services negotiations have been concluded in the WTO since then.

In the meantime, however, an increasing number of RTAs have been signed covering services trade. Even though the level of participation of WTO members in services RTAs varies, the number of services RTAs has drastically increased since the entry into force of the GATS (see Figure E.1). From less than 10 in 2000, their number skyrocketed to 148 by the end of 2018. Over 130 WTO members (approximately 80 per cent of the total membership) are party to at least one RTA covering services. While the overwhelming majority of RTAs concluded before 2000 covered only goods, more than two-thirds of those concluded over the last decade also include disciplines on services trade (see Figure E.1).[9]

Another significant trend, especially in the last decade, is the fact that an increasing number of services RTAs have been concluded among developing economies (see Figure E.2).[10] Overall, most of the increase in services RTAs since 2000 concerns agreements to which developing economies are parties. Still, few least-developed countries (LDCs) have participated in services RTAs so far, and some regions have been significantly less exposed than others (Africa, in particular), although various other services RTAs are currently under negotiation. The most active members, in terms of number of notified agreements, include Chile (22), Singapore (21), the European Union (17), Japan (16), China (14), the Republic of Korea (14), the United States (13), Mexico (12) and Australia (11). Many of the more important bilateral services trade relationships are not currently covered

Figure E.1: Services RTAs have grown significantly

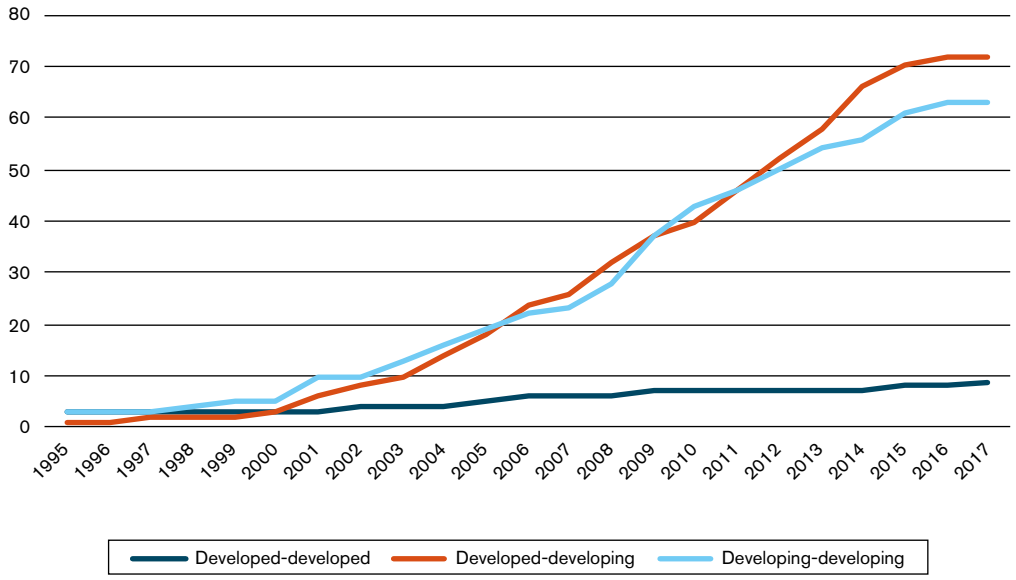
Number of services RTAs notified to the WTO, by year of entry into force (left) and proportion of RTAs notified to the WTO that cover trade in services, by year of entry into force (right)



Source: WTO Secretariat, December 2018.

Figure E.2: Developing countries are increasingly parties to services RTAs

Number of services RTAs, by level of development of parties



Source: WTO Secretariat, December 2018.

by RTAs, although, especially in more recent years, a number of agreements involving significant service traders have been notified, e.g. European Union-Japan (2019), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) (2018), European Union-Canada (2018), China-Republic of Korea (2016), and India-Japan (2011).

Since the GATS was negotiated, and in light of the fact that no further services negotiations have been concluded in the WTO since the late 1990s, RTAs have provided the main avenue to lock in services policies. Regardless, the WTO avenue remains open to governments which wish to anchor their services policy reforms, and offers the advantages of a potentially much wider participation and less volatile setting than RTAs sometimes provide. Additionally, the WTO framework includes unique features that help reinforce the stability and predictability of trading conditions, notably, in spite of its current challenges, the Dispute Settlement Mechanism, as well as the institutional structures for overseeing the implementation of commitments. The latter comprise the transparency, monitoring and review mechanisms for trade policies, which furnish a framework for benchmarking, peer-reviewing and potentially subjecting governments' actions to international scrutiny. The WTO also provides a global platform for cross-national knowledge-sharing and for the identification, across 164 economies (at time of writing), of good, if not best, practices in regulating services sectors in a manner that is least trade-restrictive. In addition, it allows for the development of an accompanying system of common and shared rules that facilitates services trade.

International collaboration, whether at the multilateral, regional or bilateral level, has focused both on lowering trade barriers and on domestic regulatory measures. There is, in fact, strong complementarity between international engagement on these two kinds of services measures.

First, as services trade is increasingly opened up, it becomes essential to ensure that domestic regulatory measures are not designed in a way that frustrates market opening. Beyond their impact on trade, poorly designed domestic regulatory measures may impair overall business dynamism and thus place a heavy burden on all services firms, regardless of their origins, as well as on their consumers (OECD, 2017b). Downstream business customers and final consumers pay a price premium for a policy environment that reduces market contestability. OECD (2017b) quantifies this premium as equivalent to a sales tax on purchases, and estimates it to range, on average across 42 economies, from 3 per cent in road freight transport to almost 40 per cent in broadcasting, with large variations across economies. Although these estimates also include the impact of non-discriminatory entry barriers, and are not exclusively focused on measures of domestic regulation, they nevertheless point to the gains that could be reaped from pro-competitive reforms targeted at inefficient service regulation that enables incumbent firms to consolidate and expand their market power when competitive pressures are weakened (OECD, 2017b). Indeed, this is one area where cross-national collaboration has taken place, both multilaterally and regionally, and where further efforts are underway, as Section E.3(c) and (d) will show.

Second, and as will be discussed in more detail in Section E.4(c), cooperation on domestic regulatory measures, and regulatory governance more generally, may facilitate the further opening-up of services markets. Although not sufficient in and by itself, such regulatory cooperation is likely to be a necessary condition for liberalization to happen. The quality of economic governance is essential to ensure that services openings fully deliver their potential economic benefits, both for the liberalizing and the exporting country. However, not all economies have the requisite capacity to design, enforce and review the regulatory actions needed to this effect. Moreover, even for those economies that possess the necessary resources, domestic regulation has at times proven difficult to design and enforce, leading in some instances to significant, albeit potentially unintended, trade impacts. As such, international collaboration may contribute, on the one hand, to mobilizing the assistance necessary for developing countries to build and improve their regulatory governance structures and facilitate new services market opening, and, on the other, to promoting information exchanges and the sharing of best practices that might inform all countries' services policy-making towards least trade-restrictive outcomes. The opinion piece from Natallie Rochester (see page 166) includes a discussion of this aspect from a developing-country perspective.

The possibility for reciprocity-driven market openings is usually put forward in the literature as a premise for trade negotiations; however, reciprocity-driven bindings that imply no new market-opening might still offer a rationale. In addition to providing an avenue by which to credibly commit to their own pre-existing trade openings, trade negotiations enable governments to exchange "bindings for bindings". Governments might find it easier to "defend" domestically having committed to certain services policies if they can show that they have obtained comparable commitments from their trading partners. This may not only apply to bindings of access levels, but also to bindings relating to trade-facilitating

disciplines on domestic regulatory measures. Undertaking obligations jointly with other countries not only offers guarantees to service suppliers of the application of comparable criteria across various jurisdictions, thus reducing trade costs, but could also provide regulators with some degree of comfort that, as other governments are equally ready to take them on, such obligations would not unduly encroach on their regulatory freedom.

This emphasis on bindings does not imply that services trade agreements stand no chance of delivering new market-openings. Although, as will be discussed in Section E.4(a) and (b), this has proven challenging so far, as technology advances and economies and production structures evolve, governments are likely to face growing pressures to open up their own markets and seek mutual openings on the part of their trading partners.

3. How countries collaborate in the services sphere

As Section E.2 has illustrated, regulation is pervasive in services industries. It is also the virtually exclusive trade policy tool in this sector. As services trade evolves under the impetus of technological advances, fragmentation of production, demographic trends, income growth and environmental concerns, regulation becomes even more crucial. The kind of domestic regulatory measures introduced, and the quality of the regulation passed, will play a very significant role in ensuring that the opportunities of services trade to strengthen growth, development, economic diversification and inclusiveness are fully realized. This explains why countries have cooperated on services trade policy, and why they are continuing to do so.

From a theoretical viewpoint, Mattoo and Sauvé (2011) note that assessing the level of governance at which international cooperation should take place, whether multilaterally in the WTO or at the regional/preferential level, requires an extension of conventional trade theory to factor in the multiplicity of modes of supply and the regulatory nature of trade protection specific to services trade. As most services trade barriers increase the operating costs faced by foreign suppliers without necessarily generating equivalent domestic rents, granting preferential access costs little or nothing, as little or no revenue is lost, although countries outside the preferential arrangement may be left worse off.

Still, there is the risk that RTAs may lead to the establishment of relatively inefficient suppliers, less likely to generate the greatest positive spill-over effects of technology and know-how transfers. As such, Mattoo and Sauvé (2011) assert that, in the case of services, particularly for infrastructural industries that have high locations-specific sunk costs, non-MFN trade-opening carries long-term risks that are not encountered in the case of goods trade. Given the role that the establishment of a commercial presence plays in services trade, any detrimental effects on the competitive landscape resulting from preferential liberalization may be long-lasting, leading these authors to argue in favour of multilateral market openings applied on an MFN basis. In this vein, it is noteworthy that, in several RTAs, "preferential" bindings relate to measures that are, in actual fact, applied on an MFN-basis, as further discussed in Section E.3(b)(i).

Conversely, when it comes to international cooperation on "behind-the-border" domestic regulatory measures, several commentators argue that this might be more fruitfully pursued at the regional/preferential level, or among small group configurations, rather than multilaterally. Braga and Hoekman (2017) posit that cooperation on domestic regulatory policies cannot take place among 160+ economies and might require smaller-group level engagement. Mattoo and Sauvé (2011) argue that regulatory cooperation might be more desirable, and is probably more feasible, among a sub-set of countries, as this is likely to facilitate the deeper convergence required to fully integrate markets, as was the case with the European Union. Balchin et al. (2016) find that regional negotiations are particularly important to facilitate the mutual recognition of services sector qualifications. On the basis of the analysis of all mutual recognition agreements (MRAs) notified between 1995 and 2007, Marchetti and Mavroidis (2012) conclude that WTO members usually enter into recognition agreements with other WTO members that are partners in RTAs, share the same language, are in geographic proximity, or exhibit all of these features. Regardless, regional efforts need to take into account the general obligations adopted at the multilateral level; regional efforts that are consistent with multilateral principles can, as these authors suggest, achieve regulatory complementarity at a higher level of detail and specificity.

The sections that follow describe the state of play with regard to international cooperation on lowering services trade barriers and on domestic regulatory measures. They present the multilateral level first, and provide a brief description of currently on-going discussions, and the preferential level thereafter. A final section also provides an overview of the regulatory cooperation activities of other international organizations that are most relevant to trade in services.

OPINION PIECE

By Natallie Rochester,
Trade and Development Consultant,
Managing Director, Mango Tales Ltd., Jamaica

The potential of trade in services for developing countries

The conclusion of the Uruguay Round and the creation of the World Trade Organization in 1995 marked the first time commitments on trade in services would be undertaken not only by developed countries, but also by many other economies outside of the European Union and parties to the North American Free Trade Agreement (NAFTA). The now conservative commitments under the General Agreement on Trade in Services (GATS) reflected that WTO members were less familiar with the trade disciplines in the new subject area of services than with those covered by the General Agreement on Tariffs and Trade (GATT). A core tenet of the GATS is the right to preserve policy flexibility and the right to regulate, and to introduce new regulations on services to meet national policy objectives.

However, international production integration, business practices, time and the dynamism of technological advances have challenged the relevance in today's trading environment of many of the reservations and conditions of WTO members in the GATS commitments on services sectors and modes of supply. Progressive liberalization on trade in services, including through the termination of MFN exemptions, was intended by WTO members to promote the economic growth of all trading partners and the development of developing countries. New commitments on services liberalization could align the WTO bindings to the status quo regime in a wider range of services sectors across the expanding WTO membership. This is important for the transparency of global services and predictability for traders, and could be supported by recognition agreements among members. Improved commitments by WTO founding members would improve the balance of rights and obligations of acceded WTO members, including small vulnerable economies and newly independent states, which have typically made wide and deep services commitments.

When the WTO was established, developing states were not equipped to compete with more advanced economies in capital-intensive extractive, agricultural processing and manufacturing industries. At that time, it was less understood that there is a symbiosis between trade in services and the growth of other services and non-services; and that efficient trade in value-adding services supports competitiveness and facilitates moving up the value chain in non-services sectors. In 2017, foreign direct investment in manufacturing and services were almost on a par (WIR, 2018). In response to price volatility and preference erosion, traditionally commodity-dependent developing countries are relying more on trade in services to mitigate vulnerability. Services account for more than two-thirds of global gross domestic product (OECD and WTO, 2017), are a major contributor to employment, and their trade has been more resilient in times of economic crisis than goods trade.

Services sector promotion, intellectual property-based innovation, and technology transfer and know-how will be critical to reducing the vulnerability of developing economies. Therefore, increased participation in international services trade is an essential element of a nation's sustainable development plan.

Consensus on domestic regulation disciplines would reduce disguised barriers to trade in the prospective markets of developing members, and would reduce transaction costs for traders by increasing the transparency of regimes and improving market information and decision-making. Significant progress has been made in this area. However, the built-in agenda of the GATS evidenced the difficulty of resolving complex conceptual issues of trade in intangibles using a GATT-

inspired construct, particularly in regard to subsidies and safeguards.

These challenges in rule-making persist because of the inter-dependence of modes of supply and economic activities to fulfil transactions with consumers. WTO members have been exploring the unique nature of the operation of trade in services with attention to the trends in specific sectors, and the appropriate scheduling framework for guaranteeing effective market access and national treatment. Clarification and understanding of trading interests in services have sometimes been limited to participants in plurilateral negotiations. Cooperative engagement on trade in services at the level of the WTO membership and enhanced frameworks for strengthening information exchange could help to inform developing countries' formulation of their negotiating positions, their participation in negotiations and their eventual implementation of new WTO commitments on trade in services. In practice, access to distribution channels in partner markets will be the key to unlocking new markets for developing countries. The LDC Services Waiver[11] and related implementation modalities are a good reference point for responding to developing country priorities in services negotiations. Effective delivery of cooperation, as provided for under the GATS Article IV, Aid for Trade and other trade-related capacity-building efforts in trade in services, would enhance the prospects of concluding, and capitalizing on, new trade commitments in the WTO.

Telecommunications and information communication technologies and financial services were recognized early in the existence of the GATS as sectors in their own right, as well as infrastructure services on which other sectors could be built. In today's digital economy, we understand that these services are critical for enabling commercial participation regardless of levels of development and size. Digitalization also expands the scope of cross-border services, as reflected in the increase in business services and ICT transactions in 2017 (WIR, 2018). Digitalization also disrupts trade in goods patterns in favour of goods with a digital equivalent, and transfer of digital information through processes like 3D printing change relationships previously based on the geographic location of production. Therefore, developing countries have an interest in binding commitments on services liberalization, services rules and other key areas of e-commerce and MSMEs. Looking ahead, approaches to negotiating trade rules should look to the different WTO agreements in order to ensure coherence in commitments and maximize the potential of a linked world.

(a) International cooperation on lowering trade barriers at the World Trade Organization

(i) State of play

Specific commitments under the GATS determine the extent to which WTO members provide for "market access" (Article XVI) and "national treatment" (Article XVII) across different services sectors and modes of supply. Specific commitments on market access and national treatment in relevant sectors can be used to encourage further competition and investment in services sectors, anchor liberalization undertaken autonomously, and enhance the credibility of policy plans. Also, commitments that bind existing levels of access provide enhanced transparency and predictability and prevent policy reversals that would result in increased protection.

However, the current commitments of WTO members under the GATS, which are in most cases over 20 years old, are modest overall, and generally do not guarantee the current applied level of openness of services trade policies (see, for instance, Borchert et al., 2011). This is because during the Uruguay Round, members put greater effort into establishing the new services trade agreement than negotiating commitments. Multilateral market opening negotiations have not produced significant results since then, except for the extended negotiations on financial services and basic telecommunication services (1995-97), which successfully resulted in expanding commitments, and commitments undertaken by members that acceded to the WTO after its creation in 1995.[12]

Given the nature of services trade barriers, GATS commitments are not as easy to summarize and quantify as tariff concessions. They can be analysed by looking at their sectoral scope – the number or proportion of sectors in which guarantees have been contracted – and the level of treatment that has been bound under each mode of supply for sectors committed for market access and national treatment.

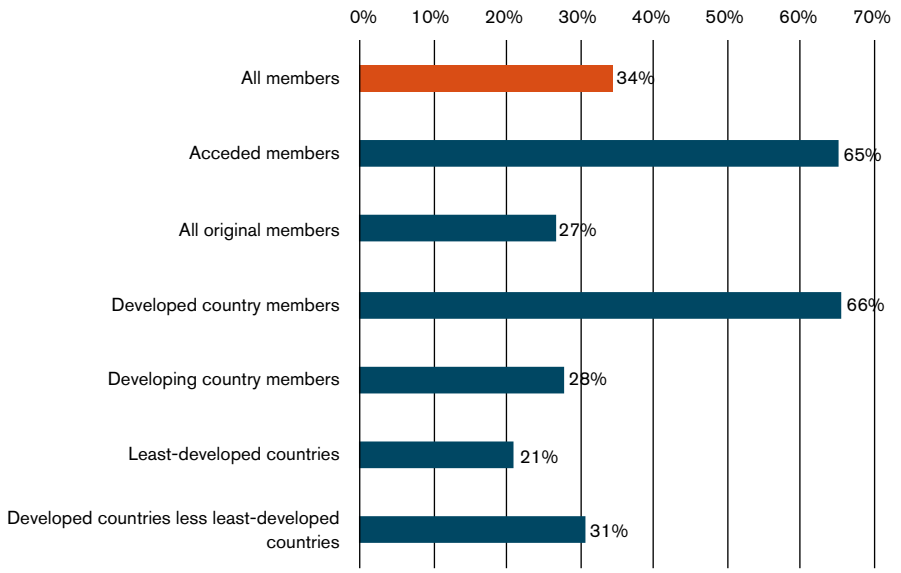
As regards sectoral coverage, the majority of WTO members do not have commitments in the majority of services sectors. As shown in Figure E.3, on average, WTO members have specific commitments in just over one-third of all services sub-sectors. Sectoral coverage varies significantly across different groups of members, with developed countries (66 per cent) having, on average, more commitments than developing economies (28 per cent). LDCs have, on average, a smaller share of sub-sectors committed (21 per cent). Members that went through the process of accession to the WTO have tended to undertake more commitments than original members, in a number of sectors similar to that of developed countries. While the share of sectors covered varies across groupings, the range also fluctuates significantly within each group. For example, among developing economies, one member had only one sub-sector committed, while another had as many as 132.

As Carzaniga et al. (2015) find, the market-opening commitments, as well as the domestic regulatory disciplines, subscribed by acceded members differ substantially from those undertaken by original WTO members at similar levels of development. By examining the schedules of 31 acceded members, it may be observed that these members committed to a significantly higher degree of trade-opening compared to those undertaken by original WTO members. This is borne out by the wider range of sub-sectors committed and the relatively high numbers of full bindings, without market access or national treatment limitations, undertaken by these members.

Some services sectors have tended to attract more commitments than others. For example, tourism, financial, and telecommunication services have attracted commitments from the majority of members, while other sectors, such as transport, distribution, postal-courier, environmental or audio-visual services have attracted fewer commitments (see Figure E.4). Consistent with figures on total sub-sector coverage, the proportion of acceded members with commitments in various sector groups is much higher than for other members. As illustrated in Figure E.5, a large majority of acceded members have commitments in most sector groups. For original members, the situation is almost the reverse: tourism, financial, telecommunication and business services are the only sectors where the majority have certain specific commitments.

Figure E.3: GATS commitments differ across different groups of members

Average proportion of services sub-sectors subject to specific commitments under the GATS, by different groups of members

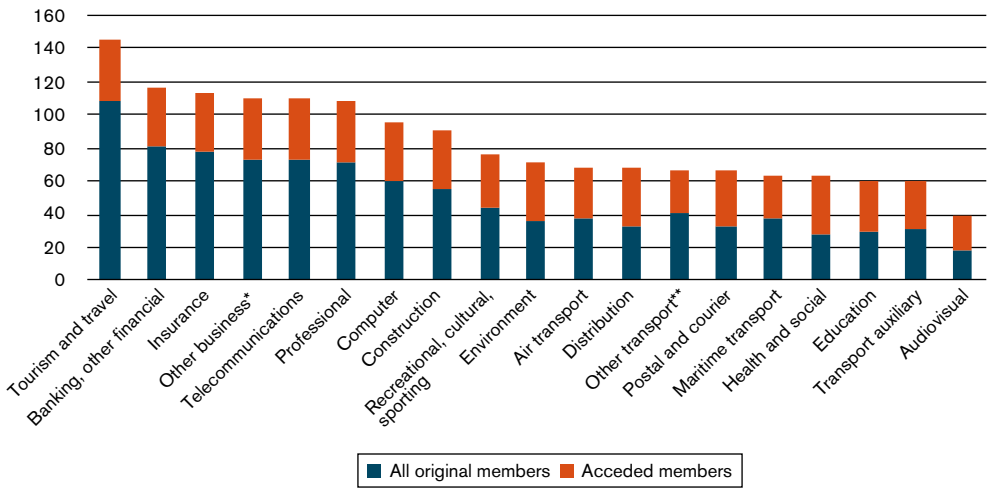


Source: WTO Secretariat, May 2019.

Note: Groups of members are based on definitions used in the WTO Secretariat report "Participation of developing economies in the global trading system" and WTO's Statistics Database. The number of services sub-sectors is based on the Services Sectoral Classification List (WTO official document MTN.GNS/W/120).[13] The schedule of the European Union (25) is counted as one, except for the categories of "original members" and "acceded members", where the schedule of the then European Communities (12) is used, given that a number of the EU (25) members acceded to the WTO after 1995.

Figure E.4: GATS commitments vary by sector

Number of members with specific commitments, acceded members and other members by sector



Source: WTO Secretariat, May 2019.

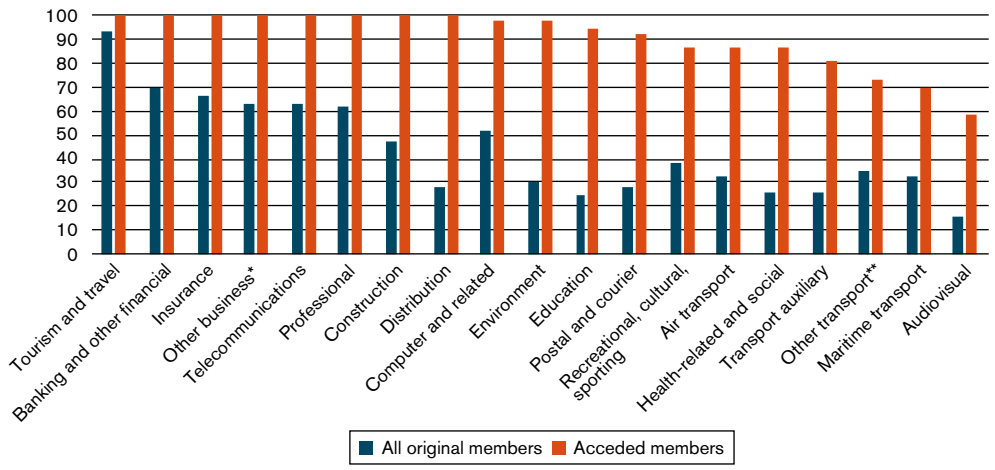
Note: European Communities (12), which is used given that a number of the EU (25) members acceded to the WTO after 1995, are considered as one.

* Business services other than professional and computer and related services.

** Transport other than maritime, air, and auxiliary services to all modes of transport.

Figure E.5: Acceded members have committed more sectors than other members

Percentage of acceded and other members with commitments, by sector



Source: WTO Secretariat, May 2019.

Note: European Communities (12), which is used given that a number of the EU (25) members acceded to the WTO after 1995, are considered as one.

* Business services other than professional and computer and related services.

** Transport other than maritime, air, and auxiliary services to all modes of transport.

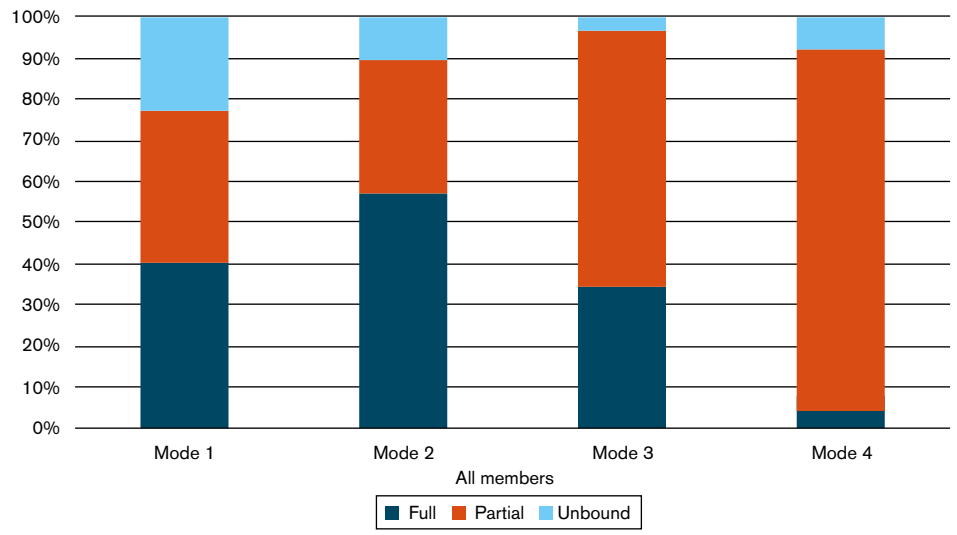
To summarize the level of treatment bound for each sub-sector committed, a straightforward approach is to distinguish, for each mode of supply, between full commitments (i.e., unrestricted), partial commitments (with some limitation(s) to market access/national treatment), and "unbound" (no commitments on market access/national treatment for a particular mode of supply). As illustrated in Figure E.6, sector-specific commitments on mode 3 tend to be subject to more limitations and mode 2 commitments are more unrestricted, while mode 1 is relatively more "unbound". Mode 4, for its part, is typically subject to cross-sectoral entries that limit commitments to certain categories of natural persons. This general pattern does not vary extensively across different groups of WTO members.[14]

The two levels of analysis – sectoral coverage and levels of commitments – are combined and reflected in Figure E.7. In that context, the average incidence of full, or even partial commitments, at the sector-specific level is rather limited. However, the incidence of commitments is higher for acceded members, in particular full commitments for modes 1, 2 and 3.

The situation varies significantly across different sectors. For example, the proportion of schedules that contain commitments on cross-border supply and commercial presence for such digital infrastructure services such as voice telephony, computer services, and online information and database retrieval, for example, is higher than in a number of other services sectors, though more than one-third of schedules provides no guarantees of treatment in these areas. For its part, retailing services is uncommitted in the majority of members' schedules. Furthermore, the number of schedules containing commitments on mode 1 is limited in relation to services where the increasing performance of digital networks is providing opportunities for cross-border electronic supply, such as accounting, engineering, research and development, advertising, audiovisual or educational services.

Further analysis has been conducted to provide a clearer picture of the level of openness/restrictiveness suggested by GATS commitments by looking at the type and scope of limitations listed (Gootiiz and Mattoo, 2009; Miroudot and Pertel, 2015). Indeed, "partial" commitments may sometimes be highly

Figure E.6: Different modes of supply enjoy dissimilar levels of commitments
Average levels of commitment by mode of supply for sub-sectors scheduled (%)

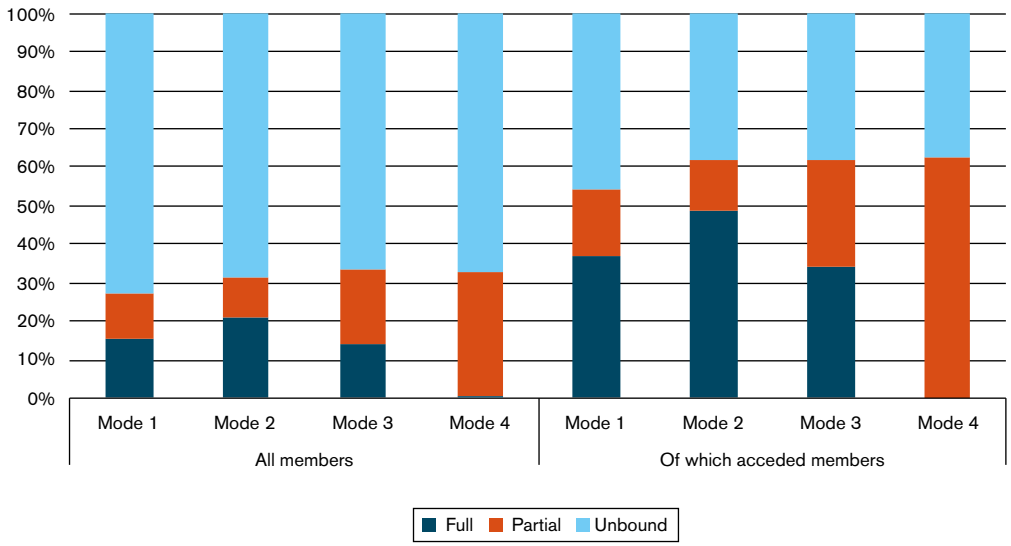


Source: WTO Secretariat, May 2019.

Note: The four modes of supply of the General Agreement on Trade in Services (GATS) are as follows: mode 1 is cross-border supply, mode 2 consumption abroad, mode 3 the establishment of a commercial presence in a foreign country and mode 4 the presence of natural persons abroad. The vertical axis represents the average proportion of full, partial and unbound entries for market access and national treatment across sector-specific commitments, per mode of supply. European Communities (12), which is used given that a number of the EU (25) members acceded to the WTO after 1995, are considered as one. Horizontal limitations are not taken into account in determining whether sector-specific commitments are "full" or "partial". "Full" means that commitments do not contain sector-specific limitations for both market access and national treatment, for a given mode of supply. "Partial" commitments contain some sector-specific limitation to market access or national treatment or are "unbound, except as indicated in the horizontal section". "Unbound" means that no commitment is undertaken for a given mode of supply. The number of services sub-sectors is based on the Services Sectoral Classification List (WTO official document number MTN.GNS/W/120).

Figure E.7: The incidence of commitments for acceded members is higher

Average levels of sector-specific commitments by mode of supply for all sub-sectors (committed or not) (%), all members and acceded members



Source: WTO Secretariat, May 2019.

Note: See Figure E.6 for further details. In Figure E.7, "unbound" also includes uncommitted sub-sectors.

restrictive, and others much less so. A number of sector-specific commitments do not bind the existing level of openness and provide instead more restrictive guarantees than allowed in practice, especially in view of the autonomous trade-opening that has taken place since Uruguay Round commitments were undertaken.

(ii) Determinants of GATS commitments

Limited work has been undertaken on the determinants of commitments in the GATS. As explained by Francois and Hoekman (2010):

> "[a]nalysis of the determinants of commitments is more complex than for goods (the GATT) because of the need to explicitly consider the multiple modes through which trade can occur and map this to the endowments (comparative advantage) of countries. It is also important to differentiate predictions regarding preferences for applied trade policies from commitments on such policies. The theory predictions regarding determinants of trade policy preferences pertain to actual (applied) policies, so it is not necessarily surprising that they do not do well in explaining commitments in the GATS".

Some attempts have been undertaken only for specific sectors, in particular financial services. On the basis of a simple model of endogenous trade policy on financial services, Harms et al. (2003) explore the determinants of GATS commitments in this sector – on the basis of indices on financial services protection that are based on members' commitments – resulting from the 1997 extended negotiations. Harms et al. are the only authors that have derived their explanatory variables from a formal trade policy model. They find that opening up banking services, and, to a lesser extent, opening up securities services, is explained well by their theoretical framework, which caters for distributional conflicts among different domestic groups (in particular the domestic banking sector and workers, whose welfare is a proxy for general welfare), as well as future trade negotiations (which may lead to future trade-offs). They generally find that greater financial sector development, a high degree of unionization of domestic workers, greater macroeconomic stability, better prudential regulation, and a greater foreign bank presence are all determinants of liberalization commitments. However, the possibility for an economy of exchanging concessions across different sectors in future negotiations leads to a more protectionist regime today.

Valckx (2004) also looks into the determinants of financial services liberalization commitments. He finds that a country's choice of commitment level is determined by a number of macroeconomic and institutional variables, such as economic growth, inflation, openness, and the performance of the banking sector. "Peer group effects" seem to have

played a role as well, in the sense that countries from the same region or income group adopted a similar level of commitments.

Other studies focus on the determinants of members' commitments in all sectors. Egger and Larch (2008) find that large and rich (capital-abundant) economies tend to be more inclined to lower barriers to trade and investment in services than small and poor ones, even though the latter group of economies should experience the larger welfare gains from doing so, according to the standard general equilibrium theory of trade and multinational enterprises. According to Egger and Larch, this result might be explained by the negotiation process and the lack of comprehensive domestic regulatory frameworks of services sectors in poorer economies. They also find that economies that were active in opening up trade prior to the advent of the GATS, through participation in preferential trade agreements, tended to commit to more extensive services liberalization than other economies. Furthermore, they also find some "peer group effects", in the sense that economies are more likely to make extensive commitments if their natural trading partners or neighbours do so as well.

Drawing on international political economy insights, Roy (2011) looks at the determinants of members' commitments in the GATS. His main finding is that more democratic regimes – theoretically more responsive to public opinion's general preference for openness and less reliant on the discretionary use of trade protection to gather support from specific groups – and countries with greater human capital endowments – reflecting comparative advantage in services – are associated with greater bindings, measured in terms of sectoral coverage and level of treatment bound. Other factors positively related to patterns of services commitments across economies are relative to economic size and regulatory capacity (measured by level of bureaucracy).

(iii) On-going discussions

Services negotiations pursuant to Article XIX of the GATS were launched in 2000. Article XIX ("Negotiation of Specific Commitments") mandates WTO members to "enter into successive rounds of negotiations" with a view to "achieving a progressively higher level of liberalization". Members established negotiating guidelines and procedures and, in view of the additional guidance provided with the launch, in 2001, of the Doha Development Agenda (DDA) negotiations, they engaged in bilateral and plurilateral negotiating processes, and exchanged initial and revised offers of improvements to their schedules of commitments. However, negotiations faltered when members proved unable to meet the timeline for agreeing on modalities on agriculture and on non-agricultural market access in 2006. The services "signalling conference" in 2008, at which a group of ministers exchanged indications on further improvements they could make to their schedules, marked the last significant development in services market-opening negotiations in the WTO. Differences over a special safeguard mechanism for agricultural products during negotiations in the summer of 2008 prevented a new effort to agree on modalities on agriculture and non-agricultural market access, and brought the entire DDA to an impasse. Since then, discussions of market-opening in services have been limited.

Most recently, in 2018, a group of members (Chile, Mexico, New Zealand, Panama) proposed that delegations engage in exploratory discussions on services market openings in the context of the Special Session of the Council for Trade in Services, the WTO body that oversees services negotiations. The objective is for delegations to exchange views on their current market opening interests, against the background of recent economic and policy developments, and without prejudice to positions on whether to hold negotiations.[15]

Services market-opening has also been discussed in the context of members' deliberations under the Work Programme on Electronic Commerce, particularly in recent years during its revitalization. Members circulated background documents outlining their priorities. In some cases, these submissions included, among many other things, references to the relevance of a services-related market opening component to improving the prospects for e-commerce. As a variety of members expressed the view that the Work Programme did not have a mandate for negotiations of either new rules or commitments, the question of market opening negotiations forming part of e-commerce work has now been taken up in the group of 70+ members participating in the informal discussions on e-commerce announced in a joint statement issued at the Buenos Aires Ministerial Conference in December 2017.

Most recently, as the participants in this open-ended Joint Statement Initiative (JSI)[16] on electronic commerce agreed to move to a negotiating phase, some members have again made submissions urging that market-opening on services relevant to e-commerce be among the items to be negotiated by the group. Suggestions range from minimal, covering key e-commerce infrastructure such as telecommunications and computer services, to broad-based, covering cross-border supply (mode 1) for

many or most services or including all modes of supply for e-enabled services, bearing in mind, for example, that commercial presence (mode 3) and the presence of natural persons (mode 4) also play a role in e-commerce. One of the reasons that the negotiations of services market-opening commitments has been raised in the context of e-commerce is that there is a perceived need to improve upon commitments that date, for many members, back to 1995, with a view to bringing services schedules more into line with modern technological and commercial realities.

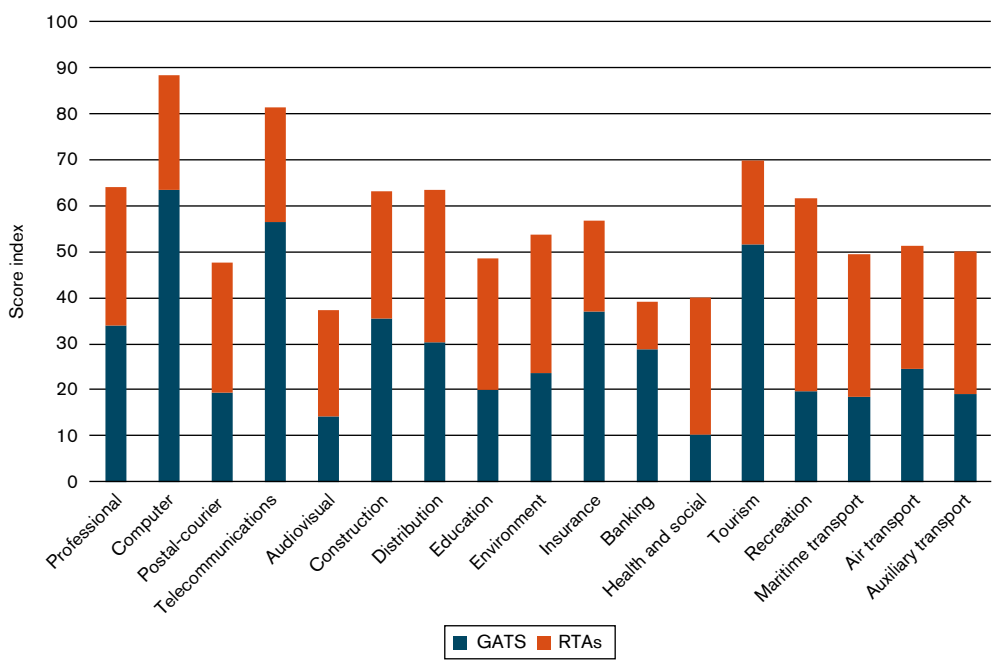
(b) International cooperation on lowering trade barriers in RTAs

(i) State of play

The modest state, overall, of commitments in the GATS stands in stark contrast with levels of bindings on services that have been achieved by various members in RTAs.[17]

Various studies have showed that parties to services RTAs tend, on average, to go well beyond the commitments they had undertaken in the GATS, as illustrated in Figure E.8 (see also Roy et al., 2007; Marchetti and Roy, 2008; Fink and Molinuevo, 2008; Marchetti et al., 2012; Roy, 2014; Van der Marel and Miroudot, 2014). Overall, GATS+[18] commitments in RTAs are significant across different sectors and modes of supply. This body of research shows how GATS+ commitments in RTAs vary across sectors, modes of supply, different regions and levels of development, as well as across agreements with different types of legal architecture, and examines the role of reciprocity in commitments among RTA parties in different sectors and modes of supply. Research focusing on determinants of the gap between GATS and RTA commitments on services find that such factors as the quality of governance, market size, skill endowments and asymmetries between parties are relevant in accounting for GATS+ commitments in RTAs (Van der Marel and Miroudot, 2014), while others emphasize that the coherence and level of restrictiveness of parties' regulatory frameworks, as well as the importance of parties' bilateral merchandise trade, have a positive impact (Shingal et al., 2018).

Figure E.8: RTA commitments go well beyond those undertaken in the WTO
Index of GATS+ commitments in services RTAs, by sector



Source: WTO Secretariat, May 2019.

Note: Based on commitments undertaken by 53 WTO members (counting the European Union (15) as one) in 67 services RTAs (Roy, 2014), The index score is brought within a scale of 0 to 100 for each sector, with 100 representing full commitments (i.e., without limitations) across all relevant sub-sectors. "GATS" reflects the index value for both GATS commitments and services offer in the DDA. "PTA" reflects the index value for a member's "best" RTA commitments across all its RTAs. The score for EU commitments is for the EC (15).

However, in contrast to merchandise trade, where RTAs typically bring down tariffs to 0 over time for most products traded, services RTAs are believed to provide for little new trade-opening in practice, despite some important exceptions (see Roy et al. (2007) for examples).[19] Rather, services RTAs have tended to bind existing levels of access and non-discrimination to a much greater extent than under the GATS. This is the case for a number of RTAs that follow a GATS-type approach to the scheduling of commitments. But in recent years, an increasing number of RTAs follow, at least in part, a different scheduling approach – called negative-list – whereby all covered services are deemed fully open, unless specified otherwise in a list of reservations for non-conforming measures that is annexed to the RTA in question.[20] By the end of 2018, 40 per cent of services RTAs were using a positive-list approach, while the rest were using a negative-list approach, in whole or in part (Gootiiz et al., 2019).

Negative-list RTAs usually provide that reservations be undertaken for "existing" measures that do not conform with certain provisions of the agreement (e.g. market access, national treatment). This suggests as default that applied levels of openness at the time of the signing of the agreement be bound.[21] In addition, negative-list agreements often include a so-called "ratchet mechanism", which provides that any future liberalization (autonomous or otherwise) of existing non-conforming measures will be automatically bound. The use of such "negative list" modalities in RTAs have tended to produce commitments that significantly reduce the gap between applied and bound levels.

Members' market-opening commitments in RTAs will typically differ from their GATS commitments, but also vary across a given party's different RTAs. While different bindings are undertaken, and different guarantees of access are provided to suppliers of different members, unlike in the case of goods, this does not necessarily imply that actual preferences are applied and that foreign suppliers will be subject to different measures on the basis of their origin. Given their nature (inside the border measures that are often embedded in domestic regulatory frameworks), services trade measures are usually applied on an MFN-basis, even though there are exceptions (e.g., foreign direct investment (FDI) screening thresholds in a number of jurisdictions). Domestic resistance to multilateralizing commitments undertaken in RTAs should, in principle, be low, and the potential for RTA commitments to facilitate, rather than hinder, MFN-based multilateral commitments should be greater in services than in merchandise trade.

(ii) Determinants of services RTAs

Some work has been undertaken on the determinants of economies' willingness to negotiate RTAs covering services trade with each other. Cole and Guillin (2015) find significant evidence that the "natural trading partner hypothesis", i.e. similarity in terms of economic size and relative factor endowment differences between partner economies, increases the propensity to negotiate a services agreement. Egger and Shingal (2014) observe that regulation is an important determinant of membership of a services RTA, and find that economies displaying greater convergence of services policies and less restrictive regulation are more likely to sign an RTA with each other. Building on previous research works, Sauvé and Shingal (2016) and Shingal et al. (2018) find that economies with high pre-existing levels of bilateral merchandise trade are more likely to negotiate services agreements with each other, which they take as confirmation of the rising complementarity between goods and those services that foster goods trade, especially in those regions, like Asia, that are increasingly integrated in global value chains (GVCs).

When it comes to the decision to engage in preferential services negotiations, Marchetti and Roy (2008) posit that RTA commitments were driven by disappointment with the DDA negotiations and concerns about free-riding.[22] Adlung and Roy (2005) argue that political support for bilateral trade agreements might have helped overcome the substantial obstacles that emerged during multilateral services negotiations, such as the resource constraints faced by smaller economies in engaging in complex negotiations or the institutional resistance from many non-trade ministries responsible for services trade policy-making. Hoekman et al. (2007) note that bilateral deals may entail commercial gains for service exporters that can be perceived more clearly in comparison with multilateral agreements, thereby capturing the attention of political interests.

(c) International cooperation on domestic regulatory measures at the WTO

(i) State of play

As Box E.2 shows, existing domestic regulatory provisions in the GATS are rudimentary and limited to a small number of transparency and good governance obligations. However, it is important to note the dynamic elements incorporated into the GATS, as its drafters conceptualized it as a core building block for progressive liberalization: the GATS contains a

built-in mandate to engage in successive rounds of negotiations with the purpose of lowering trade barriers, as well as converging on pro-competitive good regulatory practice, which can be bound through additional commitments.

In addition, recognizing the potentially trade-restrictive effects of domestic regulatory measures, WTO members agreed on the need to develop specific disciplines to ensure that certain government regulations are not unduly trade-restrictive. The result was Article VI:4 of the GATS, which mandates the development of "any necessary disciplines" to ensure that certain types of regulation (i.e. licensing requirements and procedures, qualification requirements and procedures, and technical standards – so-called "GATS domestic regulation") do not constitute unnecessary barriers to trade in services. Importantly, the Article VI:4 mandate is not intended to launch a de-regulatory process, or to seek harmonization between regulatory systems, but rather to promote good practices in regulation that would allow members to realize any of the policy objectives they seek to achieve.

Following the negotiating track to develop domestic regulatory disciplines under Article VI:4, WTO members decided to focus first on the accountancy sector. The negotiations resulted in the "Guidelines for Mutual Recognition Agreements or Arrangements in the Accountancy Sector" (May 1997), followed by the "Disciplines on Domestic Regulation in the Accountancy Sector" in December 1998.

The Guidelines, which are voluntary, were developed to provide practical guidance for governments, negotiating entities or other entities entering into mutual recognition negotiations on accountancy services. They recognize that differences in education and examination standards and experience requirements, amongst others, make implementing recognition on a multilateral basis extremely difficult. They set out a checklist of items that would lead to greater transparency in the negotiation, conclusion and substance of mutual recognition agreements, and promote a degree of similarity between the agreements that would facilitate the extension of mutual recognition more broadly.

The Accountancy Disciplines provide a set of rules that ensure that domestic regulatory measures related to licensing, qualifications, and technical standards in the accountancy sector are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary barriers to trade in accountancy services. For this purpose, measures must be no more trade-restrictive than necessary to fulfil a legitimate objective. The Accountancy Disciplines, which are meant to apply to members with liberalization commitments in the sector, comprise enhanced transparency obligations on publication and public availability of measures and requirements to inform other members, upon request, of the rationale behind regulatory measures in the accountancy sector. The Accountancy Disciplines introduce, for the first time in a trade in services context, a best endeavour obligation on members to provide opportunity to comment on draft regulatory measures. Licensing requirements and procedures are to be pre-established, and objective, and fees need to reflect administrative costs involved. Foreign-obtained qualifications are to be taken into account on the basis of equivalency of education, experience and/or examinations. Technical standards are to be developed and used only to fulfil legitimate objectives, and international standards are to be taken into account in determining the necessity of regulatory measures.

Members decided to integrate the Accountancy Disciplines into the GATS no later than at the conclusion of the mandated round of services negotiations, with members agreeing not to enact new measures inconsistent with the disciplines in the future.

Another instance of WTO members converging on good regulatory practices was the "Reference Paper on regulatory principles for telecommunications", which was drafted during the WTO negotiations on basic telecommunications (1995-97) and supplements market access and national treatment commitments in this sector. It was the product of close collaboration between trade officials and telecommunications ministry and regulatory officials.

The "Reference Paper on regulatory principles for telecommunications" contains six sections, with provisions covering regulatory obligations on competitive safeguards, interconnection, universal service, licensing, independence of regulators, and allocation and use of scarce resources (frequencies, numbers and rights of way). Negotiators agreed on disciplines regarding competitive safeguards and the closely related interconnection guarantees essentially because it was obvious that newly reformed telecommunications regimes would be characterized by a dominant supplier, typically the former monopoly. An important feature of the universal services obligations was also that any mechanism used to achieve these objectives should be implemented in a competition-neutral manner. In this sense, such provisions were expansions on the relevant disciplines in the GATS addressing monopoly and exclusive

suppliers (Article VIII) but applied to dominant suppliers in this sector. The provisions on licensing, independent regulators and scarce resources are more closely aligned with the type of provisions found in GATS Article VI, on domestic regulation, calling for impartiality and non-discrimination, and in GATS Article III, on transparency.

At the close of the negotiations on basic telecommunications, 57 governments included, as additional commitments in their GATS schedules, the Reference Paper, in whole or with minor modifications, and six members scheduled at least some elements of it. These entered into force in 1998. Today, as a result of accessions and unilateral improvements submitted by existing members, 101 WTO member governments subscribe to the Reference Paper in their respective schedules, with 94 of these members having taken it on in full, or with only minor modifications.

(ii) On-going discussions

Currently, on-going discussions on regulatory aspects in the WTO focus mostly on three areas: GATS domestic regulation, electronic commerce and the relevant aspects of investment facilitation.

Starting with GATS domestic regulation, further to the adoption of the Accountancy Disciplines, members decided to work towards developing generally applicable disciplines in the Working Party on Domestic Regulation (WPDR), while at the same time also considering developing disciplines for individual sectors or groups thereof.

Subsequent negotiations concentrated on disciplines applicable to all sectors, and members' proposals have been distilled into a number of Chairman's draft texts, comprising disciplines to enhance transparency, and to ensure that authorization processes provide for efficient procedures (e.g. allowing electronic submission, and ensuring processing of applications without undue delays), including reasonable fees. These drafts also provide disciplines requiring regulatory measures to be based on objective and transparent criteria and decisions to be reached and administered independently from other suppliers, and through adequate and impartial procedures.

Discussions in the WPDR stalled in 2011. They were revived in 2016, but further draft proposals submitted at that time, and with similar substantive elements, failed to gain sufficient acceptance among all members to become a basis for a consensus-based outcome.

In light of the opposition encountered, since the beginning of 2018, a group of 60+ WTO members have been pursuing discussions to advance a negotiating text outside the dedicated negotiating forum, in meetings open to all WTO members now referred to as the Joint Statement Initiative on GATS domestic regulation. By early 2019, the group was close to agreeing on a full set of substantive disciplines. At the time of writing, it had not been clarified how the group would give legal effect to the agreed outcome.

Turning to electronic commerce, substantive discussions are taking place under the multilateral WTO Work Programme on Electronic Commerce and in an informal group of members, referred to as the Joint Statement Initiative on e-commerce. In the Work Programme, the implications of continuing the long-standing moratorium on customs duties on electronic transmissions is under consideration. In the Joint Statement group, deliberations are exploring a number of areas of regulation that are considered to be important in putting in place a sound regulatory framework for e-commerce. The difference between the Joint Statement Initiative and the Work Programme is that participants in the Initiative are hoping to agree on a set of provisions on regulatory issues, and possibly scheduling Information Technology Agreement-related or GATS market-opening commitments that would be undertaken, if not multilaterally, then plurilaterally.

The kind of regulatory issues under consideration in the Joint Statement group, many of which were also flagged in the Work Programme, concern, for example, online consumer protection, recognition of electronic contracts and electronic signatures, unsolicited emails, cybersecurity and technology transfer, to name a few. Similarly to some provisions currently found in many RTAs, the types of provisions Joint Statement participants generally call for are ones in which governments agree to ensure that they have or will put in place laws or regulations relevant to these areas of concern. Also, similar to related RTA provisions, the rules suggested by participants are not prescriptive in nature about what exactly these laws and regulations should contain, but there is an underlying assumption that they need to be consistent with GATS principles such as transparency, impartiality and non-discrimination. Some participants have also called for greater transparency, or even prior publication and comment on new rules and regulations, not unlike proposed texts on GATS domestic regulation. Enhanced collaboration and consultation among relevant regulators on the various e-commerce regulatory topics has also been proposed.

Finally, turning to the relevant aspects of investment facilitation, the Joint Ministerial Statement on Investment Facilitation for Development, signed by 70 WTO members, calls for "beginning structured discussions with the aim of developing a multilateral framework on investment facilitation", which shall "seek to identify and develop the elements of a framework for facilitating foreign direct investments […]". The Joint Statement clearly establishes that "these discussions shall not address market access, investment protection, and Investor-State Dispute Settlement", and encourages all WTO members to participate actively in the initiative.

Following the Joint Statement, participating members have identified, and are further developing, the possible elements of the framework aimed at (i) increasing the transparency and predictability of investment measures; (ii) streamlining and speeding up administrative procedures and requirements; (iii) enhancing international cooperation, information-sharing, the exchange of best practices, and relations with relevant stakeholders, including dispute prevention; and (iv) facilitating greater developing and least-developed members' participation in global investment flows. As Box E.5 discusses, measures affecting FDI in non-services sectors have also been found to be determinants of services trade.

(d) International cooperation on domestic regulatory measures in RTAs

RTAs have also made inroads into developing disciplines on services regulatory measures, in particular in services e-commerce, GATS domestic regulation, mode 4 and telecommunication services. This section provides an overview of RTA provisions concerned with these issues.

(i) Services e-commerce

One of the aims of RTA provisions on e-commerce is to encourage trading partners to put in place a regulatory framework conducive to online trade, which has become an increasingly common means of trading services. Currently, at least 75 RTAs (of those notified to the WTO) have dedicated provisions or a chapter on electronic commerce. Both developed and developing economies have concluded RTAs that address e-commerce: approximately 63 per cent are agreements between developed and developing economies and 33 per cent are between developing economies (Monteiro and Teh, 2017).

Relevant domestic regulatory measures are addressed in more than half of the RTAS that have e-commerce provisions, particularly the more recently negotiated agreements. This can include provisions of a general nature concerning transparency, minimizing regulatory burdens, maintenance of relevant laws and regulations and open consultations. More specific provisions relate to domestic regulatory issues, such as consumer protection, data protection, paperless trading and unsolicited messages. However, there is wide variation in the RTAs concerned as to whether their provisions involve binding obligations or best-endeavour language (the latter generally encourages parties to put in place the relevant legal frameworks for online trade). Many of the RTA provisions on e-commerce call for greater collaboration among the parties on such regulation, which presumably means collaboration among the relevant authorities in the different areas of regulation concerned.

Finally, it is worth noting that if a services RTA does not have provisions on e-commerce, this does not mean that electronic trade in services does not fall within the scope of that particular RTA, as many of its commitments, as noted earlier, may improve upon those in the GATS, for example on the cross-border supply of services that can be provided online. Likewise, any overall provisions on domestic regulation would apply to e-commerce in agreements that do not have e-commerce provisions or, if they do, the e-commerce provisions would complement provisions or chapters that spell out obligations on domestic regulation.

(ii) Building on GATS domestic regulation

Building on the GATS, RTAs generally include disciplines on services regulatory measures. The majority of RTAs notified to the WTO in the last 10 years include disciplines that go beyond the GATS (i.e. GATS+). The number and degree of such disciplines varies across RTAs. In addition, since the sectors committed in RTAs extends far beyond those bound in the GATS, RTA provisions apply de facto to many more services sectors.

GATS+ provisions are found in RTAs involving developed and larger developing or emerging economies, as well as in many RTAs amongst developing economies. Moreover, provisions of a similar kind are found in RTAs comprising the same parties. Not surprisingly, the latest RTAs, including so-called "mega regional" RTAs such as the CPTPP or the Comprehensive Economic and Trade Agreement (CETA), include more GATS+ features.

GATS+ elements feature prominently in regulatory transparency and disciplines on administrative

Box E.5: FDI as a determinant of trade in services

Global investment and trade are inextricably intertwined through the international production networks of multinational enterprises, which fragment their production processes into different components in various locations, and their trade inputs and outputs into global value chains of various degrees of complexity (UNCTAD, 2013). Discussions, as well as the literature, on international cooperation in services trade tend to focus on policies directly affecting trade in services, including via commercial presence (mode 3 of the GATS). Thus, discussions generally focus on the policies and regulations affecting the ability of foreign services exporters either to export services to or to invest and establish a commercial presence in host countries. However, manufacturing FDI is important for services traded both on a cross-border basis and through commercial presence.

An increasing body of research makes the case that trade in services, particularly through commercial presence, is related to – and dependent upon – FDI in manufacturing. Looking at 57 economies over the period 1989 to 2000, Kolstad and Villanger (2008) find that FDI in manufacturing is a robust determinant of FDI in certain infrastructure services, in particular finance and transport, but is insignificant for FDI in other types of services industries such as retail trade. This result is consistent with the idea that infrastructure services such as finance and transport bind together a globally integrated chain of production.

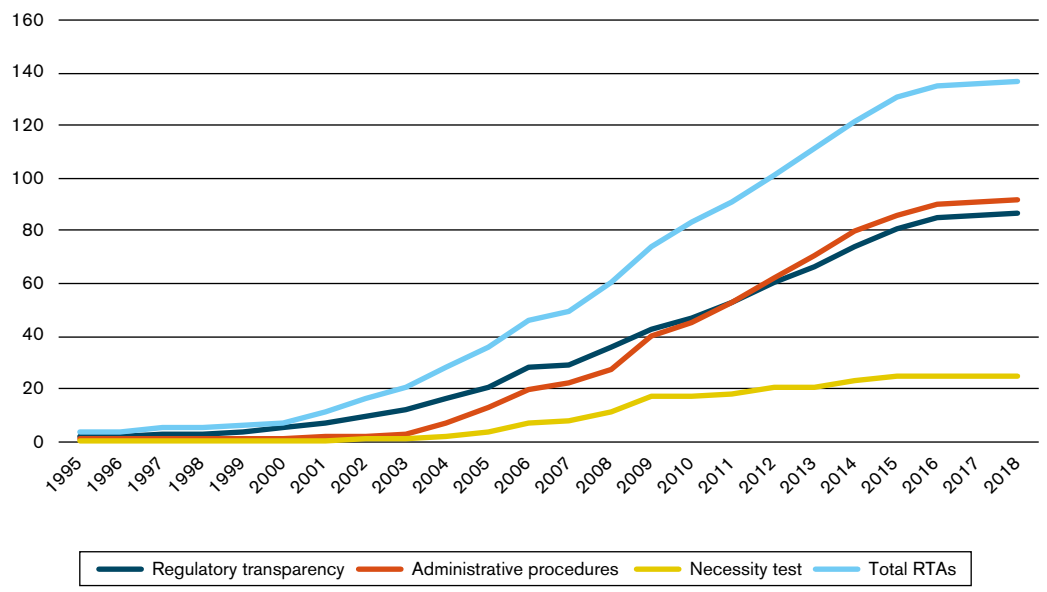
Evidence from firm-level data also points in the same direction: the location choices of manufacturing and services firms are interdependent. For example, when analysing the choices of French business services firms over the period 1997 to 2002 of foreign locations in which to establish affiliates, Nefussi and Schwellnus (2010) find evidence of strong complementarity: affiliates of French business services firms tended to be located where French manufacturing affiliates were in order to meet the demand for services of the latter. This complementarity depends on strong input-output linkages between the two sectors, manufacturing and business services. A similar study by Armenise et al. (2011) on the location determinants of Italian FDI in business services over the period 1995 to 2005 finds that such complementarity depends on the service concerned. Their results show a positive association only between manufacturing FDI and telecommunications FDI by Italian firms.

Ramasamy and Yeung (2010), looking at OECD countries over the period 1980 to 2003, also find strong empirical support for complementarity between services FDI and manufacturing FDI. In addition to the typical agglomeration effect (FDI attracts FDI), they find that services FDI tends to follow manufacturing FDI, in order to serve home-based customers in host countries. As they conclude in their study, "manufacturing FDI is the single most important determinant of services FDI." The same follow-the-client hypothesis is confirmed by Cazzavillan and Olszewski (2012) for nine economies (i.e. Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia) between 1996 and 2007, and by Falck (2014) for Sweden over the period 2002 to 2009.

FDI (including in non-services sectors) has been found to be a strong determinant of services exports. Eichengreen and Gupta (2013) find such an association between FDI inflows and services exports in 60 emerging market – including India, the focus of their study – over the period 1990 to 2008. A positive and significant association between FDI inflows and services exports in 13 selected Asian economies is found by Ahmad et al. (2018). Sahoo and Dash (2017) also ascertain that inward FDI has a positive impact on exports from India of such services as software, business services, financial services and communications. Studying the different modes of supply for US exports of services, Christen and Francois (2015) find a positive effect of manufacturing FDI on affiliate activity for some services sectors in US outward sales, in particular business services. This result, in the authors' view, supports the findings on positive interaction between FDI in manufacturing and business services previously found in the economic literature, e.g. Gage and Lesher (2005), Francois and Woerz (2008), and Egger et al. (2015).

procedures. As shown in Figure E.9, the number of RTAs including GATS+ elements has increased significantly since 2000. In many RTAs, the same transparency disciplines apply horizontally to both goods and services, with services chapters building on them. This is in stark contrast to WTO disciplines on regulatory transparency, which are more far-reaching for trade in goods (e.g. under the Technical Barriers to Trade (TBT) Agreement, the WTO Agreement on the Application of Sanitary

Figure E.9: GATS+ provisions on domestic regulatory measures have increased
Number of RTAs with GATS+ disciplines on services domestic regulatory measures



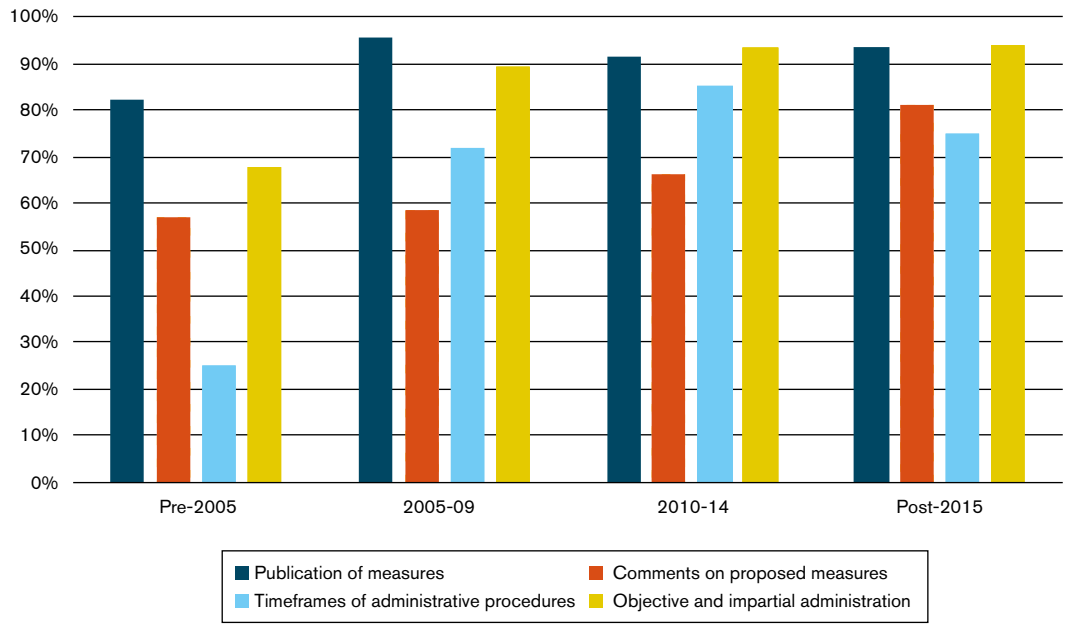
Source: WTO Secretariat calculations based on data extracted from Gootiiz et al. (2019) (based on 137 RTAs notified to the WTO from 1995 to 2018).

and Phytosanitary Measures (SPS Agreement) or the Trade Facilitation Agreement (TFA)) than those applying to services under the GATS. The latter seems at odds with the regulatory intensity of services.

One notable trend in RTA disciplines on regulatory transparency is the emphasis put on making measures available to stakeholders at different stages of the regulatory cycle, which is absent in the GATS, and had first been developed in the Accountancy Disciplines. As shown in Figure E.10, around 80 per cent of RTAs notified in 2015 provide an opportunity for "interested persons" to comment on "proposed" measures.[23] Receiving inputs from stakeholders during the regulatory process may contribute to facilitating trade by reducing unintended effects and helping services suppliers adapt to changing requirements. Likewise, responding to requests for information on measures from "interested persons" features in many RTAs.[24] A second trend relates to the requirement to make available specific information on procedures and requirements applicable to services sectors.[25] A third trend relates to the increasing number of references in RTAs concerning the use of ICT for enhancing the transparency of trade regimes, for instance by making measures and information electronically available through official websites.[26] However, notification obligations are found only in a few RTAs, possibly because notification at the multilateral level is preferred.

Another important cluster of GATS+ provisions relates to administrative procedures for the authorization to supply a service, which aim at enhancing the clarity, predictability and efficiency of such procedures. Around 90 per cent of RTAs notified require that applications be processed within certain timeframes or that indicative time periods be provided (see Figure E.10).[27] As to the treatment of incomplete applications, RTAs mandate that the applicant be informed of the additional information required to complete the application, provided with the opportunity to correct minor errors or omissions[28] and, in case of rejection, given an opportunity to resubmit.[29] RTAs also require authorization fees charged by competent authorities to be reasonable or not, in themselves, restrictive of the supply of a service.[30] Disciplines on examinations for the assessment of qualifications for obtaining licences can also be found in recent RTAs (e.g. scheduling examinations at reasonable intervals).[31] Some recent RTAs provide for the electronic submission of applications.[32]

Figure E.10: RTAs progressively include more regulatory provisions
Percentage of RTAs covering selected provisions



Source: WTO Secretariat calculations based on data extracted from Gootiiz et al. (2019) (based on 137 RTAs notified to the WTO from 1995 to 2018).

A second group of RTA disciplines focuses on minimum standards applicable to administrative procedures, such as requiring the objective and impartial administration of procedures,[33] the independence and impartiality of competent authorities deciding on authorizations, and the right to prompt review of administrative decisions.[34]

As with WTO negotiations on GATS domestic regulation, in RTAs members also have been less inclined to submit the substantive aspects of their licensing and qualification regimes to further disciplines. Whereas disciplines on procedural aspects aim to tackle the efficiency of administrative procedures, members have shown the desire to maintain more autonomy with regard to disciplines on substantive requirements about the content and quality of regulations. While a considerable number of RTAs include basic principles such as the obligation to apply objective and transparent criteria, the requirement that licensing and qualification requirements are not more burdensome than necessary (so-called "necessity-test") is present in less than 25 RTAs (see Figure E.9).[35] A number of RTAs include a provision requiring the parties to review the agreement in light of the results of WTO negotiations on GATS domestic regulation possibly as a way of reducing regulatory fragmentation.

As to disciplines on the recognition of services sectors qualifications, 95 per cent of RTAs include a provision on MRAs.[36] Most of them are based on Article VII of the GATS and in many cases they foresee the possibility for the parties of concluding MRAs in the future, in some cases identifying priority professional services sectors (e.g. accountancy, engineering or architecture).[37] More recent RTAs encourage the parties to consult with their relevant bodies to develop recommendations on proposed MRAs,[38] or in some instances, to encourage the relevant bodies from the parties to exchange information with the aim of entering into negotiations on MRAs for identified sectors based on pre-established guidelines,[39] in both cases making MRAs subject to the review of the RTA bodies.[40]

Some recent RTAs include innovative provisions aimed at promoting regulatory coherence and cooperation throughout the regulatory cycle.[41] The aim is to improve the quality and efficiency of regulations, while reducing regulatory divergence. Regulatory coherence and good regulatory practices focus on improving domestic coordination among relevant authorities, conducting public consultations on and preparing impact assessments of proposed regulations, and periodic review of regulations.[42] Cross-border cooperation among regulatory

authorities relates to the exchange of good regulatory practices, information-sharing on planned and existing measures, and cooperation in regional fora.[43] Both rely on enhancing transparency, which may be deemed a pre-condition for further regulatory coherence and cooperation. These provisions are of a cross-cutting nature, providing the possibility to exclude certain measures. They sometimes constitute "soft law" (i.e. they are not legally binding) or are excluded from the RTA dispute settlement mechanism (i.e. they are not subject to adjudication).

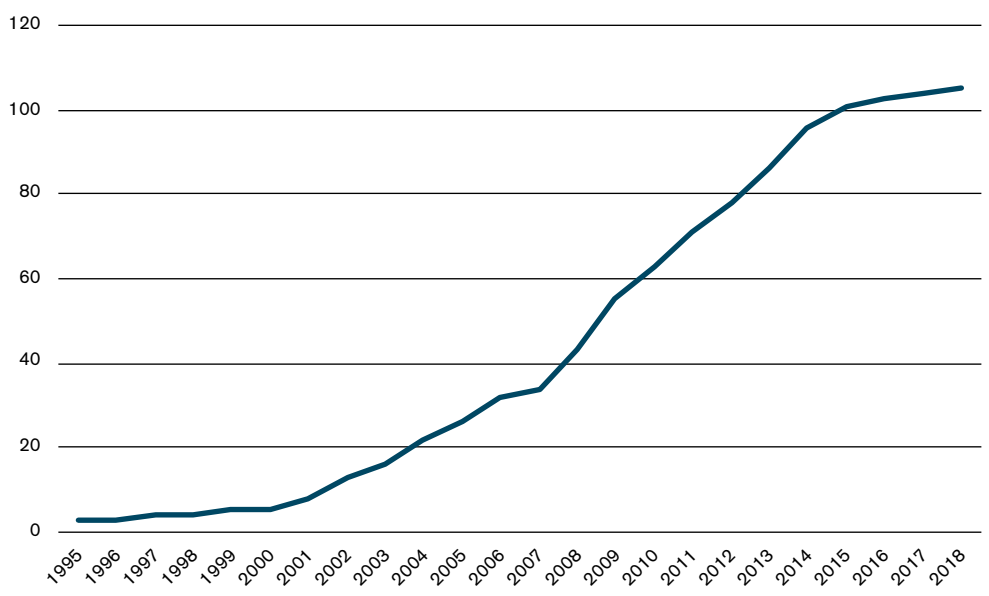
Many RTA provisions use "best endeavour" language (i.e. "to the extent practical" or "to the extent possible"). This may be explained by different reasons, such as the scope of the provision at issue (e.g. whether it applies to all levels of governments or only at the central level, or to some or all sectors), the degree of GATS+ elements, and the level of regulatory capacity of the economies involved. Parties may also find value in including GATS+ disciplines using best endeavour language as a means of improving their regulatory environment to further facilitate trade. While such language is found in RTAs concluded by both developed and developing economies, it is more prevalent in RTAs involving developing countries and where the RTAs include more far-reaching disciplines. The inclusion of such language may also be seen as part of the natural evolution of international agreements, where new disciplines are introduced first in soft terms, up to a point where those practices become more familiar and strengthened provisions are warranted.

(iii) Presence of natural persons (mode 4)

As stipulated in the GATS,[44] all RTAs must cover all modes of supply, including mode 4. Traditionally, RTAs only tackled mode 4 trade from a market opening perspective. In that regard, they provide some advances compared to the commitments undertaken in the GATS, but the progress they achieve is, overall, rather mediocre (Carzaniga, 2008).

However, more recently, RTAs have started to incorporate regulatory disciplines related to mode 4 that are aimed at facilitating such trade. These disciplines generally go beyond the obligations contained in the GATS. As Figure E.11 shows, the number of RTAs that contain mode 4-specific provisions has been growing steadily. Although these numbers exclusively reflect the existence of provisions specific to mode 4, generally in separate chapters or annexes, and do not account for the substantive elements therein, they nevertheless point to the increased attention that mode 4 regulatory issues have attracted in RTAs concluded over the past 10 years or so.

Figure E.11: Mode 4 provisions in RTAs are on the rise
Number of RTAs with mode 4-specific provisions



Source: WTO Secretariat calculations based on data extracted from Gootiiz et al. (2019) (based on 137 RTAs notified to the WTO from 1995 to 2018).

When it comes to the substantive mode 4 elements addressed in RTAs, disciplines regarding the setting of visa fees are those encountered most frequently. Fees are variably required to be "reasonable and in accordance with domestic laws",[45] "not unduly impairing or delaying trade"[46] or "based on the approximate cost of services rendered".[47] The second most frequently found type of mode 4-related disciplines relates to limiting recourse to the dispute settlement mechanisms of the RTAs to situations where there is a practice of rejecting applications and after local administrative remedies have been exhausted. This is followed by disciplines relating to the handling of visa and work permit applications, which are mandated to be processed "expeditiously",[48] "promptly"[49] or within given time-limits,[50] varying between 10 and 45 days.

In roughly half of the RTAs containing mode 4 regulatory disciplines, the parties are also mandated to inform visa and/or work permit applicants of the outcome of their application. In around half of the RTAs concerned, material relevant to such applications, or any changes thereto, are also required to be published "promptly",[51] "without undue delay",[52] or within a set timeframe.[53] Finally, about one-third of these RTAs provides for the establishment of contact points, to facilitate governments' or applicants' access to relevant information.

(iv) Telecommunications

RTAs have increasingly included standalone chapters on telecommunications that draw extensively on the GATS Annex on Telecommunications and "Reference Paper on pro-competitive regulatory principles" in the sector and add provisions on new regulatory topics. As with the GATS provisions, the RTA regulatory topics are also most commonly oriented toward expanding on ways to promote and preserve a healthy competitive environment. For this reason, some of the provisions on new topics may more explicitly cover or clarify issues dealt with in a more generic manner in the Telecommunications Annex and Reference Paper. Examples of this are the provisions calling for number portability and pro-competitive practices in the mobile services sector.

Currently, 101 RTAs have standalone chapters on telecommunications services. Another approach, found in 12 RTAs, is a provision in the services chapters that incorporates, by reference, the GATS Annex on Telecommunications as integral to provisions of these RTAs. Both developing and developed economies participate in one or more of the RTAs that have a standalone chapter on telecommunications. High-income and upper-middle-income economies amount to 84 per cent of all WTO members participating in RTAs with a standalone chapter on telecommunications. Overall, high-income countries represent 61 per cent of all WTO members participating in RTAs with a chapter on telecommunications, compared to 25 per cent and 13 per cent for upper-middle-income and lower-middle-income countries, respectively.

(e) Work in other international organizations

The work of many international organizations (IOs) is relevant to services trade. These IOs offer a governance framework, mostly along sectoral lines, for countries to cooperate with each other on rules that are pertinent for services. Such cooperation does not address trade barriers per se, but is focused on developing, disseminating and adopting a common approach with regard to sectoral domestic regulations that, although formally unrelated to trade, may nevertheless have a trade impact. Indeed, while the WTO, and trade agreements more generally, do not set the substance of regulatory norms, cooperation on these takes place amongst regulators in specialized international bodies. That there is a wide range of IOs that deal with, or whose activities are pertinent to, services industries is largely a reflection of the regulatory intensity of this sector.

While an exhaustive account of the work in all relevant IOs would be beyond the scope of this Report, what follows is a brief description of their main pertinent areas of activity. Appendix Table E.1 offers some more detail. This section confines itself to specialized IOs with universal membership. It is essential to acknowledge, however, the significant and extremely valuable work undertaken in the area of services trade by universal, non-sectoral IOs, such as the World Bank, the United Nations Conference on Trade and Development (UNCTAD) or the International Trade Centre (ITC), regional organizations and fora, such as the Organisation for Economic Co-operation and Development (OECD) or the Asia-Pacific Economic Cooperation (APEC), and other relevant specialized bodies of a non-universal nature.

The activities carried out by IOs generally affect services trade through two channels: the establishment of international standards and the promotion of recommended practices. Whereas standards commonly refer to "necessary" requirements of services to pursue safety or quality objectives, the application of recommended practices is considered as "desirable" in the interest of safety, regularity and efficiency of services activities. Examples include the Standards and Recommended Practices developed by the International Civil Aviation Organization (ICAO), the Standards and Recommended Practices set out by the International

Box E.6: Trade in services and health worker mobility

Parallel to the changing demographics, the number of jobs in the health sector is growing. Across OECD countries, employment in health and social work grew by 48 per cent between 2000 and 2014. In addition, the global economy is projected to create an additional 40 million jobs for health workers by 2030, primarily in middle- and high-income countries. Concurrently, the international mobility of health workers is accelerating. Over the last decade, the number of foreign doctors and nurses working within OECD countries has increased by 60 per cent (OECD, 2015). The patterns of international health worker mobility are also growing in complexity, with substantial intra-regional, South-South, and North-to-South movement, alongside better understood movement of health workers from South to North (WHO, 2017).

Although still largely unused, there is potential in the international trading system to maximize benefits from health worker mobility while protecting the system against adverse effects (e.g. skill-drain, overstay of health professionals). Trade in services frameworks (global, regional and bilateral agreements) have resulted in the development of ways to facilitate and manage health worker mobility, and in specific cases have evidenced the ability to bring together a variety of national interests (e.g. education, foreign affairs, health, labour and trade) related to health worker mobility. The frameworks contain flexibility to strengthen and advance ethical health worker mobility. This is consistent with the World Health Organization (WHO) *Global Code of Practice on the International Recruitment of Health Personnel* which was adopted in 2010 by the 63rd World Health Assembly. The aim of the Global Code is to regulate the migration and movement of healthcare workers from areas that need them the most. This is achieved by means of a "health labour market analysis". However, further analysis is required to identify how best to leverage trade rules to meet the needs of countries of origin, destination countries and health workers.

Trade agreements and the WHO Global Code could be mutually reinforcing, with positive language from trade agreements replicated in targeted bilateral agreements on health workers. It would be useful, for instance, to analyze further how recognized and harmonized "health labour market analysis", in both origin and destination countries, could be used to complement or supplement the "economic needs test/labour market tests" used in trade agreements. This could potentially contribute to opening up trade in services further, by better targeting demonstrated needs.[54] Concerns related to "brain drain" would also need to be addressed. Applying economic needs tests for this purpose could provide confidence at the national and sub-national levels that opening up services trade benefits, rather than harms, socio-economic advancement. The potential to incorporate provisions to support international technical cooperation and financial assistance with respect to health personnel education in RTAs also holds important promises.

However, a number of issues would need to be addressed if the full benefit from trade in services agreements in this sector is to be felt, for example identifying the extent to which behind-the-border measures, as well as immigration-related requirements, can affect mode 4 health services trade; using trade dialogue to inform domestic regulation and policy in this sector; taking advantage of the health services commitments in mode 4 in GATS and RTAs to provide opportunities for greater temporary movement of qualified health workers; and strengthening the links between trade in educational services and international health worker mobility (Carzaniga et al., 2019).

Maritime Organization (IMO), the standards developed by the International Telecommunication Union (ITU) and the best practice guidelines issued by the ITU's Global Symposium for Regulators. Box E.6 provides an illustration, drawn from the health services sector, of how mutually reinforcing the activities of IOs and trade agreements can be.

International standards, usually designed by standardizing bodies of IOs and adopted by consensus, may be more binding for the countries involved than recommendations, which require countries to make only a best effort to conform. However, most standards are offered for adoption by standardizing bodies without being mandated by law. Only the inclusion of a particular standard into legislative frameworks makes adherence to the standard mandatory, and such mandatory compliance is often undertaken in order to address public health, safety and environmental issues.

Standards and recommended practices specify the characteristics of a service and the manner in which it should be produced. They are used in services sectors to fulfil different functions that typically impact on market openness and trade in specific sectors, although, in comparison to goods standards, their utilization is more limited.

First, as networked services often need to be used together, governments require standards that promote compatibility and interoperability, as this can stimulate economies of scale (i.e. network effects), increase market efficiency and competition. These standards typically define the equipment or interfaces to be used in the supply of a given service. For instance, in the telecommunications sector, the ITU develops standards for protocols to allow networks to communicate with each other. Another example of how standards can integrate separate markets and open up competition comes from the transport sector and is represented by standardized railway tracks, which allow commercial railway operators to move their trains across borders. These standards have also been adopted in the postal services sector, to interconnect the global postal network. The Universal Postal Union's Standards Board develops the technical standards and electronic data interchange message specifications to facilitate the exchange of operational information between national postal systems.

Second, standards can reduce the information asymmetry between service suppliers and consumers by providing a minimum guarantee of services safety and quality. This represents a core issue for services and services trade, as their non-tangible nature means that a quality assessment of the service prior to its actual consumption is not possible, and it also compounds the general lack of consumer expertise to evaluate technical information on services. Therefore, service providers' observance of widely recognized and accepted quality standards can help distinguish their services as well as reduce information and transaction costs.

Third, standards can address negative externalities that may not be considered by either suppliers or users, thereby providing incentives for international cooperation on various topics. The World Tourism Organization, for instance, has proposed a Global Code of Ethics for Tourism, which defines a non-binding set of principles to guide key players in tourism development. It aims to help maximize the sector's benefits and facilitate international tourism flows while minimizing the potentially negative impact on the environment, on cultural heritage and on societies. Another example is the international standards that have been adopted to reduce greenhouse gas emissions in the transport sector.[55]

The implementation of international standards and guidelines set by IOs may decrease transaction costs and improve the access of service suppliers to distribution channels and information networks, thereby facilitating their participation in international trade. However, it is also generally recognized that participation in standard-making at the international level is costly, and developing countries face particular capacity constraints. Service providers from developing countries may find themselves in a weaker position to participate in international transactions. In order to overcome these challenges, in areas where standards are more prevalent than services, initiatives have been developed to ease the impact of certain provisions on developing countries and support their capacity to implement international standards, guidelines and recommendations.[56] The extent to which similar initiatives might also be necessary with regard to services is an open question.

4. Prospects for future cooperation

(a) Trade agreements have found it difficult to drive services trade reforms

As Section E.3(a) has illustrated, to date the GATS has yet not fulfilled its potential to open markets for services trade, with the notable exception of those members that have joined the WTO since 1995 and the phased-in commitments made during the extended negotiations on basic telecommunications and on financial services in 1995-97. While it might be tempting to attribute this to the impasse in WTO negotiations or shortcomings in the GATS itself, the difficulty is more widespread: also RTAs have not generated substantial improvements compared to whatever opening had been achieved unilaterally. Whether at the WTO or in preferential settings, trade agreements have not generally opened services markets beyond the applied status quo regimes.

This may come as a surprise. By allowing for reciprocal exchanges, trade negotiations are intended to help governments to overcome the resistance of private interests that gain from trade protection by giving a voice to exporters seeking better access to foreign markets. However, the traditional mechanism does not seem to have been as effective as it might be when it comes to services. One possible explanation is that, given the relatively lesser importance attributed to services trade by governments compared to goods trade, better access to foreign markets may appear to generate smaller prospective profits for exporting firms than the rents/excess profits captured by sheltered incumbents in the countries concerned (Hoekman and Messerlin, 1999). Still, Fiorini and Hoekman (2017) note that the opposition to negotiating reciprocal commitments to open-up services markets is "a bit of a puzzle", in particular given that services trade offers the prospect of attracting foreign investment, via mode 3,

with the associated effects on job quality, technology transfer and induced demand for a broad range of local goods and services.

Resistance to opening markets in the context of trade negotiations may, in various instances, find its origins in the pervasive role that regulation performs in services markets, as alluded to in Section E.2. Amending regulatory regimes is more difficult and complex than reducing tariffs. For starters, responsibility for internationally negotiated services reforms is highly segmented within governments. While the opening-up of manufacturing trade tends to be coordinated between different departments within one ministry (Trade), the competencies for services may reside in a multitude of different ministries (e.g. Education, Health, Finance, Labour, Environment, Communication, Justice and Transport, etc., in addition to Trade) that are not normally required to cooperate. In some cases, the respective competencies are even vested in, and may constitute the sole "raison d'être" of, agencies at the sub-federal level.

As Copeland and Mattoo (2008) observe, given their exclusive focus on regulatory measures, services trade agreements by definition involve measures normally thought of as domestic policy, and so are sometimes perceived as intervening in the domestic policy sphere, even when their sole objective in doing so is to reduce governments' ability to erect barriers that are detrimental not only to trade but also to economic welfare.

Furthermore, as Hoekman et al. (2007) note, public interest concerns tend to be particularly acute when it comes to services, and clearly separating protectionist measures from legitimate policy-driven measures may be a challenge, as discussed in Section E.2(b). Hoekman et al. (2007) contend that, in the absence of systemic shocks, such as the effect that new technologies had in the telecommunications sector, delivering negotiated services trade-opening is complicated by the possibility that regulators and consumers coalesce around a pro-status quo bias. On the one hand, regulators may resist market-openings because they are concerned that their ability to enforce domestic regulatory standards may be impaired, are captured by incumbent interests, or fear losing any rents they enjoy as a result of restricting entry. On the other hand, consumers, who would normally be in favour of the reforms that could result in lower prices and/or an increase in the choice of services, may oppose them for fear that the quality of the services on offer will be affected.

In this regard, Young (2016) notes that the international political economy literature usually ignores consumers' trade policy preferences; consumers are expected to benefit from trade being opened up, but they are assumed not to care about trade policy per se because their individual gains are minimal. However, he argues that when the trade agenda covers behind-the-border measures, as is the case with services agreements, consumer groups become engaged in trade policy-making, and may, in certain instances, do so in defence of national regulations and against the perceived danger of lower quality standards resulting from international trade disciplines.

(b) The dynamics may be changing

The findings of the preceding sections point to the possibility that governments may face growing pressures to pursue additional reforms, and to open up not only their own markets, but also to seek mutual openings on the part of their trading partners. Starting with the domestic market, reform pressures are bound to be on the rise due to a number of factors. First, digitalization has enabled many more services to be traded remotely. This is facilitating the participation of new actors in services trade, such as MSMEs, as Section B has showed. Such new entrants are likely to represent added voices pressuring governments to reduce, if not eliminate, the benefits that incumbents derive from trade protection and urging them to engage in deeper regulatory cooperation.

Second, as the fragmentation of production processes continues, efficient markets for producer services are going to become even more essential to the competitiveness of all firms and their ability to participate in global value chains. This is likely to be especially important for developing countries seeking to diversify their exports and to move up value chains.

Third, demographic changes, rising per capita incomes, environmental concerns and technological advances are intensifying demand for, and trade in, a range of services sectors. As consumers increasingly buy services internationally, they may be expected to become more aware of the existence of any trade barriers.

Fourth, as services trade statistics improve and, in parallel, the measurement of services trade restrictiveness advances, empirical work on the effects of services trade has been growing significantly. While many of the findings are intuitive, the ability to measure them exposes more clearly the benefits of services liberalization and, in parallel, the costs of protecting services.

Looking at export markets, the strong complementarity between goods and services, and the increasing blurring of boundaries between goods and services traders should further widen the range of firms with a stake in more open services markets abroad. The growing servicification of manufacturing makes goods-producing firms not only bigger buyers of services, but also services exporters. The presence of foreign suppliers in domestic markets that are heavily restricted, particularly for intermediate services, is likely to add an international voice to domestic calls for reform.

Taken together, these factors might be expected to motivate governments to open up their own services markets, while working to secure similar openings from trading partners. Using a model of services trade liberalization that is explicitly based in political economy, Fung and Siu (2008) find that when governments also take into account the interests of manufacturing firms, and not just those of services firms, negotiations result in a lower number of state-owned services suppliers.

(c) Greater cooperation on domestic regulation may help

Well-designed domestic regulatory measures and adequate regulatory resources and skills are essential in many sectors to ensure that trade openings are sustainable and welfare-enhancing. Yet trade agreements have not generally been focused on helping governments to implement adequate domestic regulation to ensure that new market-opening fully delivers on its expected benefits. While trade agreements have understandably been focused on ensuring that domestic regulatory measures do not frustrate market openings, Hoekman and Mattoo (2011) note that insufficient consideration has been given to whether domestic regulation and institutions are "adequate" to bring about the benefits of services liberalization or, if they are not, whether international cooperation can help move them in that direction.

Beverelli et al. (2017) find that, in the short and medium run, governance, including the quality of domestic regulatory measures, shapes the downstream effects of services trade policies, and that removing barriers to services trade may be ineffective in cases where weak governance generates excessive uncertainty and insecurity. Looking at EU member states, Fiorini and Hoekman (2017) find that effective governance and regulatory institutions have a positive impact on the economy-wide benefits of services liberalization and, as such, are important complements of a liberal trade regime. They further note that, in the presence of weak governance institutions, eliminating restrictions to the establishment of foreign direct investment may not induce foreign entry and thus fail to generate any positive downstream effects.

Various commentators (Hoekman et al., 2007; Mattoo, 2015; Fiorini and Hoekman, 2017) argue that accompanying market opening negotiations with greater international cooperation focused on domestic regulation may be one avenue to harness the potential of services trade negotiations and deliver greater market openness. In the same vein, the opinion piece from Jane Drake-Brockman (see page 188) offers a further, services business perspective.

(i) Supporting domestic regulatory capacity

International cooperation could be directed at supporting the development of the domestic capacity and institutions necessary to identify, understand and design the regulatory actions needed to bolster the efficiency of services sectors that are opened up to trade.

Although domestic regulation is essential to realising the benefits of liberalization in many services sectors, there is a disconnect between market-opening negotiations, which are held within the WTO, and the policy advice and assistance for regulatory reform, which are provided separately by multilateral and regional institutions and development agencies (Hoekman et al., 2007). In this sense, Hoekman and Messerlin (1999) maintain that WTO technical assistance for developing countries should not be directed only at expanding the capacity of their trade negotiators to "negotiate", but should be extended to include strengthening and maintaining domestic regulatory capacity. In the wake of the liberalization undertaken in the telecommunications sector in the WTO in the mid-1990s, for instance, bilateral and multilateral technical assistance was afforded to developing country governments to draft rules and regulations that supported market-opening and strengthened regulators' capacity, but this was not formally mandated by the WTO. The Trade Facilitation Agreement, which entered into force in 2017, offers a further example of the provision of similar technical assistance, but one which is, crucially, directed by WTO members and explicitly linked to the undertaking of trade facilitating obligations under the WTO.

Along similar lines, commentators point to the role that the WTO's Aid for Trade (AfT) mechanism could play in the services sphere in supporting trade generally, and services trade more specifically. Reflecting on the role that services play as an input into goods production and trade, Hoekman and Shingal (2017) find complementarity between services AfT and merchandise trade, and between AfT directed

towards economic infrastructure, notably in the transport and energy sectors, and services trade. Shepherd (2017) calls for prioritizing services AfT interventions on domestic regulatory reforms, given their relatively low cost but high impact, especially in terms of trade facilitation.

Although development assistance targeted at economic infrastructure necessities is understandably skewed towards infrastructure projects, Shepherd (2017) also argues that, to reduce services trade costs and enhance trade integration in services markets, AfT should be directed at supporting national policy mechanisms and institutions that help develop effective and efficient services domestic regulation.

(ii) Fostering interaction between trade officials and sectoral regulators

International cooperation could also be aimed at enabling improved collaboration among regulators about the design, content and enforcement of regulations and more extensive deliberations on their experiences with services reform, all set against key trade principles. Feketekuty (2010) argues that a mechanism is needed for trade officials to interact with sectoral regulators, particularly as the latter design regulation without necessarily considering its trade effects but will be the ones to ultimately affect trade opportunities and, symmetrically, to implement trade obligations. A sectoral focus to discussions would be particularly crucial given how technical, specific and pervasive much services regulation is.

Indeed, even for countries with the necessary resources, regulating many services sectors is a complex task, as the example in Box E.7 illustrates. Moreover, as discussed in Section E.2, the rapid pace of technological change is raising new and significant complications for regulators. In searching for appropriate regulatory answers, the trade impact of regulation might be disregarded, particularly if the need for a solution is urgent.

Box E.7: The complexity of services regulation – the case of network industries

Many network service industries rely on very large-scale infrastructures with high fixed costs and, as such, exhibit important economies of scale. These imply that the segment of the market referred to as the infrastructure "bottleneck"[57] is most efficiently supplied by a single firm, a "natural monopolist", as this avoids the wasteful duplication of assets that would arise under competition. However, the attainment of this productive efficiency may engender allocative inefficiency, as the monopolist has an incentive to charge higher, monopoly prices.

As governments step back from their role of monopoly suppliers of such services, regulation needs to be introduced. It is usually directed at "unbundling" the competitive and anti-competitive segments of the value chain and at ensuring that the monopolist controlling bottleneck facilities prices access to such facilities on reasonable terms (e.g. on the basis of an access charge to recover fixed costs and a user charge to recover variable costs) (Dee and Findlay, 2007; Pelkmans and Luchetta, 2013).

In many network industries, regulation is also necessary to ensure general availability of relevant services to all citizens, regardless of income levels or geographical location. Requirements to serve the public may involve defining the scope of the services subject to the obligations, the recipients of these services and relevant quality and price levels. Often, the obligations include universal services mechanisms that may comprise network rollout obligations on service suppliers, compensation of suppliers for serving non-economic customers at below market costs, or direct subsidization of disadvantaged consumers.

Positive network externalities may further complicate the regulation of many network industries. Network effects, whereby the value of the service increases the more users there are, may result in a service or a segment of a market being dominated by only very few players or, in extreme circumstances, by one "winner takes all" firm. To prevent undue monopolization in such situations, regulation, generally geared at universal service obligations, or effective competition policies are required.

Regulation in network services sectors is not only sophisticated and complex but needs to be monitored closely and adapted as necessary as the context evolves. As technological advances reduce the cost of duplicating networks, and hence the extent of natural monopolies, as income levels grow and the scope of universal access mechanisms is enlarged, it is also necessary for regulators to re-examine, and possibly modify, the instruments employed until then. As such, it is essential for regulators to have, and maintain, a high level of sectoral expertise, a clear mandate, technical skills and resources, as well as sufficient independence from operators, and from the former monopolist in particular.

OPINION PIECE

By Jane Drake-Brockman,
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Why regulatory cooperation matters for business

Facilitating international business requires more than trade negotiation alone. Liberalization of market access restrictions at the border is necessary. But for trade in services, it is not sufficient.

This is because the extent of public ownership and the degree of domestic regulatory intervention has traditionally been higher in the services sector than in the goods sector.

Many of the barriers to trade in services consequently lie in regulatory regimes, not only at borders, but deep behind borders, in a myriad of domestic regulations that constrain the manner in which commercial services business is conducted.

The efficiency of domestic regulation, i.e. the extent to which it avoids imposing undue compliance costs on services providers, is vital to domestic services industries' productivity and international competitiveness (Sáez et al., 2014). Improved efficiency in domestic regulation of services helps grow the local services industry even when it also facilitates foreign entry. This is the distinctive "win-win" of services trade and the underlying rationale for international efforts to agree on principles to guide regulatory best practice in services.

It makes sense, given how important domestic regulatory regimes are, both for international competitiveness and for international market access, that cross-jurisdictional regulatory connectivity should become a matter of significant services business interest.

This is especially the case as the globalization of services intensifies with the shift to the digital economy. Business perception surveys (e.g. PECC, 2016; OECD, 2018b) now consistently show that business respondents consider regulatory disconnects to be the paramount obstacle to increased services trade.

To make matters worse, regulatory fragmentation in the global services economy appears to be on the rise. In 2018, the OECD Services Trade Restrictiveness Index (STRI) showed increased regulatory tightening in telecommunications and computer services. In 2019, the OECD's new digital STRI shows significant regional heterogeneity impacting on services traded over the internet, with the effect that regulatory barriers risk derailing the benefits of digitalization. Looking at the whole digital ecosystem, heterogeneity is especially evident in regulations affecting infrastructure and connectivity, the areas also experiencing most recent tightening of policy changes.

These regulatory barriers translate into hefty tax equivalents that significantly exceed average tariffs on traded goods (as high as 80 per cent in some sectors) and raise the price of services (as much as 20 per cent in some sectors). Larger firms are more able to find ways around the regulatory disconnects, so this impacts most severely on MSMEs, raising their average trade costs by an average additional 7 per cent (OECD, 2018b).

The need for international regulatory cooperation in services is not new. It has long been recognized as a contributing element of regulatory best practice. This is partly because international benchmarking and sharing of information are helpful in the domestic regulatory design process. It is also because regulatory interoperability across different jurisdictions has proved essential to improving the effectiveness of domestic regulations in achieving their public policy purposes: think international air transportation (ensuring safety and connectivity) or shared expertise in the development of technical standards (Mumford, 2018). But the need for regulatory cooperation has grown exponentially since the GATS came into effect.

As services become increasingly tradeable across borders as a result of new technologies, the need for dedicated regulatory cooperation efforts will become increasingly evident to governments. After two decades of post-GATS business reality on the ground, the business community is beginning to agree that unlocking further trade liberalization on services is going to require a big push in terms of regulatory cooperation.

Some commentators (e.g. Mattoo, 2015) suggest that regulatory cooperation has become a critical pre-condition for further services trade liberalization, at least in the WTO. Mattoo argues for a sequenced approach, with much greater immediate effort on regulatory cooperation, because without the greater mutual understanding, enhanced confidence and familiarity that come from regulatory interaction, efforts at services trade liberalization will remain stymied.

From a services business perspective, neither trade liberalization nor regulatory cooperation are independently sufficient to facilitate international flows of services. Both are necessary; for services trade to grow, the two must go hand-in-hand.

Some services sectors and some modes of supply experience higher degrees of regulatory heterogeneity than others. Mode 4 of the GATS has always been and remains highly constrained by regulatory disconnect. Mode 3 has been the least impacted and traditionally has shown the highest growth rate. Thanks to digitalization, mode 1 should be top of the charts – but is much more constrained than it should be, if regulators could only find appropriate ways to engage.

That is the crux of the problem. Where and how should regulators engage? Regional groupings are already grappling with this. The WTO needs to do the same.

Over the last decade, 77 per cent of RTAs have included provisions on trade in services, up from 16 per cent in the 1990s (Braga et al., 2019). As businesses increasingly call for greater regulatory seamlessness, the services aspects of RTAs are edging towards deeper levels of integration, including greater alignment on regulatory principles. Agreeing on the elements that constitute regulatory best practice is a vital first step.

Efforts are also needed on mutual recognition and equivalence – the outcomes of regulatory cooperation in action.

As a non-negotiating forum, APEC has been well positioned to set some influential precedents in regulatory cooperation relevant to facilitating trade in services. To name a few: the APEC Business Travel Card, Asia Region Funds Passport, Cross-Border Data Privacy Rules and Non-binding Principles for Domestic Regulation in Services.

Most regional integration fora recognize the importance of complementing services trade negotiation with efforts to reduce regulatory irritants and disconnects across regional markets. The EU Services Directive is all about improving the regulatory environment for cross-border services trade, including in professional services; the EU Digital Single Market similarly establishes a strategy to build regulatory interoperability. Regulatory excellence is a core pillar of the Master Plan on ASEAN Connectivity. The Caribbean Community (CARICOM) has developed a regional Certificate of Recognition of CARICOM Skills Qualification; the Common Market for Eastern and Southern Africa (COMESA) has a Yellow Card for cross-border motor vehicle insurance. The list goes on, but most regional fora remain seriously under-utilized in terms of their potential for regulatory cooperation.

Business is looking for a big push – at all levels but specifically in the WTO – and especially with respect to the many regulatory building blocks required for digital trade. The e-commerce negotiations have the potential to show the way.

To build a foundation for this effort to succeed, WTO members need to create new fora to help share perspectives and build regulators' confidence in each others' approaches and perspectives.

WTO services committees could be one avenue to help governments become aware of and better understand the trade impact of the regulatory requirements they, and their trading partners, enact. As Hoekman (2017) notes, this could enable consideration of possible alternative approaches that would achieve exactly identical public policy objectives in a less trade-restrictive manner. Cooperating in the context of trade agreements may also benefit sectoral regulators if it helps mobilize additional resources to reduce capacity constraints in support of such cooperation.

(d) The sequencing of market openings and regulatory actions matters – and phased-in commitments may have a role to play

Balchin et al. (2016) argue that, in industries where market failures are significant, the necessary regulatory policies have to be in place before, and in parallel with, the opening of services markets, rather than subsequent to their opening. This points to one of the many challenges that trade negotiations face when trying to deliver new services market openings. In the absence of concerted efforts on the part of regulators and trade negotiators, it is difficult to ensure that liberalization advances in tandem with the accompanying domestic regulatory interventions necessary to reap the expected benefits of market-opening.

One way to address this challenge could be to make fuller use of commitments to future liberalization, to allow for sufficient time to develop the necessary accompanying domestic regulatory measures. The GATS offers a valuable mechanism in this regard, as it allows WTO members to undertake legally binding market opening commitments that only take effect at a future date bound in the commitment. Any such phasing-in of commitments offers exactly the same degree of certainty and legal force as commitments to immediate liberalization; a failure to honour them when they become applicable could be legally challenged and lead to an obligation to compensate affected trading partners, thus strengthening a government's resolve to implement desired regulatory reforms.

WTO members have had some limited recourse to such phased-in commitments, notably in the telecommunications sector, which is arguably one of the few areas in which the GATS has been successful in delivering actual liberalization.[58] However, the potential of such mechanisms to contribute to greater market-opening has not yet been explored to its full extent. As Low and Mattoo (1999) observe, phased-in commitments make a domestic pledge to open up services markets more credible than a simple policy announcement. Governments may be unwilling to remove trade barriers immediately because of an "infant regulation" argument (i.e. an insufficiently developed regulatory framework) or a traditional "infant industry" rationale (i.e. a notion that, if shielded from competition, domestic suppliers would be able to gradually learn-by-doing and ultimately become internationally competitive). However, once trade restrictions are in place, governments may be unable to threaten credibly to remove them, either because governments have a direct stake in domestic firms or because they are captured by private interest groups. Committing to future liberalization might help to counter the perpetuation of infant industry measures, whereby "transitory" strategies become permanent due to pressure from invested stakeholders. It also gives the affected industry and other stakeholders time to adapt and prepare for competition, for example through corporate restructuring, revamping of the product offering, or exploring new markets.

Mattoo and Sauvé (2011) also note that the same mechanism could be at play in South-South RTAs whose objective is to expose domestic industries to competition in a progressive manner, by liberalizing exclusively at the regional level initially, and globally only subsequently. However, as the creation of new vested interests, which resist any additional market-opening, may end up frustrating the original goal, committing to future liberalization at the multilateral level would offer a potentially important way of ensuring that reform is locked in to a definitive time-frame.

(e) Areas where further cooperation on services trade policy is being pursued

On-going deliberations in the WTO point to the areas in which the members concerned feel that international cooperation with regard to services trade policy is worth pursuing further. These discussions address both possible improved market-opening commitments and regulatory disciplines. They do not necessarily reflect the areas, or the only areas, where further collaboration would be desirable, but are, rather, a demonstration of a meeting of minds among the members concerned that WTO discussions on those topics can be valuable. The fact that, contrary to traditionally held perceptions that services trade is only of interest to richer countries, they involve members at all levels of development is likely testament to the growth and development potential of services trade.

Starting with deliberations on market-opening, the proponent members note that multilateral services commitments have been under-used to bind services

trade policies conducive to economic growth and trade integration. Room for improvement is considerable, as commitments generally reflect a much more restrictive picture than applied regimes. Multilateral commitments do not match the role that services play in the global economy today, including in developed and developing members' trade in value-added terms.

While more has been achieved in a number of services RTAs, especially in terms of providing for greater certainty and predictability by guaranteeing existing levels of openness, the set of bilateral and plurilateral RTAs do not cover world services trade as fully as they might. Moreover, given their behind-the-border regulatory nature, services trade measures are embedded in domestic regimes and hence generally, although not exclusively, applied on an MFN basis. This means that no modification of relevant domestic regulatory regimes would be required to extend many of the RTA bindings multilaterally. In keeping with the negotiating processes built into the GATS, multilateral commitments could, moreover, be undertaken in a "variable geometry" configuration, by those members that are so inclined, and in the sectors of their choosing. As has happened in the past (see Box E.3), GATS bindings can emerge from plurilateral processes with multilateral outcomes, applied on an MFN basis.

In view of the transformative role of technology on trade in services, it may come as a surprise that, in e-commerce-related services sectors, market openings under the WTO are not yet fully committed and therefore predictable. This is largely due to the fact that most GATS commitments date back to 1995 and the classification used to undertake those commitments dates to 1991. Opportunities to achieve bindings and to better understand services classification, in order to be sure of how existing and future commitments may encompass online supply across borders or through commercial presence, could provide services trade with a boost. This would potentially benefit not only larger, more developed economies, but also developing economies and MSMEs that are actively engaging or preparing to trade online. According to a number of the proponent members, both market-opening commitments and regulatory obligations are relevant to any such effort. The possibility to commit to phase-in dates by members whose relevant regulatory regime is still being put in place might be relevant in this context.

One of the prominent features of e-commerce is its globalized nature and the worldwide reach of the companies taking part in it. For this reason, many government measures, which may include privacy rules, requests to remove material from the internet, or cybersecurity laws, are increasingly characterized by a degree of extraterritorial consequences, intended or not. While this may be controversial, in some respects it is unavoidable. Whereas commercially present foreign suppliers operate in the territorial and legal jurisdiction in which they supply services, cross-border suppliers using telecommunications technologies to trade do not. When governments lack formal jurisdiction over a supplier that is not in their territory, governments face challenges in enforcing relevant laws and regulations. Not only can these features create difficulties for the application of governments' regulatory regimes, they can also lead to conflicting and overlapping rules that may confront global suppliers of services, whether large or small. MSME service suppliers can find differing rules in different jurisdictions especially daunting, as they do not have the resources that large companies have to adapt to these differences.

As such, the increasing feasibility and importance of cross-border supply brings with it challenges for governments and for the trading system, making collaboration and cooperation across borders significantly more important than in the past. Improving regulatory frameworks for e-commerce is supported by discussions in the WTO Work Programme on Electronic Commerce and the Joint Statement Initiative on e-commerce, as well as in UNCTAD, the OECD, and many other international and regional organizations working on e-commerce issues. Although harmonization may be unrealistic, particularly beyond the regional level, given societal differences and disparate legal traditions, compatibility and coordination across borders is achievable if governments take advantage of existing mechanisms or create new ones for regulatory consultation and cooperation. Such cooperation may be technical, related to standards for the new technologies and the services that thrive on them. Other cooperation may be between regulators, with a view to resolving particular problems. Finally, some collaboration on basic principles for trade in services that characterize the digital economy might also take place.

Still, many of the regulatory issues related to services in general, and likewise to e-commerce, are not normally under the direct competence of trade ministries. Recently, many trade ministries, as well as ICT ministries, have embarked on inter-agency consultative processes to collaborate and coordinate on cross-cutting e-commerce issues. Some international organizations exist wherein competent authorities related to certain e-commerce issues can come together, for example in the International

Telecommunication Union and, in particular, its annual Global Symposium for Regulators, but this is not consistently the case. Cybercrime, for example, is one area in which governments are only beginning to set up arrangements for consultation with one another, usually via bilateral relations.

Another area of on-going WTO work concerns disciplines on GATS domestic regulation. As discussed above, WTO negotiations on GATS domestic regulation disciplines have focused on the ability of suppliers to obtain licenses and qualifications so as to be authorized to supply services in, or into, new markets. While the negotiations among WTO members have not concluded, GATS+ "innovations" contained in draft texts relate in particular to enhanced transparency provisions and due process provisions related to the administrative procedures. It is noteworthy that the multilateral process seems to have paved the way for outcomes in many RTAs up until 2009, by incorporating text elements of WTO Chairman's drafts into a number of RTAs. Following the impasse in services negotiations after 2011, the reverse trend is now observable: draft texts proposed by members in the WTO as of 2016 are strongly influenced by language developed in regional negotiations, and gaining acceptance for text developed outside the multilateral structure of the WTO has proven to be difficult for proponents.

That said, certain "good practices" for regulation appear to be acceptable for many members representing most of world services trade. These relate in particular to enhanced transparency provisions, including the right of services suppliers to obtain information from host country authorities, and the possibility to comment on draft regulation. Another focus has been on the rationalization of the authorization process, with a set of rules related to the treatment of applications, including on application timeframes, processing times, electronic submissions and processing fees.

While many of the provisions appear to be acceptable only as "soft" obligations at this time, it is clear that there is a basic understanding among many members that such efficiency-enhancing provisions are of universal benefit. At the same time, there seems to be broad agreement not to subject regulatory requirements to strict disciplines, beyond requirements that these are to be based on objective and transparent criteria.

In this context, notwithstanding the adoption of the Disciplines on Domestic Regulation in the Accountancy Sector in 1998, the vast majority of members is uncomfortable at present with the introduction, as was the case in those Disciplines, of a necessity test requiring that regulatory requirements (or even procedures) are not more trade-restrictive than necessary (to achieve legitimate objectives). Similarly, many members do not appear comfortable with adopting specific obligations with regard to qualification procedures for professionals, in spite of the already existing obligations to have adequate procedures in place to verify the competence of foreign professions in sectors in which access for such professionals has been granted. This reluctance may be explained by a degree of existing heterogeneity as well as the perceived "uniqueness" of many countries' professional qualifications.

The fundamental technological changes discussed above may enable different conclusions: on the one hand, it may be possible that the technical ability of professionals to supply their services across borders will lead to greater cooperation of professional regulators, driven by demands from their previously largely inward-looking constituencies; on the other hand, the possibility to disaggregate many professional services into a multitude of components that can readily be offshored may obviate the need to seek professional accreditation.

When it comes to the services elements of discussions on investment facilitation, many aspects of services FDI are already taken care of in the GATS through its coverage of commercial presence (mode 3). Nevertheless, as discussed in Box E.5, manufacturing FDI has been found to be related to services trade, particularly through commercial presence. This would seem to point to a more holistic approach to investment policies, which is indeed already the approach of a myriad of preferential trade agreements, as they cover all investment policies and regulations, regardless of whether they cover investment in services or manufacturing activities, in one single chapter. In particular, investment facilitation policies (e.g. providing for more transparent and predictable investment frameworks, reducing red tape, and promoting the coordination of central and sub-central FDI policies and regulations), by facilitating FDI broadly, may contribute to the expansion of services trade.

Finally, besides rule-making discussions, members use, and might further exploit the potential of, WTO regular committees, such as the Council for Trade in Services, to foster regulatory cooperation in areas of common interest. In the context of WTO regular committees, "soft" approaches requiring a lower degree of collaboration, such as information exchanges on regulatory approaches, processes or practices, would appear to be possible candidates

for promoting regulatory cooperation. Work carried out in other WTO committees also concerned with regulatory measures – notably the SPS and the TBT Committees – may provide some food for thought in that regard. For example, those committees have put a great deal of work into improving the transparency of regulations, including through the development of guidelines, as well as into promoting internal coordination between national regulatory authorities as a way of enhancing the quality, coherence and efficiency of regulations. Similar approaches aimed at improving transparency and domestic coordination among relevant regulatory authorities might also be useful in the services context, where the latter has proven particularly challenging.

A key aspect relates to the identification of possible areas where members may have an interest or incentive to cooperate, taking into consideration the diverse composition of the membership, including members' different objectives and levels of regulatory capacity. Given the evolving nature of regulations, Bollyky (2017) has suggested areas where members face common regulatory challenges, such as those emerging from the development of new technologies. In this context, exchanging information and experiences on how to address these regulatory challenges would allow them to learn from one another. This may be particularly beneficial for economies that are developing their regulatory capacity and wish to assess different regulatory options and their implications. Another area that has been suggested as providing a possible ground for regulatory cooperation at the multilateral level relates to sectors dominated by GVCs (Hoekman, 2015 and Bollyky, 2017). This may include, for example, the development of some basic principles or guidelines aimed at reducing regulatory fragmentation in order to reap the benefits of GVCs.

5. Concluding observations

Many forces are shaping world services trade. Technological advances and digitalization have been exerting a particularly profound transformational impact, and other factors, such as demographics, income growth and environmental concerns are further changing the markets and actors, the relevance of the various modes of supply and the composition of services trade. These developments present governments with significant opportunities, as well as sizeable challenges, to ensure that services trade delivers inclusive growth, development and economic diversification.

International cooperation has played a crucial role in ensuring that services trade takes place under transparent, rule-based and predictable conditions. Countries have collaborated on lowering trade barriers and on domestic regulatory measures, both in the WTO and in RTAs. Yet, thus far, such collaboration has not been fully exploited to deliver on its potential, as exemplified by the overall shallow levels of services commitments in the WTO compared to actually applied services regimes, except on the part of economies that acceded to the WTO after 1995, and still has room to evolve. The generally modest state of WTO commitments stands in stark contrast with the breadth of the levels of access bound in RTAs. RTAs have also made deeper inroads in developing disciplines, in particular on services e-commerce, GATS domestic regulation, mode 4 and telecommunication services.

However, services trade agreements, multilateral as well as bilateral/regional, have so far found it difficult to drive services trade reforms. One likely explanation for this state of affairs is the pervasive role that regulation plays in services markets and the essential role that well-designed regulatory policies and adequate domestic regulatory capacity play in delivering welfare-enhancing trade liberalization.

Still, the findings of this report point to a number of factors that might motivate governments not only to open up their services markets, but also to seek mutual openings on the part of their trading partners. This has led various commentators to argue that accompanying market opening negotiations with greater international cooperation focused on domestic regulatory measures may be one avenue to harness the potential of services trade, given the strong complementary between the two aspects.

In most services sectors, market openings need to be supported and enhanced by adequate domestic regulatory measures, while strengthened regulation and governance are a necessary condition for trade-openings to deliver on their potential economic benefits. Technical assistance and capacity-building would be particularly crucial in this regard, enabling countries to better respond to the challenges and opportunities brought about by technology and the ensuing changes in services trade patterns.

On-going deliberations in the WTO point to the areas where the members concerned feel that international cooperation is worth pursuing further. They do not necessarily reflect the issues, or the only issues, where deeper collaboration would be desirable, but rather demonstrate a meeting of minds amongst the members concerned that WTO discussions on those topics can be valuable.

Appendix Table E.1: Overview of relevant work of other international organizations

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Organization	Description/relevant initiatives	Standards and recommendations	Website
International Civil Aviation Organization (ICAO)	ICAO develops standards, recommended practices and procedures, as well as policies related to international civil aviation safety, air navigation capacity and efficiency, security, environmental protection and the economic development of air transport. - Convention on International Civil Aviation - Facilitation (FAL) Programme	- Standards and Recommended Practices (SARPs) - Procedures for Air Navigation Services (PANS) - Regional Supplementary Procedures (SUPPs) - Guidance Material in several formats	http://www.icao.int/
International Maritime Organization (IMO)	The IMO is responsible for the safe, secure and efficient shipping and the prevention of pollution from ships. This is done through the harmonization of regulations, requirements and procedures related to ships, cargoes, crews and ports. - Convention on the Facilitation of International Maritime Traffic (FAL)	- Standards and Recommended Practices set out by the FAL Convention	http://www.imo.org/
International Telecommunication Union (ITU)	Meetings, e.g.: - Annual Global Symposium for Regulators (GSR) -Development Bureau, Study Group 1 - Enabling Environment for the Development of Telecommunications/ICTs - Development Bureau, Study Group 2 - ICT Services and Applications for the Promotion of Sustainable Development - Standardization Bureau, Study Group 3 - Economic and policy issues. Publications, e.g.: - Global ICT Regulatory Outlook (annual) - Measuring the Information Society Report (MISR) Vol 1. and Vol. 2, which includes the ICT Development Index (annual)	- ITU Recommendations - Regulatory best practice guidelines issued by GSR	http://www.itu.int/
United Nations Educational, Scientific and Cultural Organization (UNESCO)	- Conventions and Recommendations on recognition of qualifications, such as: Revised Convention on the Recognition of Studies, Certificates, Diplomas, Degrees and Other Academic Qualifications in Higher Education in African States (2014) Asia-Pacific Regional Convention on the Recognition of Qualifications in Higher Education (2011)	- Recommendations, guidelines and principles included in conventions and international treaties	http://www.unesco.org/

Appendix Table E.1: Overview of relevant work of other international organizations *(continued)*

Organization	Description/relevant initiatives	Standards and recommendations	Website
United Nations World Tourism Organization (UNWTO)	- Global Code of Ethics for Tourism (GCET) - Initiative for Measuring the Sustainability of Tourism (MST) - Aid for Trade and the Enhanced Integrated Framework (EIF) - B2B Session of INVESTOUR 2019 for tourism investment promotion - First UNWTO/ICAO Ministerial Conference on Tourism and Air Transport in Africa, held in March 2019	- Principles set out by the Global Code of Ethics for Tourism	http://unwto.org
Universal Postal Union (UPU)	The UPU sets the rules, standards and technical assistance for international mail exchanges which enable and facilitate trade in postal services - Terminal dues	- Technical standards and Electronic Data Interchange (EDI) messaging standards	http://www.upu.int/
World Health Organization (WHO)	The International Health Regulations (IHR, 2005) are an international legal instrument that is binding on all the member states of WHO. The purpose and scope of the IHR is to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade. Also, WHO is increasingly engaging in eHealth issues, as well as in health worker mobility.	- International Health Regulations - Global Code of Practice on the International Recruitment of Health Personnel	http://www.who.int/

Endnotes

1 "Domestic regulatory measures" or "domestic regulation" are used interchangeably in this section, to refer to regulatory measures that affect trade in services but that that are not barriers to trade (i.e. neither limitations to market access, as defined in GATS Article XVI, nor to national treatment, as per Article XVII). The term "GATS domestic regulation", however, specifically refers to licensing procedures and requirements, qualification procedures and requirements, and technical standards, i.e. to those domestic regulatory measures for which disciplines are mandated to be developed under GATS Article VI:4.

2 https://www.uber.com/en-CH/newsroom/company-info/ – consulted in July 2019.

3 A fuller discussion of why governments regulate services markets may be found in Section II.3.C of WTO (2012).

4 Externalities refer to situations where the price of a service does not reflect the true cost or benefit to society of producing that service.

5 Acceded members are those economies that, in contrast to the WTO's founding members, acceded to the WTO after its creation in 1995.

6 The Fifth Protocol provided that, if by 30 January 1999 it had not been accepted by all its signatories, those signatories which had accepted it before that date would decide on its entry into force. The latter members finally decided to let the protocol enter into force on 1 March 1999. In addition, the date for acceptance by other signatories was extended until 15 June 1999. After 15 June 1999, the Council for Trade in Services opened the Fifth Protocol on a case-by-case basis to allow for the acceptance by the outstanding signatories. All signatories eventually accepted the Protocol.

7 Sunk costs are costs that firms have already incurred and cannot recover upon exiting a market.

8 The services negotiations were extended beyond 1995 also for mode 4, yielding minimal results, and maritime transport services, proving inconclusive.

9 Another relevant phenomenon is the abundance of bilateral investment treaties that overlap with trade in services through mode 3. While these treaties would normally not meet the criteria of Article V of the GATS because other modes of supply are typically excluded, they nevertheless tend to have broad sectoral coverage and to guarantee national treatment at the post-establishment stage.

10 The majority of services RTAs notified to the WTO since 1 January 2015 have been agreements between developing countries, rather than developed-developed or developed-developing country agreements.

11 The LDC Services Waiver was adopted by the WTO Ministerial Conference on 17 December 2011 and allows WTO members, notwithstanding the MFN obligation of GATS Article II, to grant preferential treatment to services and service suppliers from LDC members.

12 The discussion of market-opening commitments in the GATS and RTAs draws on Roy (2019).

13 WTO official documents may be accessed via https://docs.wto.org/dol2festaff/Pages/FE_Search/FE_S_S005.aspx

14 The importance of "partial commitments" would be increased (and that of "full commitments" reduced) if horizontal limitations were taken into account as most schedules contain such cross-sectoral limitations, especially as it regards modes 3 and 4.

15 See WTO official document JOB/SERV/282. In 2019, the four economies submitted a communication on market openings in the tourism sector (WTO official document JOB/SERV/286).

16 The term "Joint Statement Initiative" refers to a number of initiatives that their respective proponent groups, each representing around 70 WTO members at all levels of development, unveiled at the occasion of the Buenos Aires Ministerial Conference, stating their intention to move forward with discussions in the areas concerned.

17 The reference to RTAs encompasses all preferential trade agreements.

18 "GATS+" refers to commitments that have a wider sectoral coverage and deeper level of openness than those undertaken under the GATS, or to disciplines that build upon those of the GATS.

19 Other studies have underscored how a number of members have undertaken commitments in RTAs that are more restrictive than under the GATS. See, for example, Adlung and Miroudot (2012).

20 In the GATS, in contrast, the obligations of market access and national treatment apply only to the sectors inscribed in the schedule of specific commitment.

21 Existing non-conforming measures are typically listed in a first annex, while a second annex contains reservations for sectors or activities where a party wishes to maintain non-conforming measures or adopt new ones in the future. Further, various RTAs that use a negative-list approach will have a separate chapter on the entry of natural persons, where commitments are undertaken in a positive manner.

22 This concept refers to the possibility that an economy that does not make any trade concessions, profits, nonetheless, from concessions made by other economies in negotiations under the MFN obligation.

23 See for example Art. 11.5 of ASEAN-AU-NZ, Art. 19.1 of Canada-Korea, Art. 9.6.3 (financial services) of China-Korea, Art. 21.1.2 of Korea-US, Art. 26.2 of CPTPP, Art. 1.13.2 of EU-Viet Nam, Art. 18.1 of Colombia-Korea and Art. 9.8.2 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

24 See for example, Art. 5.4 of ASEAN-AU-NZ, Ar. 10.11.6 of Canada-Korea, Art. 66.1 of India-Japan, (services suppliers) Article 9.8 of Colombia-Korea and Art. 9.8.1 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

25 See for example, Art. 5.5 of ASEAN-AU-NZ (financial services), Arts. 10.11.7 (financial services) and 11.10 (telecommunications) of Canada-Korea, Art. 10.9 (telecommunications) and Art. 9.6.6 (financial services) of China-Korea (via http://rtais.wto.org/).

26 See for example, Art. 26.2 of CPTPP and Art. 11.3 of ASEAN-AU-NZ (via http://rtais.wto.org/).

27 See for instance, Art. 5.7 (financial services) of ASEAN-AU-NZ, Art. 10.11.9 (financial services) of Canada-Korea, Arts. 12.3.5 and 12.3.13 of CETA, Art. 9.6.8 (financial services) of China-Korea, Art. 10.8.4 of CPTPP, Art. 8.20.4 of EU-Viet Nam, Art. 6.7.3 of EFTA-the Philippines and Art. 9.9.2 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

28 See for example, Art. 10.5 of ASEAN-AU-NZ and Art. 12.3.15 of CETA, Art. 10.8.4 of CPTPP and Art. 8.20.5 of EU-Viet Nam (via http://rtais.wto.org/).

29 See for example Art. 10.5 of ASEAN-AU-NZ, Art. 12.3.16 of CETA (via http://rtais.wto.org/).

30 See for example Art. 12.3.8 of CETA, 10.8.5 of CPTPP, Art. 8.20.1 of EU-Viet Nam, Art. 8.312 of EU-Japan and Art. 9.9.4 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

31 See for example, Art. 10.8.6 of CPTPP and Art. 9.9.5 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

32 See for example Art. 12.3.11 of CETA, Art. 8.31.4 of EU-Japan (via http://rtais.wto.org/).

33 See for example Art. 10 of ASEAN-AU-NZ, Art. 9.9.1 of Pacific Alliance Partnership Framework Agreement and Art. 7.7.1 of Turkey-Singapore (via http://rtais.wto.org/).

34 See for example, Arts. 12.1 and 12.2 of ASEAN-AU-NZ, Art. 19.4 of Canada-Korea, Art. 12.3.6 of CETA and Art. 16.5 of Turkey-Singapore (via http://rtais.wto.org/).

35 See for example, Art. 9.8.4 of Australia-Japan, Art. 7.7.2 of Turkey-Singapore, Art. 9.7.2 of Colombia-Korea and Art. 9.9.3 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

36 Based on data extracted from Gootiiz et al. (2019), which covers RTAs notified until 2018.

37 As in many cases, MRAs form part of the RTA built-in agenda, there is no available data on the actual number of MRAs concluded within the purview of RTAs. A number of MRAs have been concluded, for instance, in the context of APEC, ASEAN, and more recently, the EAC.

38 See for example Annex 9-A of Colombia-Korea, Art. 11.3 of CETA, Art. 8.21 of EU-Viet Nam and Annex 9.10 of Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

39 See Art. 9.8 of Canada-Korea (via http://rtais.wto.org/).

40 See for example Art. 9.8 of Canada – Korea (via http://rtais.wto.org/).

41 See for instance, CPTPP, CETA, EU-Japan and Pacific Alliance Partnership Framework Agreement (via http://rtais.wto.org/).

42 See for example Arts. 25.4 and 25.6 of CPTPP, and 18.5, 18.6 and 18.7 of EU-Japan (via http://rtais.wto.org/).

43 See for example, Arts. 21.4 and 21.7 of CETA (via http://rtais.wto.org/).

44 Footnote 1 to Article V:1(a): "This condition is understood in terms of number of sectors, volume of trade affected and modes of supply. In order to meet this condition, agreements should not provide for the a priori exclusion of any mode of supply".

45 See for example, Art. 9.4.5 of Korea-New Zealand (via http://rtais.wto.org/).

46 See for example, Art. 1203.3 of Canada-Peru (via http://rtais.wto.org/).

47 See for example, Art. 13.04.3 of Canada-Panama (via http://rtais.wto.org/).

48 See for example, Art. 80 of China-Singapore (via http://rtais.wto.org/).

49 See for example, Art. 9.6.1 of ASEAN-AU-NZ (via http://rtais.wto.org/).

50 See for example, Art. 128 of New Zealand-China (via http://rtais.wto.org/).

51 See for example, Art. 82 of China-Singapore (via http://rtais.wto.org/).

52 See for example, Art. 77.3 of India-Japan (via http://rtais.wto.org/).

53 See for example, Art. 9.8 of ASEAN-AU-NZ (via http://rtais.wto.org/).

54 "Economic needs tests" or "labour market tests" are tests that condition market access upon the fulfilment of certain economic or labour criteria.

55 See, for instance, the CO_2 emission standards for aircraft developed by the International Civil Aviation Organization.

56 One example is the Standards and Trade Development Facility, a global partnership that helps developing countries comply with international sanitary and phytosanitary standards.

57 Examples include the electricity transmission grid or the underground transport network.

58 In the context of the basic telecommunications negotiations (see Box E.3 for further details), many governments first undertook a phased-in commitment to enact reforms by a set deadline, and thereafter used these international obligations to help garner domestic consensus on the reforms and allow firms, both incumbent and new entrant, to prepare.

F. Conclusions

Over the last few decades, services have become the backbone of the global economy and the most dynamic component of international trade. Services are increasingly easier to trade thanks in large part to digitalization. From online education to virtual law firms, technology is penetrating all services sectors, transforming services traditionally delivered face-to-face into remotely tradable services. Trade, long dominated by the exchange of goods, increasingly involves services, transforming the global economy in the process.

Despite the critical role that services play in the global economy, their significance in international trade is not always fully appreciated. This report tries to fill this gap by analysing how trade in services has evolved in recent years and how it may evolve in the future.

Traditional statistics on trade in services do not cover all four of the modes of services supply as defined by the General Agreement on Trade in Services (GATS). However, a new WTO experimental dataset includes GATS mode 3 – commercial presence – for the first time, thereby capturing the total value of services trade.

Our analyses show that commercial presence is the dominant mode for trading services globally, with distribution services and financial services being the most traded sectors. Some services, such as education, healthcare or environmental services, which currently account for a negligible share of trade, are rapidly growing in importance, attesting to the profound changes under way. Services also play a critical role in global value chains; according to our estimates, services value-added accounts for close to a half of world trade.

These changes can open new opportunities. Trade in services creates meaningful welfare gains for society through a more efficient allocation of resources, a greater variety and quality in the services that consumers and producers can purchase, and by allowing the more productive services firms to expand. In sectors like healthcare, education and finance, in particular, these gains can directly improve development outcomes. A geographically diverse range of economies, including many developing economies, has benefited from the recent expansion of trade in services. The share of developing economies in global services trade has increased by more than 10 percentage points since 2005, and although the participation of least-developed countries is small, their share has also been rising significantly. A large number of jobs, both in developed and developing economies, is supported by services exports. The decline in trade costs, thanks in large part to technology, allows more services to be traded cross-border, which particularly benefits developing economies and micro, small and medium-sized enterprises, which rely predominantly on this mode of supply.

This report, using a novel approach to estimate trade costs, demonstrates that trade costs in services nevertheless remain much higher than in goods, largely due to the "proximity burden" (i.e. the necessity for suppliers and consumers of services to be in close physical contact) of services and more complex policy regimes.

This report discusses three major trends that are likely to impact services trade and trade costs in the future, and estimates the extent to which services trade may change over the next 20 years.

First, digitalization is expected to further reduce the cost of services trade, making it possible to deliver services digitally that previously required face-to-face interaction, for example through telepresence in areas such as medical services. The distinction between goods and services activities is and will continue to become increasingly blurred, and the importance of data flows and intellectual property will continue to rise. Digitalization will also affect the way firms do business.

Second, demographic changes will have an impact on the composition of future services demand and patterns of specialization. While an ageing population in developed economies is likely to increase the demand for health services, a growing young population will increase the demand for online services. Rising per capita incomes in the developing world are expected to boost demand for skill-intensive services.

Finally, climate change and consumers' growing awareness of environmental issues are likely to disrupt supply and trade in some services, such as tourism and transportation, forcing companies to adjust. As a result, the market for environmental services is expected to grow significantly in the future.

Using a computable general equilibrium model to try and quantify the potential impact of these major trends on services trade, this report finds that

reduced trade costs due to technological innovation, a diminishing need for face-to-face interaction, and a reduction of the policy barriers to services trade, are likely to increase the share of services in global trade by 50 per cent by 2040. If developing economies are able to adopt these new technologies, their share in global services trade could increase by about 15 per cent.

Assessing the full extent of the changes under way and trying to quantify their potential impact are, however, constrained by lack of data and research. For instance, there is still little evidence to date on labour market adjustments to services trade, and data on trade through commercial presence remains sketchy. Likewise, information on actual services policy regimes is unsatisfactory. Existing statistical and information tools need to be refined, and existing data gaps need to be filled, in order to enable a more accurate analysis of the changing nature, scope and effects of services trade and trade policies.

While technology is – and will continue to be – a key driver of services trade expansion, this potential will only be achieved if future technological changes are accompanied by intensified international cooperation. Despite the far-reaching, often unilateral, reforms that economies around the globe have undertaken over the past three to four decades to open services markets, trade in services still remains subject to higher barriers than trade in goods, suggesting that more can be done to drive market-opening successfully. In order to seize the opportunities offered by the changes currently taking place, new pathways will need to be found to advance global trade cooperation and make services a central element of trade policy.

Accompanying market opening negotiations with greater international cooperation on domestic regulatory measures may be one avenue to harness the potential of services trade. In most services sectors, market openings need to be supported and enhanced by adequate domestic regulatory measures, while strengthened regulatory measures and governance are a necessary condition for trade-openings to deliver on their potential economic benefits. Technical assistance and capacity-building would be crucial in this regard, as they may help countries to respond to the challenges and opportunities brought about by technology and the ensuing changes in services trade patterns.

Services trade can be a powerful engine of economic growth, development and poverty reduction, but for this to happen, international cooperation needs to be intensified.

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Technical notes

WTO members are frequently referred to as "countries", although some members are not countries in the usual sense of the word but are officially "customs territories". The definition of geographical and other groupings in this report does not imply an expression of opinion by the WTO Secretariat concerning the status of any country or territory, the delimitation of its frontiers, nor the rights and obligations of any WTO member in respect of WTO agreements. The colours, boundaries, denominations and classifications in the maps of the publication do not imply, on the part of the WTO, any judgement on the legal or other status of any territory, or any endorsement or acceptance of any boundary.

Throughout this report, South and Central America and the Caribbean is referred to as South and Central America.

The Netherlands with respect to Aruba; the Bolivarian Republic of Venezuela; Hong Kong Special Administrative Region of China; the Republic of Korea; and the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu are referenced as: Aruba, the Netherlands with respect to; Bolivarian Rep. of Venezuela; Hong Kong, China; Korea, Republic of; and Chinese Taipei respectively.

There are no WTO definitions of "developed" and "developing" economies. Members announce for themselves whether they are "developed" or "developing" economies. The references to developing and developed economies, as well as any other sub-categories of members used in this report, are for statistical purposes only, and do not imply an expression of opinion by the Secretariat concerning the status of any country or territory, the delimitation of its frontiers, nor the rights and obligations of any WTO member in respect of WTO agreements.

The data supplied in the World Trade Report 2019 are valid as of 31 July 2019.

Composition of regions and other economic groupings **Regions**				
North America				
Bermuda	Canada*	Mexico*	Saint Pierre and Miquelon	United States of America*
Other territories in the region not elsewhere specified				
South and Central America and the Caribbean				
Antigua and Barbuda*	Chile*	El Salvador*	Nicaragua*	Suriname*
Argentina*	Colombia*	Grenada*	Panama*	Trinidad and Tobago*
Aruba, the Netherlands with respect to	Costa Rica*	Guatemala*	Paraguay*	Uruguay*
Bahamas**	Cuba*	Guyana*	Peru*	Venezuela, Bolivarian Republic of*
Barbados*	Curaçao	Haiti*	Saint Kitts and Nevis*	
Belize*	Dominica*	Honduras*	Saint Lucia*	
Bolivia, Plurinational State of*	Dominican Republic*	Jamaica*	Saint Martin	
Brazil*	Ecuador*	Montserrat	Saint Vincent and the Grenadines*	
Other territories in the region not elsewhere specified				
Europe				
Albania*	Czech Republic*	Iceland*	Montenegro*	Slovak Republic*
Andorra**	Denmark*	Ireland*	Netherlands*	Slovenia*
Austria*	Estonia*	Italy*	North Macedonia*	Spain*
Belgium*	Finland*	Latvia*	Norway*	Sweden*
Bosnia and Herzegovina**	France*	Liechtenstein*	Poland*	Switzerland*
Bulgaria*	Germany*	Lithuania*	Portugal*	Turkey*
Croatia*	Greece*	Luxembourg*	Romania*	United Kingdom*
Cyprus*	Hungary*	Malta*	Serbia**	
Other territories in the region not elsewhere specified				
Commonwealth of Independent States (CIS), including associate and former member States				
Armenia*	Georgia*	Moldova, Republic of*	Turkmenistan	
Azerbaijan**	Kazakhstan*	Russian Federation*	Ukraine*	
Belarus**	Kyrgyz Republic*	Tajikistan*	Uzbekistan**	
Other territories in the region not elsewhere specified				

Africa				
Algeria**	Congo*	Ghana*	Mauritius*	Somalia**
Angola*	Côte d'Ivoire*	Guinea*	Morocco*	South Africa*
Benin*	Democratic Republic of the Congo*	Guinea-Bissau*	Mozambique*	South Sudan**
Botswana*	Djibouti*	Kenya*	Namibia*	Sudan**
Burkina Faso*	Egypt*	Lesotho*	Niger*	Tanzania*
Burundi*	Equatorial Guinea**	Liberia*	Nigeria*	Togo*
Cabo Verde*	Eritrea	Libya**	Rwanda*	Tunisia*
Cameroon*	Eswatini*	Madagascar*	São Tomé and Príncipe**	Uganda*
Central African Republic*	Ethiopia**	Malawi*	Senegal*	Zambia*
Chad*	Gabon*	Mali*	Seychelles*	Zimbabwe*
Comoros**	The Gambia*	Mauritania*	Sierra Leone*	
Other territories in the region not elsewhere specified				
Middle East				
Bahrain, Kingdom of*	Israel*	Lebanese Republic**	Saudi Arabia, Kingdom of*	Yemen*
Iran**	Jordan*	Oman*	Syrian Arab Republic**	
Iraq**	Kuwait, the State of*	Qatar*	United Arab Emirates*	
Other territories in the region not elsewhere specified				
Asia				
Afghanistan*	Hong Kong, China*	Malaysia*	Niue	Chinese Taipei*
Australia*	India*	Maldives*	Pakistan*	Thailand*
Bangladesh*	Indonesia*	Marshall Islands	Palau	Timor-Leste**
Bhutan**	Japan*	Micronesia, Federated States of	Papua New Guinea*	Tonga*
Brunei Darussalam*	Kiribati	Mongolia*	Philippines*	Tuvalu
Cambodia*	Korea, Republic of*	Myanmar*	Samoa*	Vanuatu*
China*	Korea, Democratic People's Republic of	Nauru	Singapore*	Viet Nam*
Cook Islands	Lao People's Democratic Republic*	Nepal*	Solomon Islands*	
Fiji*	Macao, China*	New Zealand*	Sri Lanka*	
Other territories in the region not elsewhere specified				
Regional trade agreements				
Andean Community (CAN)				
Bolivia, Plurinational State of	Colombia	Ecuador	Peru	
Association of Southeast Asian Nations (ASEAN)				
Brunei Darussalam	Indonesia	Malaysia	Philippines	Thailand
Cambodia	Lao People's Democratic Republic	Myanmar	Singapore	Viet Nam
Central American Common Market (CACM)				
Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
Caribbean Community (CARICOM)				
Antigua and Barbuda	Belize	Guyana	Montserrat	Saint Vincent and the Grenadines
Bahamas	Dominica	Haiti	Saint Kitts and Nevis	Suriname
Barbados	Grenada	Jamaica	Saint Lucia	Trinidad and Tobago

*WTO members
**Observer governments

Central African Economic and Monetary Community (CEMAC)				
Cameroon	Chad	Congo	Equatorial Guinea	Gabon
Central African Republic				
Common Market for Eastern and Southern Africa (COMESA)				
Burundi	Eritrea	Madagascar	Somalia	Zimbabwe
Comoros	Eswatini	Malawi	Sudan	
Democratic Republic of the Congo	Ethiopia	Mauritius	Tunisia	
Djibouti	Kenya	Rwanda	Uganda	
Egypt	Libya	Seychelles	Zambia	
Economic Community of West African States (ECOWAS)				
Benin	Côte d'Ivoire	Guinea	Mali	Senegal
Burkina Faso	The Gambia	Guinea-Bissau	Niger	Sierra Leone
Cabo Verde	Ghana	Liberia	Nigeria	Togo
European Free Trade Association (EFTA)				
Iceland	Liechtenstein	Norway	Switzerland	
European Union (28)				
Austria	Denmark	Hungary	Malta	Slovenia
Belgium	Estonia	Ireland	Netherlands	Spain
Bulgaria	Finland	Italy	Poland	Sweden
Croatia	France	Latvia	Portugal	United Kingdom
Cyprus	Germany	Lithuania	Romania	
Czech Republic	Greece	Luxembourg	Slovak Republic	

Gulf Cooperation Council (GCC)				
Bahrain, Kingdom of	Oman	Qatar	Saudi Arabia, Kingdom of	United Arab Emirates
Kuwait, the State of				
Southern Common Market (MERCOSUR)				
Argentina	Brazil	Paraguay	Uruguay	Venezuela, Bolivarian Republic of
North American Free Trade Agreement (NAFTA)				
Canada	Mexico	United States of America		
Southern African Development Community (SADC)				
Angola	Eswatini	Malawi	Namibia	Tanzania
Botswana	Lesotho	Mauritius	Seychelles	Zambia
Comoros	Madagascar	Mozambique	South Africa	Zimbabwe
Democratic Republic of the Congo				
South Asia Free Trade Agreement (SAFTA)				
Afghanistan	Bhutan	Maldives	Pakistan	Sri Lanka
Bangladesh	India	Nepal		
West African Economic and Monetary Union (WAEMU)				
Benin	Côte d'Ivoire	Mali	Senegal	Togo
Burkina Faso	Guinea-Bissau	Niger		

Other groups				
African, Caribbean and Pacific countries (ACP)				
Angola	Côte d'Ivoire	Guinea-Bissau	Namibia	Solomon Islands
Antigua and Barbuda	Cuba	Guyana	Nauru	Somalia
Bahamas	Democratic Republic of the Congo	Haiti	Niger	South Africa
Barbados	Djibouti	Jamaica	Nigeria	Sudan
Belize	Dominica	Kenya	Niue	Suriname
Benin	Dominican Republic	Kiribati	Palau	Tanzania
Botswana	Equatorial Guinea	Lesotho	Papua New Guinea	Timor-Leste
Burkina Faso	Eritrea	Liberia	Rwanda	Togo
Burundi	Eswatini	Madagascar	Saint Kitts and Nevis	Tonga
Cabo Verde	Ethiopia	Malawi	Saint Lucia	Trinidad and Tobago
Cameroon	Fiji	Mali	Saint Vincent and the Grenadines	Tuvalu
Central African Republic	Gabon	Marshall Islands	Samoa	Uganda
Chad	The Gambia	Mauritania	São Tomé and Príncipe	Vanuatu
Comoros	Ghana	Mauritius	Senegal	Zambia
Congo	Grenada	Micronesia, Federated States of	Seychelles	Zimbabwe
Cook Islands	Guinea	Mozambique	Sierra Leone	
Africa				
North Africa				
Algeria	Egypt	Libya	Morocco	Tunisia
Sub-Saharan Africa				
Western Africa				
Benin	The Gambia	Guinea-Bissau	Mauritania	Senegal
Burkina Faso	Ghana	Liberia	Niger	Sierra Leone
Cabo Verde	Guinea	Mali	Nigeria	Togo
Côte d'Ivoire				
Central Africa				
Burundi	Central African Republic	Congo	Equatorial Guinea	Rwanda
Cameroon	Chad	Democratic Republic of the Congo	Gabon	São Tomé and Príncipe
Eastern Africa				
Comoros	Kenya	Mayotte	Seychelles	Sudan
Djibouti	Madagascar	Reunion	Somalia	Tanzania
Eritrea	Mauritius	Rwanda	South Sudan	Uganda
Ethiopia				
Southern Africa				
Angola	Eswatini	Malawi	Namibia	Zambia
Botswana	Lesotho	Mozambique	South Africa	Zimbabwe
Territories in Africa not elsewhere specified				
Asia				
East Asia				
China	Japan	Korea, Republic of	Mongolia	
Hong Kong, China	Korea, Democratic People's Republic of	Macao, China	Chinese Taipei	
Southeast Asia				
Brunei Darussalam	Lao People's Democratic Republic	Myanmar	Singapore	Timor-Leste
Cambodia	Malaysia	Philippines	Thailand	Viet Nam
Indonesia				

South Asia				
Afghanistan	Bhutan	Maldives	Pakistan	Sri Lanka
Bangladesh	India	Nepal		
Oceania				
Australia	Tuvalu	Kiribati	New Zealand	Solomon Islands
Nauru	Fiji	Marshall Islands	Papua New Guinea	Tonga
Palau	Indonesia	Micronesia, Federated States of	Samoa	Vanuatu
Asia-Pacific Economic Cooperation (APEC)				
Australia	Hong Kong, China	Mexico	Russian Federation	Thailand
Brunei Darussalam	Indonesia	New Zealand	Singapore	United States
Canada	Japan	Papua New Guinea	Chinese Taipei	Viet Nam
Chile	Korea, Republic of	Peru		
China	Malaysia	Philippines		
BRICS				
Brazil	China	India	Russian Federation	South Africa
Developed economies				
North America (except Mexico)	European Union (28)	EFTA (Iceland, Liechtenstein, Norway, Switzerland)	Australia, Japan and New Zealand	
Developing economies				
Africa	South and Central America and the Caribbean, Mexico	Europe except the European Union (28) and EFTA; Middle East	Asia except Australia, Japan and New Zealand	
LDCs (least-developed countries)				
Afghanistan	Comoros	Kiribati	Nepal	Tanzania
Angola	Democratic Republic of the Congo	Lao People's Democratic Republic	Niger	Timor-Leste
Bangladesh	Djibouti	Lesotho	Rwanda	Togo
Benin	Equatorial Guinea	Liberia	São Tomé and Príncipe	Tuvalu
Bhutan	Eritrea	Madagascar	Senegal	Uganda
Burkina Faso	Ethiopia	Malawi	Sierra Leone	Vanuatu
Burundi	The Gambia	Mali	Solomon Islands	Yemen
Cambodia	Guinea	Mauritania	Somalia	Zambia
Central African Republic	Guinea-Bissau	Mozambique	South Sudan	
Chad	Haiti	Myanmar	Sudan	
Six East Asian traders				
Hong Kong, China	Malaysia	Singapore	Chinese Taipei	Thailand
Korea, Republic of				
Pacific Alliance				
Chile	Colombia	Mexico	Peru	

Abbreviations and symbols

AI	artificial intelligence
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AVE	ad valorem equivalent
B2B	business-to-business
BPO	business process outsourcing
CARICOM	Caribbean Community
CETA	Comprehensive Economic and Trade Agreement
CGE	computable general equilibrium
CIS	Commonwealth of Independent States
COMESA	Common Market for Eastern and Southern Africa
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DST	digital services tax
EAC	East African Community
EAEU	Eurasian Economic Union
EFTA	European Free Trade Association
EU	European Union
FDI	foreign direct investment
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GTAP	Global Trade Analysis Project
GVC	global value chain
ICAO	International Civil Aviation Organization
ICT	information and communications technology
ILO	International Labour Organization
IMF	International Monetary Fund
IMO	International Maritime Organization
IO	international organization
IP	intellectual property
IPR	intellectual property rights
ISIC	International Standard Industrial Classification of All Economic Activities
ITC	International Trade Centre
I-TIP	WTO Integrated Trade Intelligence Portal
ITU	International Telecommunication Union
LDC	least-developed country
LSP	logistics services providers
MRA	mutual recognition agreement
MSME	micro, small and medium-sized enterprise
nec	not elsewhere classified
OECD	Organisation for Economic Co-operation and Development
P2P	person-to-person
R&D	research and development
RTA	regional trade agreement
SDG	Sustainable Development Goal
STPD	WTO Services Trade Policy Database
STRI	World Bank Services Trade Restrictions Index
TiVA	Trade in Value-Added
TSA	OECD Tourism Satellite Account
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
US	United States of America
WIOD	World Input Output Database
WHO	World Health Organization
WPDR	Working Party on Domestic Regulation
WTO	World Trade Organization

List of figures, tables and boxes

A Introduction

Figures

Figure A.1:	Trade in goods has grown more slowly than trade in commercial services	14
Figure A.2:	Services account for an increasing share of GDP	16

B Services trade in numbers

Figures

Figure B.1:	Commercial presence is the most important mode in trade in services	24
Figure B.2:	Distribution and financial services are the most traded services	25
Figure B.3:	EU and US cross-border financial and insurance services exports are growing faster than exports through foreign-controlled affiliates	26
Figure B.4:	World trade in air passenger transport services and world trade in tourism develop in parallel	27
Figure B.5:	China's construction exports are escalating	28
Figure B.6:	IT services are exported across borders and through the presence of individuals	29
Figure B.7:	Films, music and software drive US exports of IP-related services	29
Figure B.8:	Trade in IP-related services is dominated by developed economies	30
Figure B.9:	Developing economies rise in world trade in services but LDCs continue to lag behind	32
Figure B.10:	Five Asian economies account for more than half of developing economies' exports and imports	33
Figure B.11:	The top five developing economies have modified their way of exporting services over time	34
Figure B.12:	For the top five developing economies, commercial presence is the dominant mode for exporting services	34
Figure B.13:	The other 125 developing economies export services differently	35
Figure B.14:	Participation in services exports is positively correlated with firm size	36
Figure B.15:	Services MSMEs in LDCs export only 1.8 per cent of their sales	37
Figure B.16:	MSMEs engaged in services start exporting in four years on average, compared to six years for MSMEs in manufacturing	37
Figure B.17:	In Europe, participation by MSMEs in services trade varied across countries in 2014	38
Figure B.18:	Professional, scientific and technical activities had the highest export intensity after transportation and storage in European countries in 2014	39
Figure B.19:	Female employment in services is positively correlated with economic development	39
Figure B.20:	Female employment is concentrated in the least-traded services sectors	40
Figure B.21:	Firms owned by women are under-represented in services exports	41
Figure B.22:	In Canada, MSMEs owned by women are largely in services	44

Figure B.23:	Services account for close to half of world exports in terms of value-added	45
Figure B.24:	The share of services value-added in manufacturing exports is highest in Europe and is increasing in Asia	46
Figure B.25:	Services have similar relative importance for exports in different manufacturing sectors	47
Figure B.26:	Services value-added constitutes 90 per cent in services exports	48

Boxes

Box B.1:	What is TISMOS?	24

Opinion pieces

Alan Beattie, "The case of the missing services"	23
Sonja Grater, Ali Parry and Wilma Viviers, "MSMEs and services trade: A pathway to inclusive growth in developing economies?"	42

C Why services trade matters

Figures

Figure C.1:	The services sector constitutes the biggest share of the global economy	53
Figure C.2:	Total factor productivity in some services sectors exceeds that of manufacturing	54
Figure C.3:	The share of intangible assets in business investment in OECD countries is significant	55
Figure C.4:	The share of domestic value-added in tourism is higher than in total exports	59
Figure C.5:	Domestic supply chains have a significant role in products and services purchased by tourists	60
Figure C.6:	Other services sectors make major contributions to tourism	60
Figure C.7:	In the last decade, many economies have experienced welfare gains from more cross-border trade in services	63
Figure C.8:	In the last decade, the GDP per capita of many economies rose as a result of more cross-border trade in services	64
Figure C.9:	The share of services in total employment has been on the rise across the world	70
Figure C.10:	The services sector requires more years of education on average	71
Figure C.11:	Cross-border services exports support a high share of employment in developing countries	73
Figure C.12:	Employment in business-to-business services is significantly more concentrated in particular locations than employment in manufacturing industries	75
Figure C.13:	Services employment is higher in urban areas than in rural districts of India	75
Figure C.14:	The share of professionals in services sectors with a license differs widely across industries	77

Tables

Table C.1:	Welfare (per capita GDP) gains from services trade	65

Boxes

Box C.1:	Technological developments and productivity in services	54
Box C.2:	Assessing the impact of tourism exports through trade in value-added	59
Box C.3:	Methodologies underlying welfare calculations	62

Opinion pieces

Matteo Fiorini and Bernard Hoekman, "Services trade policy and the United Nations Sustainable Development Goals (SDGs)"	66
Rupa Chanda, "Ensuring inclusive services trade: role of complementary domestic policies"	78

D Services trade in the future

Figures

Figure D.1:	Trade costs are highest for services	85
Figure D.2:	Services trade costs are lowest among advanced economies	85
Figure D.3:	Services sectors with low trade costs	86
Figure D.4:	Services sectors with high or medium trade costs	87
Figure D.5:	Policy-related factors account for a significant part of trade costs	87
Figure D.6:	Trade in ICT-enabled services has been growing steadily	89
Figure D.7:	Some services sectors face high restrictions	92
Figure D.8:	Services trade restrictions vary by mode of supply	94
Figure D.9:	Globally, services sectors saw changes in trade restrictions	95
Figure D.10:	The digital regulatory environment has tightened	95
Figure D.11:	Regulatory heterogeneity is lowest among OECD countries	97
Figure D.12:	Investment in infrastructure differs across regions	97
Figure D.13:	Access to digital infrastructure differs according to development levels	98
Figure D.14:	Broadband subscriptions grew exponentially over the past decade	99
Figure D.15:	The manufacturing sector is increasingly reliant on services	104
Figure D.16:	The share of foreign services value-added in world gross exports is stable and is even slightly increasing	105
Figure D.17:	The number of women in high-skilled jobs is increasing	107
Figure D.18(a):	The population in developed countries is ageing	108
Figure D.18(b):	The young population in developing countries is growing	108
Figure D.19:	Expenditure on services differs by age group	108
Figure D.20:	The correlation between the old age dependency ratio and aggregate health expenditure is positive	109
Figure D.21:	Five of the top ten fastest growing occupations in the United States are related to healthcare	110
Figure D.22:	The most consumed services in China are housing, transport and communication	111
Figure D.23:	By 2030, Generation Z and the New Generation will constitute more than 50 per cent of the global population	112

Figure D.24:	The New Generation and Generation Z are the most active users of social media accounts	113
Figure D.25:	Total Netflix subscriptions have been increasing	113
Figure D.26:	Younger generations make the most use of YouTube in the United States	114
Figure D.27:	Countries' GDP is predicted to converge	115
Figure D.28:	The composition of expenditure changes according to income	115
Figure D.29:	The composition of services consumption changes according to income	116
Figure D.30:	As income grows, countries increasingly consume skills-intensive services	117
Figure D.31:	Global climate change has already had observable effects on the environment	118
Figure D.32:	New technologies are projected to reduce trade costs in least-developed economies	125
Figure D.33:	New technologies are projected to reduce trade costs in different services sectors	127
Figure D.34:	The share of services trade in total trade is projected to rise above 30 per cent in the scenario where all trade costs decline	130
Figure D.35:	Projected trade growth is highest in ICT services	130
Figure D.36:	Projected services trade growth is highest in least-developed countries	131
Figure D.37:	Projected services trade growth associated with reductions in services trade barriers is highest in least-developed countries	132
Figure D.38:	The importance of different services sectors in services trade varies with different scenarios	133
Figure D.39:	The share of developing and least-developed countries in services trade rises in scenarios with trade cost reductions	133

Tables

Table D.1:	Innovation in digital technologies grows fast	100
Table D.2:	The old age dependency ratio increases the share of aggregate expenditure for health and education	109
Table D.3:	Projected macroeconomic growth rates vary across economies	124
Table D.4:	The share of services output in total output projected to rise	129

Boxes

Box D.1:	Online workplace platforms stimulate trade in professional services	90
Box D.2:	Online platforms and the digital transformation of logistics	91
Box D.3:	World Bank-WTO Services Trade Policy Database and World Bank STRI	93
Box D.4:	Advancements in digital technologies are likely to continue in the future	100
Box D.5:	Digital technologies give rise to new concepts, such as telemedicine and telesurgery	101
Box D.6:	Challenges to taxation arising from the digitalization of services activities	102
Box D.7:	Fintech in sub-Saharan Africa	106
Box D.8:	Digital technologies provide new opportunities for women in services occupations	107
Box D.9:	Trade in online education services will increase with more interactive digital technologies and a growing young population in developing countries	111
Box D.10:	Online video content streaming	113

Appendix tables

Appendix Table D.1:	Aggregation of regions	138
Appendix Table D.2:	Aggregation of sectors	139
Appendix Table D.3:	Scaling factors of regions and sectors for the calculation of productivity growth and capital income share changes due to new technologies	140
Appendix Table D.4:	Estimation results share of ICT services used by different sectors as intermediate input in historical data and simulated data	141
Appendix Table D.5:	Regression of inferred trade costs on measures of trade costs	142
Appendix Table D.6:	Ad valorem equivalent trade cost reductions different trends (averages across economies)	143
Appendix Table D.7:	Ad valorem equivalent trade cost reductions different trends (sector averages)	144
Appendix Table D.8:	Regression of services trade, measures of trade costs, and the interaction between STRI and a border dummy	144
Appendix Table D.9:	Ad valorem trade cost reductions in three services sectors associated with reductions in STRI	145
Appendix Table D.10:	Face-to-face interactions and trade costs – bilateral sample	147
Appendix Table D.11:	Face-to-face interactions and trade costs – sector-level sample	148
Appendix Table D.12:	Additional real growth of exports (cumulative) in three services sectors as a result of reductions in the STRI	148

Appendix figures

Appendix figure D.1:	Greater importance of face-to-face communication is associated with larger trade costs in general	147

Opinion pieces

Richard Baldwin, “Digital technology and telemigration”	126

E What role for international cooperation on services trade policy?

Figures

Figure E.1:	Services RTAs have grown significantly	163
Figure E.2:	Developing countries are increasingly parties to services RTAs	163
Figure E.3:	GATS commitments differ across different groups of members	168
Figure E.4:	GATS commitments vary by sector	169
Figure E.5:	Acceded members have committed more sectors than other members	169
Figure E.6:	Different modes of supply enjoy dissimilar levels of commitments	170
Figure E.7:	The incidence of commitments for acceded members is higher	171
Figure E.8:	RTA commitments go well beyond those undertaken in the WTO	173
Figure E.9:	GATS+ provisions on domestic regulatory measures have increased	179
Figure E.10:	RTAs progressively include more regulatory provisions	180
Figure E.11:	Mode 4 provisions in RTAs are on the rise	181

Boxes

Box E.1:	Fintech, regulation and international cooperation: the case of innovation offices and regulatory sandboxes	156
Box E.2:	The GATS in brief	158
Box E.3:	Extended negotiations on basic telecommunications and financial services	160
Box E.4:	What explains services trade agreements?	161
Box E.5:	FDI as a determinant of trade in services	178
Box E.6:	Trade in services and health worker mobility	183
Box E.7:	The complexity of services regulation – the case of network industries	187

Appendix tables

Appendix figure E.1:	Overview of relevant work of other international organizations	194

Opinion pieces

Natallie Rochester, “The potential of trade in services for developing countries”	166
Jane Drake-Brockman, “Why regulatory cooperation matters for business”	188

WTO members

(As of 1 August 2019)

Afghanistan
Albania
Angola
Antigua and Barbuda
Argentina
Armenia
Australia
Austria
Bahrain, Kingdom of
Bangladesh
Barbados
Belgium
Belize
Benin
Bolivia, Plurinational State of
Botswana
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Burundi
Cabo Verde
Cambodia
Cameroon
Canada
Central African Republic
Chad
Chile
China
Colombia
Congo
Costa Rica
Côte d'Ivoire
Croatia
Cuba
Cyprus
Czech Republic
Democratic Republic of the Congo
Denmark
Djibouti
Dominica
Dominican Republic
Ecuador
Egypt
El Salvador
Estonia
Eswatini
European Union
Fiji
Finland
France
Gabon
The Gambia
Georgia
Germany
Ghana
Greece
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hong Kong, China
Hungary
Iceland
India
Indonesia
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Korea, Republic of
Kuwait, the State of
Kyrgyz Republic
Lao People's Democratic Republic
Latvia
Lesotho
Liberia
Liechtenstein
Lithuania
Luxembourg
Macao, China
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Mauritania
Mauritius
Mexico
Moldova, Republic of
Mongolia
Montenegro
Morocco
Mozambique
Myanmar
Namibia
Nepal
Netherlands
New Zealand
Nicaragua
Niger
Nigeria
North Macedonia, Republic of
Norway
Oman
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russian Federation
Rwanda
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Samoa
Saudi Arabia, Kingdom of
Senegal
Seychelles
Sierra Leone
Singapore
Slovak Republic
Slovenia
Solomon Islands
South Africa
Spain
Sri Lanka
Suriname
Sweden
Switzerland
Chinese Taipei
Tajikistan
Tanzania
Thailand
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Uganda
Ukraine
United Arab Emirates
United Kingdom
United States of America
Uruguay
Vanuatu
Venezuela, Bolivarian Republic of
Viet Nam
Yemen
Zambia
Zimbabwe

Previous World Trade Reports

The future of world trade: How digital technologies are transforming global commerce

2018

The *World Trade Report 2018* examines how digital technologies – in particular the Internet of Things, artificial intelligence, 3D printing and Blockchain – affect trade costs, the nature of what is traded and the composition of trade. It estimates how global trade may be affected by these technologies over the next 15 years.

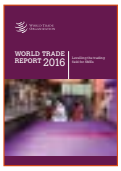
Trade, technology and jobs

2017

The *World Trade Report 2017* examines how technology and trade affect employment and wages. It analyses the challenges for workers and firms in adjusting to changes in labour markets and how governments can facilitate such adjustment to ensure that trade and technology are inclusive.

Levelling the trading field for SMEs

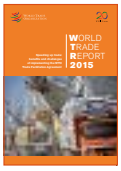
2016



The *World Trade Report 2016* examines the participation of small and medium-sized enterprises (SMEs) in international trade. It looks at how the international trade landscape is changing for SMEs and what the multilateral trading system does and can do to encourage SME participation in global markets.

Speeding up trade: benefits and challenges of the WTO Trade Facilitation Agreement

2015



The WTO Trade Facilitation Agreement (TFA), agreed by WTO members at the Ministerial Conference in December 2013, is the first multilateral trade agreement concluded since the establishment of the WTO in 1995. This Report is the first detailed study of the potential impacts of the TFA, based on analysis of the final agreement text.

Trade and development: recent trends and the role of the WTO

2014

This Report looks at four major trends that have changed the relationship between trade and development since the start of the millennium: the economic rise of developing economies, the growing integration of global production through supply chains, the higher prices for agricultural goods and natural resources, and the increasing interdependence of the world economy.

Factors shaping the future of world trade

2013

This Report looks at what has shaped global trade in the past and reviews how demographic change, investment, technological progress, developments in the transport and energy/natural resource sectors, as well as trade-related policies and institutions, will affect international trade.

Trade and public policies: A closer look at non-tariff measures in the 21st century

2012

Regulatory measures for trade in goods and services raise challenges for international cooperation in the 21st century. This Report examines why governments use non-tariff measures and services measures and the extent to which these measures may distort international trade.

The WTO and preferential trade agreements: From co-existence to coherence

2011

The ever-growing number of preferential trade agreements (PTAs) is a prominent feature of international trade. This Report describes the historical development of PTAs and the current landscape of agreements. It examines why PTAs are established, their economic effects, the contents of the PTAs, and the interaction between PTAs and the multilateral trading system.

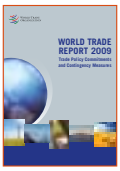
Trade in natural resources

2010

This Report focuses on trade in natural resources, such as fuels, forestry, mining and fisheries. It examines the characteristics of trade in natural resources, the policy choices available to governments and the role of international cooperation, particularly of the WTO, in the proper management of trade in this sector.

Trade policy commitments and contingency measures

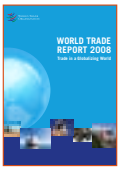
2009



This Report examines the range and role of contingency measures available in trade agreements. It aims to analyse whether WTO provisions provide a balance between supplying governments with the necessary flexibility to face difficult economic situations and adequately defining these in a way that limits their use for protectionist purposes.

Trade in a globalizing world

2008



This Report provides a reminder of the gains from international trade and highlights the challenges arising from higher levels of integration. It addresses the question of what constitutes and drives globalization, the benefits and challenges it brings, and the role trade plays in this world of ever-growing inter-dependency.

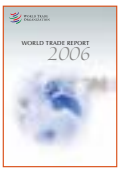
Sixty years of the multilateral trading system: achievements and challenges

2007

On 1 January 2008 the multilateral trading system celebrated its 60th anniversary. The *World Trade Report 2007* celebrates this landmark anniversary with an in-depth look at the General Agreement on Tariffs and Trade (GATT) and its successor, the WTO – their origins and achievements, the challenges they have faced, and what the future holds.

Exploring the links between subsidies, trade and the WTO

2006



This Report focuses on how subsidies are defined, what economic theory can tell us about subsidies, why governments use subsidies, the most prominent sectors in which they are applied and the role of the WTO Agreement in regulating subsidies in international trade.

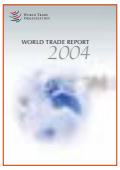
Trade, standards and the WTO

2005

This Report seeks to shed light on the various functions and consequences of standards, focusing on the economics of standards in international trade, the institutional setting for standard-setting and conformity assessment, and the role of WTO agreements in reconciling the legitimate policy uses of standards with an open, non-discriminatory trading system.

Coherence

2004



This Report focuses on the notion of coherence in analysing interdependent policies: the interaction between trade and macroeconomic policy, the role of infrastructure in trade and economic development, domestic market structures, governance and institutions, and the role of international cooperation in promoting policy coherence.

Trade and development

2003

This Report focuses on development. It explains the origin of this issue and offers a framework within which to address the question of the relationship between trade and development, thereby contributing to more informed discussion.

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World Trade Report 2019

Services have become the most dynamic component of global trade, with an increasingly important role in the global economy and in everyday life. Yet the extent of services' contribution to global trade is not always fully understood.

The *World Trade Report 2019* attempts to remedy this, making use of a new dataset developed by the WTO that captures the various ways in which services are supplied across borders. The Report examines how trade in services has evolved in recent years and looks at why services trade matters. Major trends affecting trade in services, including demographic changes, digital technologies, rising incomes and climate change, are reviewed. The Report also estimates how services trade may evolve over the next 20 years and the prospects for enhancing international cooperation on services trade policy.

Trade costs for services are higher than those for goods but these costs are falling, largely due to the impact of digital technologies, the Report finds. It highlights how declining trade costs are expected to expand the share of services in global trade and how this could contribute to more inclusive growth and development. If economies are to reap the benefits of the growing role of services trade, international cooperation will need to intensify.

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