The COVID-19 shock and services trade: explaining the heterogeneous decline

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Abstract

Global services exports and imports declined by 20% each in 2020 from their value in 2019 with significant heterogeneity across countries and sectors. The decline is found to be correlated with the incidence of COVID-19 cases and mortalities; the stringency of the imposed lockdowns; the decline in merchandise trade; and with the different ways in which services trade is transacted across sectors. The latter depends on the sectoral composition of services trade across countries, which in turn emanates from more fundamental determinants of comparative advantage in services. Results from empirical analysis suggest that larger, more capital- and PTA-intensive economies with more restrictive policies on digital trade and lower ability to leverage ICT infrastructure were associated with relatively larger declines in services trade. Regulatory quality is found to have played both alleviating and intensifying roles in the decline, while geographical remoteness is found to be inversely related to it. However, the expected role of GVC-integration in accentuating the services trade decline finds little support in the GMM results.

JEL classification: F1, F14

Key words: Services trade; COVID-19; heterogeneity; modes of supply; structural determinants; gravity model

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1 Introduction

COVID-19 has been an unprecedented health and economic crisis, leading, in its initial widespread outbreak in March 2020, to an immediate supply and concomitant demand shock emanating from stalled economic activity in the wake of widespread lockdowns imposed by countries across the world. Another significant fallout of the virus outbreak was the huge blow to international trade in goods and services, emanating, inter alia, from the disruption to regional and global value chains (GVCs), travel restrictions and social-distancing practices.

One year later, while merchandise trade has witnessed a rebound, trade in services continues to be adversely affected. At the same time, the pandemic has seen a significant rise in e-commerce and a spurt in digitalization. Against this background, the paper presents stylized facts on the decline in services trade, including at the disaggregated level, observed in 2020 and provides hypotheses and empirical analysis seeking to explain the significant heterogeneity in decline observed across countries and sectors.

Data from the WTO based on preliminary quarterly estimates show that global services trade declined by 20% in 2020, which translates into a USD 1.2 trillion loss each in exports and imports of commercial services[1]. At the same time, there is considerable heterogeneity in the observed decline in services trade across countries and sectors. On average, the group of OECD countries and the largest services traders observed much smaller percentage declines in value in 2020 compared to the non-OECD countries and the small services trading economies. More disaggregated analysis shows that trade in commercial services was adversely affected across sectors with travel services trade (mainly tourism) being by far the worst hit; global travel services exports declined by 63% in 2020 relative to 2019. In contrast, world trade in other commercial services[2] only declined by 2%.

While the incidence of COVID-19 cases and mortalities associated with the pandemic are expected to be obvious determinants of the decline in services trade value (both exports and imports) in 2020, this decline is also found to be positively correlated with the share of Modes[3] 2-4 in total services trade and inversely related to the Mode 1 share. Several Mode

[1]Commercial services are all services except for government services.

[2]These include charges for the use of intellectual property; construction; distribution; insurance; financial; telecommunications; computer and information; personal, cultural and recreational (audio-visual, health and education); and other business services (a diverse category that includes, inter alia, accounting, legal, engineering, research & development, management consulting, and technical services).

[3]In WTO GATS parlance, services trade is transacted via four modes of supply. Mode 1 or "cross-border trade" is the whole range of services transactions that take place online. Mode 2 or "consumption abroad" is the service transacted when the consumer travels to the economy of the supplier e.g. tourism. Mode 3 or "commercial presence" is foreign affiliate activities in the host economy i.e. investment. Mode 4 or "movement of natural persons" is the service delivered by the supplier in the economy of the consumer e.g.

1 services can be delivered digitally in work-from-home (WFH) scenarios, while services delivered via Modes 2-4 require physical proximity between the buyer and seller; the latter have been more adversely affected by travel bans and social distancing during the pandemic.

Thus, the primary hypothesis is that the differences in COVID-19-induced decline in services trade across countries and sectors can be explained by the different ways in which these countries transact services trade in the concerned sectors. For instance, trade in other commercial services, most of which are largely transacted online, have been the least adversely affected[4]. In contrast, travel services have been the worst hit and the decline in travel services trade is found to be positively correlated with the stringency of measures imposed during lockdowns.

This said, the use of different modes in services trade itself depends on the sectoral composition of services trade across countries, which in turn is governed by more fundamental determinants of services trade patterns that themselves vary across countries. These include traditional determinants like physical, natural and human capital endowments; economies of scale; geography; institutional quality; access to ICT infrastructure; regulatory policy; complementarity with merchandise trade as well as more recent factors such as integration and position in GVCs and intensiveness in preferential trade agreements (PTAs). Thus, the heterogeneity in the observed decline in services trade is ultimately linked to these fundamental determinants, generating several secondary hypotheses, which we explore econometrically at a more disaggregated level.

Results from this analysis suggest that COVID-19 incidence and the decline in merchandise trade were positively correlated with the magnitude of services trade decline across sectors. Moreover, larger, more capital- and PTA-intensive economies with less restrictive policies on digital trade and lower ability to leverage ICT infrastructure were associated with relatively larger declines in services trade. While regulatory quality is found to have played both alleviating and intensifying roles in the decline, geographical remoteness is found to be inversely related to it. However, the expected role of GVC-integration in accentuating the decline in services trade finds little support in the GMM results.

The rest of the paper is structured as follows. Section 2 relates this study to existing literature on the determinants of services trade patterns and the growing work on the implications of the pandemic for services trade. Section 3 provides stylized facts on the decline in services

onsite software programmers.

[4]However, several cross-border services act as complementary inputs into manufacturing and other services, and activity in the latter has been significantly disrupted, if not completely stalled, by nationwide lockdowns. Moreover, issues relating to data security, client-confidentiality and access to ICT render even some otherwise remotely-deliverable Mode 1 services infeasible. Thus, the effects of the pandemic on Mode 1 services trade are not completely benign. (Shingal, 2020a,b, 2021)

trade observed in 2020, including at the disaggregated level. Section 4 introduces primary and secondary hypotheses that aim to explain the heterogeneity in observed declines and provides suggestive evidence in support of these hypotheses. Section 5 discusses the estimation methodology used to examine the hypotheses empirically along with the relevant data sources. Section 6 presents the results from estimation and Section 7 concludes.

2 Related literature

2.1 Determinants of services trade patterns

Much like trade in goods and investment (Baldwin, 1979), services trade patterns are determined by differences in Ricardian comparative costs among economies, which in turn emanate from HOS (Heckscher-Ohlin-Samuelson) variations in factor endowments - capital and labour as well as human capital. Comparative advantage in services is also a function of geography, technology, scale economies and market imperfections (Sapir and Lutz, 1981), though the heterogeneous nature of services means that the importance of determining factors may vary across sectors.

For instance, while comparative advantage in freight services may be related to capital intensity, scale, composition of trade, and distance from trading partners, trade patterns in passenger services are associated more with capital abundance and the flow of passengers (Sapir and Lutz, 1981). In contrast, the availability of human capital, ICT infrastructure and economies of scale may be more important determinants of trade in insurance, financial, telecoms and IT services. Conventional theories are also likely to explain trade in construction and distribution services since commercial presence is the dominant mode of supply in these services. Meanwhile, regulatory requirements may be more important determinants of trade in professional services. Thus, differences in sectoral composition of services trade across countries will, ipso facto, influence the observed variations in services trade decline.

The need for physical proximity between buyers and sellers for services transactions to be effected gives rise to the "proximity burden" (Francois and Hoekman, 2010), though the ICT revolution has progressively diminished the significance of geography by enabling fragmentation and outsourcing. The latter also suggests that variations in GVC-integration and in countries' relative position in value-chains will also determine the observed cross-country differences in services trade decline. This said, services trade still requires a heavier dose of local presence of suppliers in the buyer's market than is the case with goods. Services provision is also characterized by "jointness in production" (Francois and Hoekman, 2010)

i.e. the need for complementary inputs, including both goods and other services, for the transaction to be effected. This recognition led to the methodological development of the four modes of supply by Sampson and Snape (1985). Thus, the different ways in which different services are transacted across borders will also affect variations in services trade decline observed across countries.

Many service industries, especially the "margin sectors" that facilitate transactions between agents through communications, distribution, transport and intermediation activities (Deardorff, 2001) are characterized by a mix of network externalities, regulation and natural and policy barriers to entry (Francois and Hoekman, 2010). This is a source of market power that necessitates regulation and competition in services markets. While such regulation may be driven by both efficiency and equity considerations, the incidence of restrictive regulation and regulatory heterogeneity between countries act as deterrents to services trade. This suggests that negotiating binding commitments via preferential services trade agreements (STAs) that either liberalize or harmonize regulatory requirements on services trade also matters (Egger and Shingal, 2021). Moreover, the quality of institutions managing these regulations is further likely to facilitate services trade (van der Marel, 2012) as well as minimize shock-induced adverse effects by more effective crises-management.

2.2 The COVID-19 pandemic and services trade

Amongst the earliest commentary on the pandemic's implications for services trade came from Shingal (2020a). The author argued that travel restrictions and social distancing (both voluntary and selective) are likely to outlast economic lockdowns and these would continue to inflict damage on services transactions requiring proximity between buyers and sellers. WTO (2020a) also highlighted the significant adverse impact of mobility restrictions and social distancing measures imposed for public health reasons on tourism, transport and distribution services. UNCTAD (2020a) too documented the massive disruptions to tourism, hospitality and retail sectors. Both Shingal (2020a) and WTO (2020a) also emphasized the knock-on effects of the decline in services trade on other sectors of economic activity, given increasing "servicification" (WTO, 2019) in countries across the world.

In other work, ADB (2020) modelled the increase in services trade costs arising from travel restrictions and outright bans, especially in aviation and outbound and inbound tourism. Complimenting this study, Benz et al. (2020) examined the impact of health-safety-induced regulatory restrictions on the cross-border movement of people on services trade costs. In their hypothesized scenarios wherein countries closed their borders to passengers but left

freight trade open, services trade costs were estimated to rise by an average of 12% of export values across sectors and countries in the medium term. Their analysis identified significant heterogeneity in the increase in services-trade costs across sectors and countries, "reflecting the stringency of initial regulations and the relative importance of business travel and labour mobility to international services trade".

In a related assessment, Dingel and Neiman (2020) found some service activities to be more amenable to WFH, including educational; professional, scientific and technical; management; insurance and finance; and information services in particular, but also wholesale trade; and real estate, rental and leasing services. Their analysis also suggests that lower-income countries have a lower share of jobs that can be done at home, which is consistent with the level of economic development of these countries.

At the same time, Drake-Brockman (2020), OECD (2020), Stephenson and Sotelo (2020), UNCTAD (2020b), Villafuerte (2020) and WTO (2020a, b) highlight the spurt in online delivery of services in the wake of the pandemic in sectors such as retail, health, education, telecommunications and audiovisual services and the potential of this development for greater use of Mode 1 trade in the future. Anecdotal evidence over the last one year already suggests that services trade in different modes of supply may be fungible; in fact, governments and the private sector have been coming up with innovative solutions for moving businesses online to sustain economic activity during the pandemic, and lay the groundwork for eventual recovery (Shepherd and Shingal, 2021).

This body of work also emphasizes the technology and connectivity disparities both within and across countries that impair both the supply and use of digitally-delivered services. Meanwhile, Drake-Brockman (2020) laments the lack of international coordination in approaches to facilitate the provision of essential services during periods of extended lockdown, which was associated with severe adverse effects on services value chains and on the IT/BPO sector in particular.

Shingal (2020b, 2021) provides regional analysis to examine the likely effect of the pandemic on Commonwealth and ASEAN+6 services trade, respectively. This work suggests that at least 40% of Commonwealth services exports and more than 45% of its imports could be compromised by COVID-19, with tourism-reliant Caribbean and Pacific Commonwealth countries likely to be most severely impacted, and African and Asian Commonwealth countries likely to be relatively less vulnerable. Similarly, up to half of total services trade in the 15 RCEP member countries (plus India) could be adversely affected during the pandemic, again with variations between the sample countries.

Overall, the growing literature on services trade during this crisis underscores the importance

of services that enable online delivery - telecommunications and computer services, as well as the broader infrastructural role of financial, transport, distribution and logistics services - in facilitating merchandise trade and economic growth. It also highlights the role of the government in addressing infrastructure, institutional and regulatory challenges that exacerbate the digital divide both within and across countries. Finally, all this work emphasizes the vital role that revival of the services sectors and services trade will play in economic recovery in the aftermath of the pandemic.

However, none of these early studies attempt to explain the heterogeneous decline in services trade observed across countries and sectors or present stylized facts on the subject, which is the main contribution of the present paper.

3 Stylized facts on the services trade decline

Annex Table 1 reports aggregate exports and imports of commercial services for 138 countries (for which these data are available from the WTO's Services Trade database based on quarterly estimates for the years 2019 and 2020) along with the % YoY changes in 2020. The countries are ranked in the descending order of the value of exports plus imports of commercial services in the year 2019. Expectedly, COVID-19 has been a shock for most of the countries in the table; global services trade declined by 20% in 2020, which translates into a USD 1.2 trillion loss each in exports and imports of commercial services.

At the same time, there is considerable heterogeneity in the observed decline in services trade across countries. For several countries including Macao, Laos, Bahamas, Cambodia, Fiji, Georgia and Thailand, the decline in commercial services exports was in excess of 60%, largely due to the adverse effects of pandemic-induced travel restrictions and social-distancing on tourism and related activities, which account for a large share of total services exports in these countries (see Annex Table 2). In contrast, Afghanistan, Honduras and Bangladesh witnessed an 18.5%, 10.4% and 8.6% increase in their commercial services exports despite the pandemic, emanating from the rise in their exports of other commercial and goods-related services in 2020 relative to 2019, respectively (see Annex Table 2).

In fact, the heterogeneity, both in the value of services trade in 2019 and the observed decline in 2020, is exhibited along several dimensions (see Table 1), which also motivates the choice of explanatory variables in our estimation strategy in Section 5. On average, non-OECD countries observed larger percentage declines (24.2% for exports and 25.2% for imports) in their services trade in 2020 compared to OECD countries (17.8% for exports and 17.0% for imports). The average percentage declines observed by the bottom 10 services traders

in 2019 in Table 1 are also far in excess of those observed by the top ten services traders. Likewise, countries with services trade below USD 10 billion in 2019 report much larger percentage declines, on average, than countries with services trade exceeding that threshold.

<Insert Table 1 here>

Table 1 further shows that larger, richer economies trading intensively in merchandise with less restrictive policies on digital trade and above-median values of human capital, ability to leverage ICT infrastructure, government effectiveness and PTA-intensiveness reported relatively smaller percentage declines in services trade; as, counter-intuitively, did countries more integrated and downstream in GVCs. While more geographically remote economies were associated with larger percentage declines, the above- and below-median averages in this case were not significantly different from each other. Counter-intuitively again, countries with below-median incidence of COVID-19 cases reported a larger percentage decline in services exports on average[5].

Disaggregated sector-level analysis by country in Annex Table 2 shows that trade in commercial services was adversely affected across sectors[6] and countries in 2020 relative to 2019 but with travel services trade (mainly tourism) being by far the worst hit. Global travel services exports declined by 63.2% in 2020 from their value in 2019, though in several countries including Papua New Guinea, Angola, Mongolia, Hong Kong, Taiwan, Chile, Malaysia, Montenegro and Fiji, the extent of the disruption was even more severe.

Transport and goods-related services reported a decline in global exports of 18.8% and 12.9%, respectively. Across countries, exports of transport services witnessed declines exceeding 60% in Lesotho, Macao, Mauritius, Papua New Guinea and Laos while Georgia and Pakistan observed close to 80% declines in their export of goods-related services. However, a few countries also saw their exports of these services rise considerably in 2020 relative to 2019. This was true of Timor-Leste in particular as well as Azerbaijan, China and Bangladesh for transport services exports and of Bangladesh, Bolivia, Brazil, Azerbaijan, Montenegro and Costa Rica in the case of goods-related services exports, with an increase in value exceeding 60%. Bangladesh also saw its imports of goods-related services increase over 13 times in 2020 relative to 2019, though most other countries reported a decline in their imports of

[5]The COVID-19 incidence measures are based on data on the number of cases and mortalities during January-December 2020. Data on all other variables (except for GVC-participation, GVC-position and share of services exports in PTAs that pertain to 2015 and digital-trade-restrictiveness that pertain to 2016), on the basis of which the total sample is "split" above and below median to present stylized facts in this section, pertain to 2017. All data sources are discussed in Section 5.

[6]More disaggregated data on goods-related and other commercial services for all four quarters of 2020 are available only for a much smaller country sample. Table 2 therefore reports data on more aggregate sectors.

services across sectors but especially in travel and transport. In a world of regional and GVCs, the decline in services imports not only has an adverse effect on exports but also on economic activity in general, given increasing servicification, with additional implications for post-pandemic recovery (Shingal, 2021).

Meanwhile, trade in other commercial services which accounted for over half of total commercial services trade in 2019, seems to have been the least adversely affected during the pandemic. Global exports and imports of these services declined by 2.3% and 2.6%, respectively, albeit again with significant differences across countries. Illustratively, Timor-Leste, Laos, Brunei, Papua New Guinea and Zambia observed declines exceeding 40% while for Qatar, Afghanistan and Georgia, their exports of other commercial services increased by over a fifth.

The heterogeneity in services trade decline is also observed by geographical region (see Table 2). North America, on average, reported the largest % YoY decline in the trade of goods-related services; the South Asian region in contrast witnessed a significant increase in this trade despite the pandemic, especially on the import side, driven primarily by Bangladesh. Trade in other commercial services was more adversely affected in the Pacific countries (Australia, New Zealand and Oceania), South-east Asia and Africa, while exports of these services grew by 4.3% on a YoY basis for South Asian economies on average. Meanwhile, transport and travel services trade was disrupted across all geographies, with some regions (North America for transport and South-east Asia for travel) reporting larger absolute declines than the corresponding global figures.

<Insert Table 2 here>

Finally, Figure 1 shows the evolution of the average decline in services trade and some select covariates over the four quarters of 2020. Both the value of services exports (blue bars, left panels) and imports (blue bars, right panels) fell sharply in Q2 though the magnitudes of the decline have also declined progressively over Q3 and Q4 of 2020. The same is true of the value of merchandise exports (red bars, bottom left), which in fact reported a slight increase in Q4 on a YoY basis. At the same time, the incidence of COVID-19 cases (red bars, top left) and mortalities (red bars, top right) has been on the rise through the year while lockdowns and related measures (red bars, bottom right) may have been the most stringent during Q2, with a slight reduction during Q3 and then rising again during Q4 of 2020.

<Insert Figure 1 here>

4 Exploratory hypotheses

4.1 Primary hypotheses

The incidence of COVID-19 cases and mortality rates associated with the pandemic are obvious determinants of the decline in services trade value emanating from the induced supply- and demand-shocks, and the travel and social restrictions imposed following the outbreak. At the same time, since certain countries have been more adversely affected than others and the stringency and frequency of the government-imposed lockdowns have varied both within and across countries, COVID-19 incidence is also likely to explain the observed heterogeneity in decline in services trade. This leads to the first primary hypothesis, PH1.

PH1: Decline in services trade in 2020 was directly related to the incidence of COVID-19 cases and the mortality associated with the outbreak

Interestingly though, Figure 2 does not seem to support PH1. The magnitudes of the observed decline in services exports and imports are found to be smaller for countries with larger number of COVID-19 cases. The correlations remain qualitatively unchanged if we examine the observed declines in merchandise trade instead (Figure 3). These counter-intuitive associations suggest that other determinants may also be important, which would need to be accounted for in more rigorous empirical analysis.

<Insert Figures 2 and 3 here>

Services trade is transacted in different ways and three of the four modes of supply require physical proximity between the buyer and seller for the transaction to be effected; this person-to-person exchange has been the first casualty of travel restrictions and social distancing practices following the virus outbreak. The observed differences in services trade decline are thus likely to be correlated with modal shares in total services trade, generating the following two hypotheses; Figures 4 and 5 provide suggestive evidence in support of both.

PH2: Decline in services trade in 2020 was directly related to the share of services trade delivered by Modes 2, 3 and 4

PH3: Decline in services trade in 2020 was inversely related to the share of services trade delivered by Mode 1

<Insert Figures 4 and 5 here>

Exports and imports of travel services, both business and personal travel (tourism), have been the hardest hit by the travel bans. Where these restrictions have been more stringent, the associated decline in travel services trade is expected to be larger in magnitude, leading to PH4; the hypothesis finds support in the correlation between the reduction in travel services exports and the average value of the Oxford stringency index (Hale et al. 2020) during September 2020[7] in Figure 6.

PH4: Decline in travel services trade in 2020 was directly related to the stringency of government measures imposed in the wake of the pandemic

<Insert Figure 6 here>

Heterogeneity in COVID-19-induced supply and demand shocks and GVC-contagion effects (Baldwin and Freeman, 2020; Friedt and Zhang, 2020) have also led to differences in the adverse effects that countries have observed on their merchandise trade. This likely explains cross-country differences in the decline of trade in goods-related services, generating PH5. Figure 7 lends prima facie support to this hypothesis for exports.

PH5: Decline in trade of goods-related services in 2020 was directly related to the decline in merchandise trade observed last year

<Insert Figure 7 here>

Transport services comprise both passenger and freight transport, which are likely to have different determinants explaining the decline in their trade and differences therein. While travel bans are expected to have a direct effect on passenger transport services especially air travel, COVID-19-induced declines in merchandise trade are likely to be associated with reductions in freight transport services via all modes of transport. Thus we have PH6, which is supported by the correlations in Figure 8.

PH6: Decline in transport services trade in 2020 was directly related to the decline in merchandise trade observed last year and to the stringency of government measures imposed in the wake of the pandemic

<Insert Figure 8 here>

[7]The relationship remains qualitatively similar if we use the average value of the stringency index during June or December 2020 or over the period from 16 March to 31 December 2020. This is not surprising given that a 10% increase in COVID-19 cases is found to be associated with a 0.7% rise in the value of the stringency index at the mean.

4.2 Secondary hypotheses

Different modes of supply are dominant in delivering trade in different sectors (see Table 3). For instance, insurance, financial, communications and information services are completely delivered cross-border while manufacturing and travel services are completely consumed abroad. Trade in several transport, other business (OBS) and personal, cultural and recreational (PCR) services are also largely transacted online while that in maintenance & repair is largely reliant on Mode 2. Up to a quarter of the services trade in several OBS and audio-visual, health and education services are delivered via Mode 4 while construction, distribution and heritage and recreation services trade relies primarily on commercial presence. These heterogeneities are together responsible for the observed cross-country differences in services trade decline at the disaggregated level. Moreover, the sectoral composition of services trade that determines the use of different modes of supply itself differs significantly across countries, governed by structural determinants of services trade patterns in these sectors that are themselves vastly different from one country to the other, generating the following secondary hypotheses.

<Insert Table 3 here>

SH1: Decline in services trade was directly related to capital-intensiveness though the role of economic size may be indeterminate (economic size and capital-intensiveness are both likely to facilitate Mode 3 trade which is positively associated with the decline but smaller economies are also more reliant on tourism, which is directly related to the decline)

SH2: Decline in services trade was inversely related to geographical remoteness (the latter is likely to promote greater use of Mode 1 trade which is inversely related to the decline; it is also likely to deter Modes 2-4, which are positively associated with the decline)

SH3: Decline in services trade was inversely related to access to ICT via the positive association of the latter with digitalization (which has witnessed a spurt during the pandemic)

SH4: Decline in services trade was inversely related to human capital via the positive association of the latter with trade in complex services[8] *(which are largely transacted online and thus remain amenable to WFH)*

SH5: Decline in services trade was inversely related to institutional quality via the latter's role in managing crises more effectively

[8]These include a wide range of professional services (accounting, legal, R&D, etc.) as well as insurance and financial services.

SH6: Decline in services trade was directly related to GVC-participation and to countries' upstreamness in GVCs via the role played by complex supply chains in an interconnected world in propagating COVID-19-induced shocks

SH7: Decline in services trade was inversely related to PTA-intensiveness via the role played by binding commitments in liberalizing and harmonizing restrictive services regulation

SH8: Decline in services trade was directly related to the restrictiveness of services (including digital) trade policies via the negative association of the latter with services (including cross-border) trade

5 Empirical methodology and data sources

We examine the hypotheses by estimating the following equations using fixed effects specifications:

$$YoY_{ct}^{SX,k} = \beta_1 ln(Covid_{ct}) + \beta_2 YoY_{ct}^{GX} + \beta_z D_{z_c}.ln(Covid_{ct}) + \alpha_c + \alpha_t + \varepsilon_{ct} \quad (1)$$

$$YoY_{ct}^{SM,k} = \beta_1 ln(Covid_{ct}) + \beta_2 YoY_{ct}^{GM} + \beta_z D_{z_c}.ln(Covid_{ct}) + \alpha_c + \alpha_t + \varepsilon_{ct} \quad (2)$$

where $YoY_{ct}^{SX,k}$ and $YoY_{ct}^{SM,k}$ denote the absolute value of the magnitude of the % YoY decline in services exports and imports of country c in sector k during quarter t of 2020; $Covid_{ct}$ includes the incidence of cases (or deaths) related to the pandemic; YoY_{ct}^{GX} and YoY_{ct}^{GM} denote the absolute value of the magnitude of the % YoY decline in merchandise exports and imports; α_c and α_t are the country and quarter fixed effects; and ε_{ct} is the error term[9]. The equations are estimated using OLS.

$D_{z_c} = \left\{GDP_c, KL_c, M1_c - M4_c, REM_c, HK_c, ICT_c, GOV_c, GVC_c, GVC_c^{POS}, PTA_c, DTRI_c\right\}$. These variables denote, respectively, dummy variables that are unity when nominal GDP; capital-labour ratio; share of Modes 1-4 in total services exports/imports; geographical remoteness; human capital variables; access to ICT measures; institutional quality; GVC-participation; GVC-position; PTA-intensiveness and measures for restrictiveness of digital trade policies exceed the respective median values for the country sample.

[9]Since we are interested in explaining the decline in services trade, we excluded observations where the % YoY change was positive. This reduced the effective sample size for total services exports and imports by 10%.

The variables in D_{z_c} are constructed using data for 2017 in most cases, which are sourced as follows: GDP, gross fixed capital formation, labour force, human capital and ICT measures are taken from the World Bank World Development Indicators; remoteness is computed following Baldwin and Harrigan (2011) as $REM_i = \sum_j GDP_j.d_{ij}^{(-1)}$ using bilateral distance (d_{ij}) data from CEPII (Head et al. 2010); measures of institutional quality (proxied by regulatory quality) are sourced from the Worldwide Governance Indicators (Kaufmann et al. 2010); and modal shares in total services exports/imports are computed using data from WTO Trade in Services by Mode of Supply (TiSMoS) database. Data on digital trade restrictiveness (DTRI) are sourced from ECIPE and pertain to 2016. Measures on country participation[10] and position[11] in GVCs are constructed using the EORA MRIO database (Lenzen et al. 2012, 2013) and pertain to the year 2015. The PTA-intensiveness variable is constructed as the share of a country's services exports/imports covered by "GATS-plus" PTAs (using data on deep trade agreements from Hofmann et al. 2019 and on bilateral services trade from OECD-WTO Balanced Trade in Services database or BaTiS) in its total services exports/imports in the year 2015.

Amongst other controls in equations (1) and (2), % YoY declines in quarterly merchandise trade during 2020 are computed using data from the WTO. Quarterly data on the incidence of COVID-19 cases and mortalities during 2020 are taken from the European Centre for Disease Prevention and Control. The data are organized in a panel comprising 138 countries, reported in Annex Table 1, and four quarters. However, sector-level trade data for 2020 are only available for most countries for the first three quarters, which therefore defines the effective sample size for econometric analysis. Summary statistics are reported in Annex Table 3, along with variable names, descriptions and data sources.

6 Results and analysis

The baseline OLS estimates are reported in Table 4. COVID-19 incidence is found to be positively correlated with the magnitudes of the % YoY decline in the exports of total commercial services in column (1) as well as those of travel, insurance, financial, and charges towards use of intellectual property (IP) at the sector-level. On the import side, a positive correlation is found between the number of COVID-19 cases and the magnitudes of the % YoY decline in total commercial, good-related, travel, insurance, financial, ICT, OBS and

[10] GVC participation is defined as the sum of backward (BP) and forward participation (FP); these terms were constructed using EORA MRIO data for the year 2015 as the share of foreign value added (FVA) and indirect value added (DVX) in gross exports (GX), respectively (for instance see Aslam et al. 2017).

[11] $GVC^{POS} = ln(1+FP) - ln(1+BP)$; the higher the value, the more "upstream" is the country in GVCs.

PCR services. In contrast to the correlation charts in Figures 1 and 2, these estimates control for other confounding influences via the use of country and quarter fixed effects and provide support for PH1. In other results, magnitude of the % YoY decline in merchandise trade is found to be positively correlated with total commercial, transport and especially OBS on the export side and with total commercial, transport and travel services for imports.

<Insert Tables 4-6 here>

OLS estimates from fully-specified equations (1) and (2) are reported in Tables 5 and 6 for exports and imports, respectively. All estimations include country and quarter fixed effects and the standard errors are clustered at the country-quarter level.

COVID-19 incidence is positively correlated with the magnitudes of the % YoY decline in travel and insurance services exports and in OBS imports even for below-median sample countries in Tables 5 and 6, providing further support for PH1. In contrast, the number of COVID-19 cases is found to be negatively associated with the decline in OBS (weakly) and PCR exports (Table 5, columns 10-11) in below-median sample countries.

The alleviating role of Mode 1 share in total services trade on COVID-19-associated decline in services trade (reflected in PH3) is observed for total commercial services exports (Table 5, column 1) and OBS imports (Table 6, column 10). The intensifying roles of the Modes 2-4 shares on COVID-19-associated decline in services trade (reflected in PH2) are better observed on the import side for total commercial services (Table 6, column 1 for Mode 2) and transport services (Table 6, column 3 for Mode 3). In contrast, countries with a large share of Mode 4 in total services imports seems to have witnessed smaller pandemic-induced declines in imports of PCR services (Table 6, column 11 for Mode 4).

The magnitude of the % YoY decline in merchandise trade is found to be positively correlated with the magnitudes of the % YoY decline in exports of transport, travel and other business services and imports of total commercial, transport and travel services, providing support for PH6 but not for PH5 (the associated coefficients lack statistical significance for goods-related services in column 2 of Tables 5 and 6).

The estimates in Table 5 also provide evidence for the role of scale economies in mitigating the adverse effects associated with this health shock. The coefficient of $ln(COVID_{ct}) * DGDP_c$ is found to be negative for travel and insurance (weakly) services exports. Meanwhile, the coefficient of $ln(COVID_{ct}) * DKL_c$ is found to be positive for exports of IP. However, a similar association is not observed with respect to either variable for services imports in Table 6. Thus, there is limited support for SH1.

The results reported in Table 5 weakly negate SH2; the coefficient on the interaction term with geographical remoteness is weakly positive for exports of goods-related services but the variable lacks statistical significance across all other sectors in Tables 5 and 6. Meanwhile, there seems to be more support for SH3 than for SH4 in the reported results. Countries with above-median human capital seem to have been associated with reduced declines in their travel and IP (weakly) services exports and their imports of financial and ICT services. In contrast, above-median internet usage is only found to be inversely related with the YoY decline in exports of construction services. Since construction services exports are largely transacted via commercial presence (see Table 3), this relationship likely alludes to the complementarities between Modes 1 and 3 in this sector.

The expected role of institutional quality in mitigating the pandemic-induced decline in services trade is only (weakly) observed for insurance services exports. In contrast, countries with above-median regulatory quality seem to have been associated with larger YoY declines in their travel services exports and in their imports of total commercial, transport, travel and ICT services, thus providing little support for SH5.

There is also mixed support for SH6 and SH7 in the reported results. Countries more integrated in GVCs were found to be associated with reduced services trade declines in transport and insurance exports and travel imports, albeit weakly; for construction services imports and for OBS and PCR exports, the association was reversed as expected, albeit at the 10% level of significance for the latter two. Similarly, countries more upstream in their position in GVCs seemed to have been associated with larger declines in their exports of OBS and imports of total commercial and ICT services, though the latter finding is only significant at the 10% level. Meanwhile, greater PTA-intensiveness was associated with alleviating the decline in OBS and PCR services exports and imports of construction services while for transport and construction services exports and imports of goods-related services, this relationship was reversed.

Finally, as expected, more digitally-trade-restrictive economies were found to be associated with larger declines in their total commercial and travel (weakly) services imports though the relationship was found to be reversed for imports of construction services. Thus, SH8 is also partly supported.

On the whole, the OLS results provide more evidence in support of the primary hypotheses in Section 4.1 than for the secondary hypotheses in Section 4.2.

6.1 Alternative estimator

Since the dependent variable in all estimating equations is the absolute value of the magnitude of the services trade decline, we also deployed the Poisson Pseudo-Maximum Likelihood (Silva and Tenreyro, 2006) as an alternative estimator. The PPML also accounts for heteroskedasticity-related concerns in estimation. The PPML results were found to be qualitatively similar to the OLS results and are available upon request.

6.2 Endogeneity

The decline in the value of services trade in 2020 is completely induced by the virus outbreak, which is an exogenous event. However, since the extent of the decline is found to be correlated with the ways in which services trade is transacted in different sectors and the sectoral composition of services trade in turn depends on the fundamental determinants of comparative advantage in services across countries, the relationship specified in equations (1) and (2) can still be subject to endogeneity-related concerns.

For instance, for the same level of COVID-19 incidence, tourism-intensive island economies are more likely to be adversely affected than hubs of IT-enabled services. Moreover, there may be unobserved factors like technological advancements that affect countries' sectoral composition of both merchandise and services trade and the shares of different modes of supply in their total services trade[12]. Some of these advancements may have even facilitated more rapid digitalization during the pandemic, thus having a mitigating influence on the services trade decline observed in 2020, though such advancements cannot be explicitly controlled for in the estimating equations[13]. This may lead to biases in the OLS estimates emanating from both omitted variables and simultaneity (Wooldridge, 2010).

To account for such endogeneity-related concerns in estimation and draw causal inference from analysis, we experimented with GMM (Arellano and Bond, 1991) specifications treating the COVID-19 incidence variable as exogenous and all other controls in equations (1) and (2) as endogenous; the modal shares in total services trade were not included in these estimations as what matters from an endogeneity perspective are the fundamental determinants of comparative advantage in services. The difference GMM estimates are reported in Tables 7 and 8 for services exports and imports, respectively. It turns out that the Sargan test for the validity of the over-identifying restrictions was rejected in the case of total commercial,

[12]Shepherd and Shingal (2021) provide case studies illustrating the fungibility between modes of supply, in particular, the increased move to Mode 1 during the pandemic.

[13]The use of quarterly-fixed effects can do so only partly, if at all.

OBS and PCR services exports and for insurance services imports. We thus refrain from discussing these results in the analysis below, though they are reported in Tables 7-8 for the sake of completeness.

<Insert Tables 7-8 here>

Significantly, the decline in the preceding quarter is found to reduce the magnitude of the decline in GRS and PCR services exports and imports of travel services, corroborating the stylized facts in Figure 1. The coefficients are precisely estimated for travel services imports and suggest that a 10 percentage point decline in the previous quarter reduces the decline in these imports by 1.7 percentage points in the next quarter, ceteris paribus and on average. In contrast, a 10 percentage point decline in transport services imports in the previous quarter is found to increase the decline in such imports in the following perod by 1.9 percentage points, ceteris paribus and on average.

In other results, a 10% rise in COVID-19 incidence leads to a 4.3[14] percentage point rise in the decline of construction services exports in below-sample-median countries. For imports of GRS, the effect is in the opposite direction, but weakly estimated. Meanwhile, the decline in merchandise imports is found to enhance that in services imports across sectors - total commercial, goods-related, transport and travel services (Table 8, columns 1-4). These results provide strong evidence for both PH5 and PH6, but only on the import side.

Economic size increases the decline in imports of PCR services by 19.6 percentage points, ceteris paribus and on average. This is the only evidence for the role of economic size in intensifying or mitigating the COVID-19-induced decline in services trade in the GMM results. Consistent with SH1, capital intensity is found to enhance the decline in exports of transport services by 4.7 percentage points as well as that in OBS imports (by 14.8 percentage points). For insurance services exports, however, the effect is reversed. While there is no evidence for the role of geographical remoteness in the GMM results on the export side, it is found to reduce the decline in imports of total commercial and transport services, thus supporting SH2 unlike in the OLS results. Meanwhile, regulatory quality is found to reduce the decline in travel services exports but enhance it in the case of GRS exports, thus, partly supporting SH5; there is no evidence in the GMM results either way on the import side.

Similar to the OLS results, there is somewhat more support for SH3 than SH4 in the GMM results as well. Internet access is found to reduce the YoY decline in transport services exports by 5.6 percentage points at the 1% level of significance, which is important given

[14]In a linear-log model, this is calculated as the coefficient estimate times 0.095.

that exports in this sector are largely transacted via Mode 1 (see Table 3). In contrast, the role of human capital in explaining the trade decline in all complex services is statistically indifferent from zero. The same is true of GVC-participation, with some weak evidence for enhancing the decline in transport services imports though upstreamness is found to enhance the decline in these exports by 5 percentage points.

In contrast to the role of GVCs, there is more evidence, albeit counter-intuitive, for that of PTA-intensiveness. The variable is found to enhance the decline in exports of insurance services (though at the 10% level) as well as that in GRS and PCR services imports (the latter again weakly), thereby negating SH7. Finally, restrictiveness of digital trade policies is found to enhance the decline in travel services imports by 6.4 percentage points. While one would have expected similar findings in the Mode 1-reliant sectors, the result still provides evidence in support of SH8 and alludes to the possible role of complementarities between different modes of supply in the GMM results.

7 Conclusion

The increasing servicification of economic activity (WTO, 2019) in countries across the world suggests that the revival of services trade is crucial for economic recovery in the aftermath of the pandemic. While this renders the implications of our findings salient for all countries, these are even more relevant for small vulnerable economies, least developed and developing countries as they have reported much larger percentage declines in the value of their services trade during 2020 compared to the OECD economies. At the same time, services trade has also been very important for them - according to WTO data, exports of commercial services alone witnessed a 108% rise for LDCs over 2010-2019 while global trade in commercial services grew by 54% in comparison. Even otherwise, a large body of evidence confirms the positive role of the services sector on productivity, growth, trade, investment, development and GVC-integration[15]. Assessing the implications of the pandemic for services trade thus assumes significance for policy design to reduce service link costs and overcome the economic and health challenges emanating from this crisis. Until the SARS-Cov-2 vaccine can effectively immunize people across the world, COVID-19 will continue to affect countries in multiple ways. It is thus imperative that countries undertake measures to ensure that adverse effects on services trade are mitigated and economic recovery expedited.

[15]See Francois and Hoekman, 2010 for an excellent early review and Arnold et al. 2011, 2016; Lodefalk, 2014; Beverelli et al. 2017; Hoekman and Shepherd, 2017; Fiorini and Hoekman, 2018 for more recent analysis.

Finally, note that the analysis presented in this paper is based on trade with the world as bilateral services trade data, including at the disaggregated sector-level, are not yet available for 2020. This leads to a small number of observations for empirical analysis, especially in the GMM estimations. It would thus be interesting to examine the sensitivity of our findings to dyadic analysis in a structured gravity framework in future work on this subject. That would also provide another dimension of causal inference to the estimation results, besides enabling the use of a larger effective sample.

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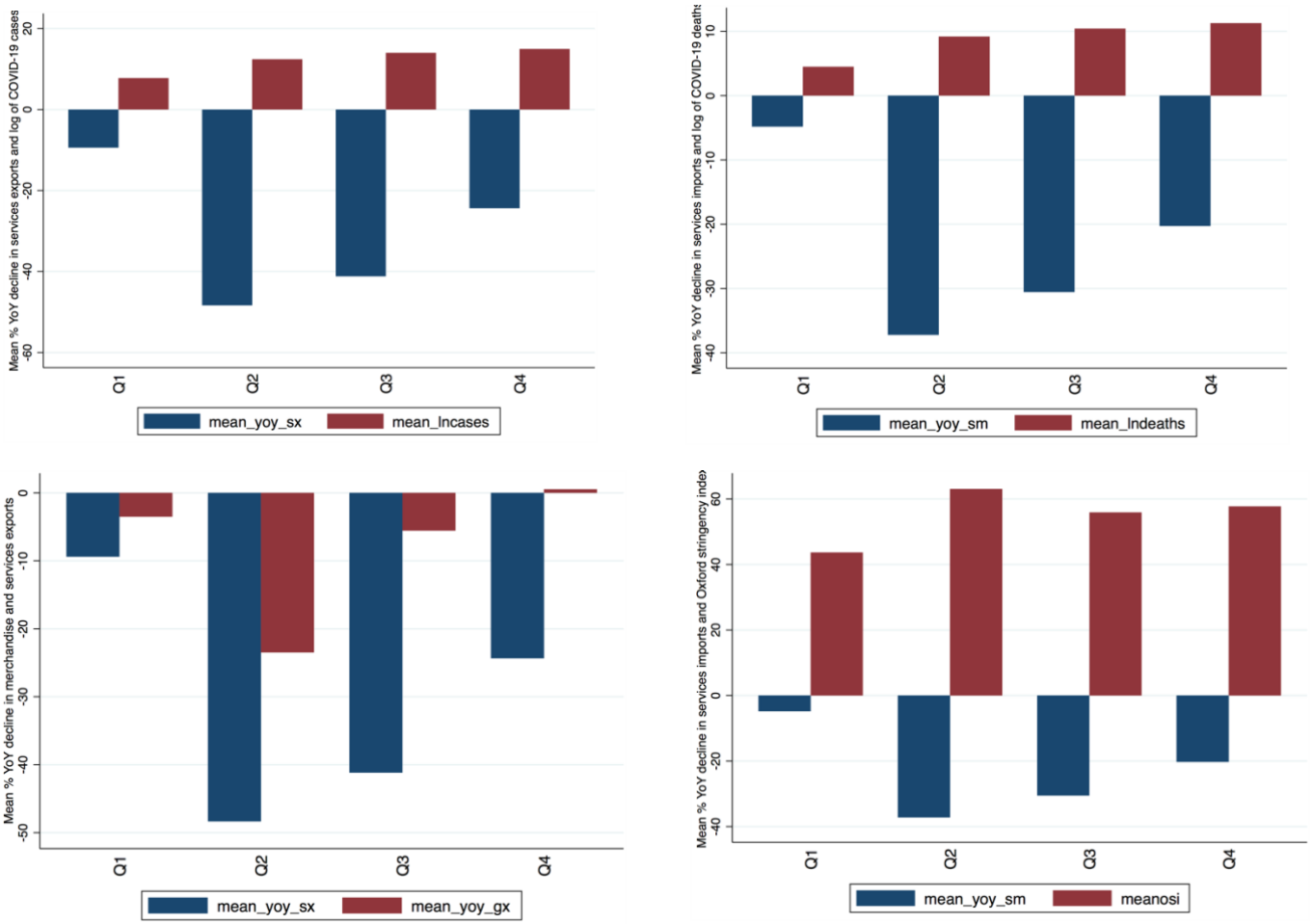
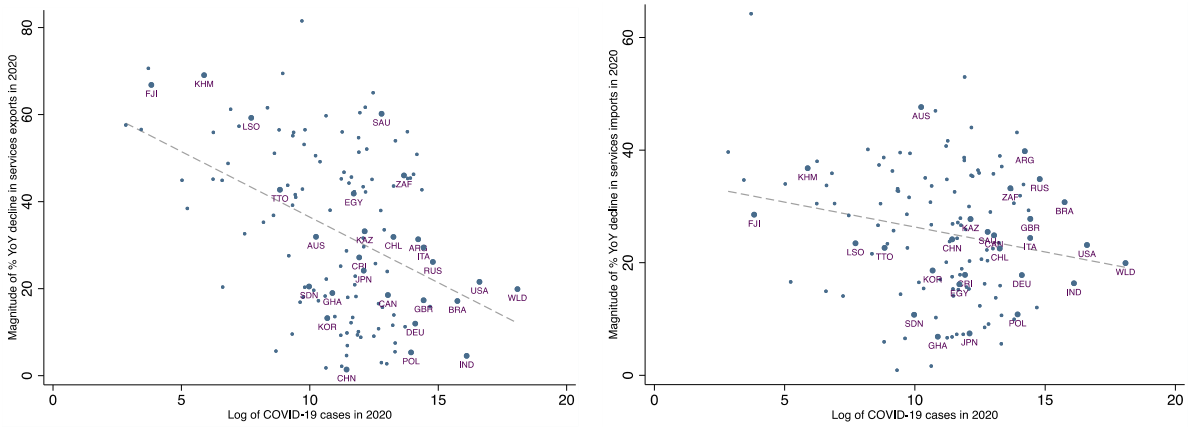
Figure 1: Evolution of decline in services trade and select covariates during 2020 by quarter



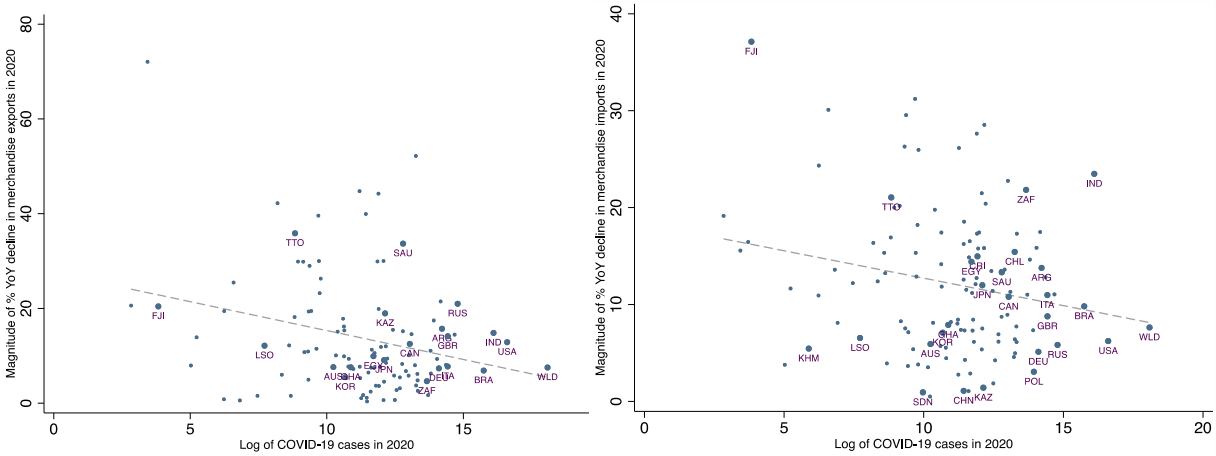
Source: WTO Trade and European Centre for Disease Prevention and Control Databases and Hale et al. (2020); own calculations

Figure 2: Countries with larger incidence of COVID-19 cases associated with smaller declines in services trade



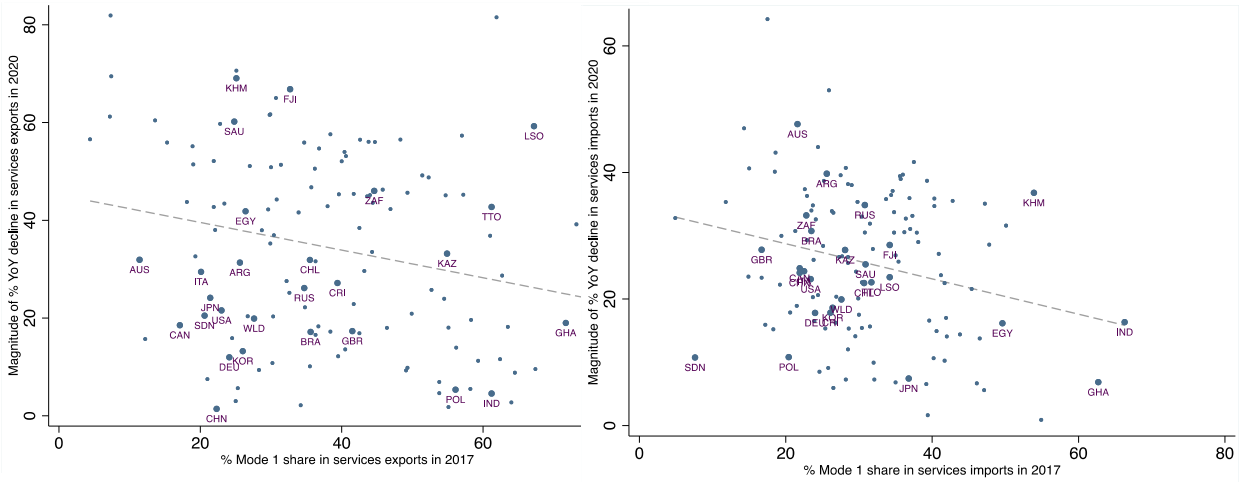
Source: WTO Services Trade and European Centre for Disease Prevention and Control Databases; own calculations

Figure 3: Countries with larger incidence of COVID-19 cases associated with smaller declines in merchandise trade



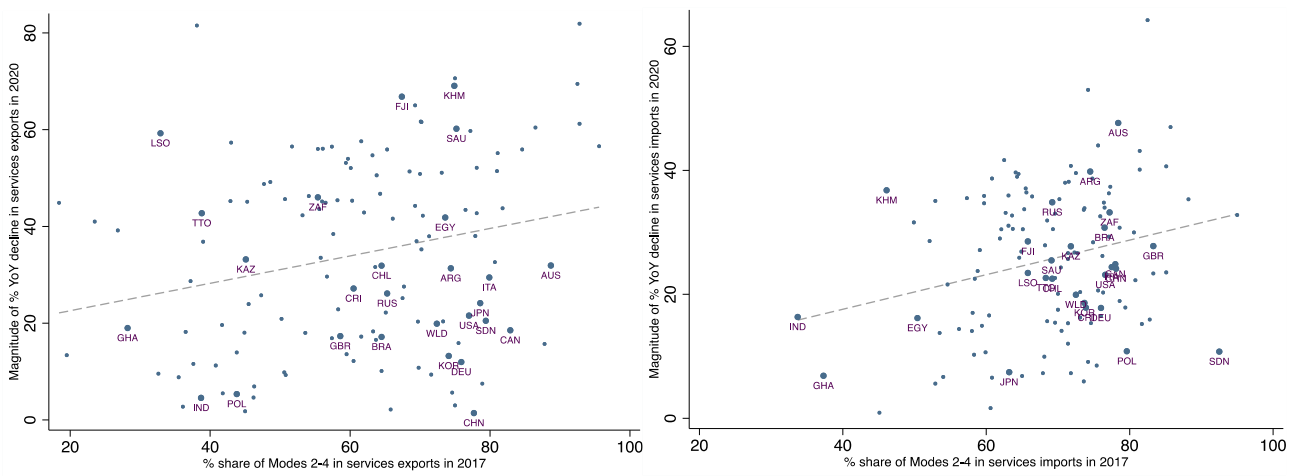
Source: WTO Services Trade and European Centre for Disease Prevention and Control Databases; own calculations

Figure 4: Countries with larger Mode 1 shares associated with smaller declines in services trade



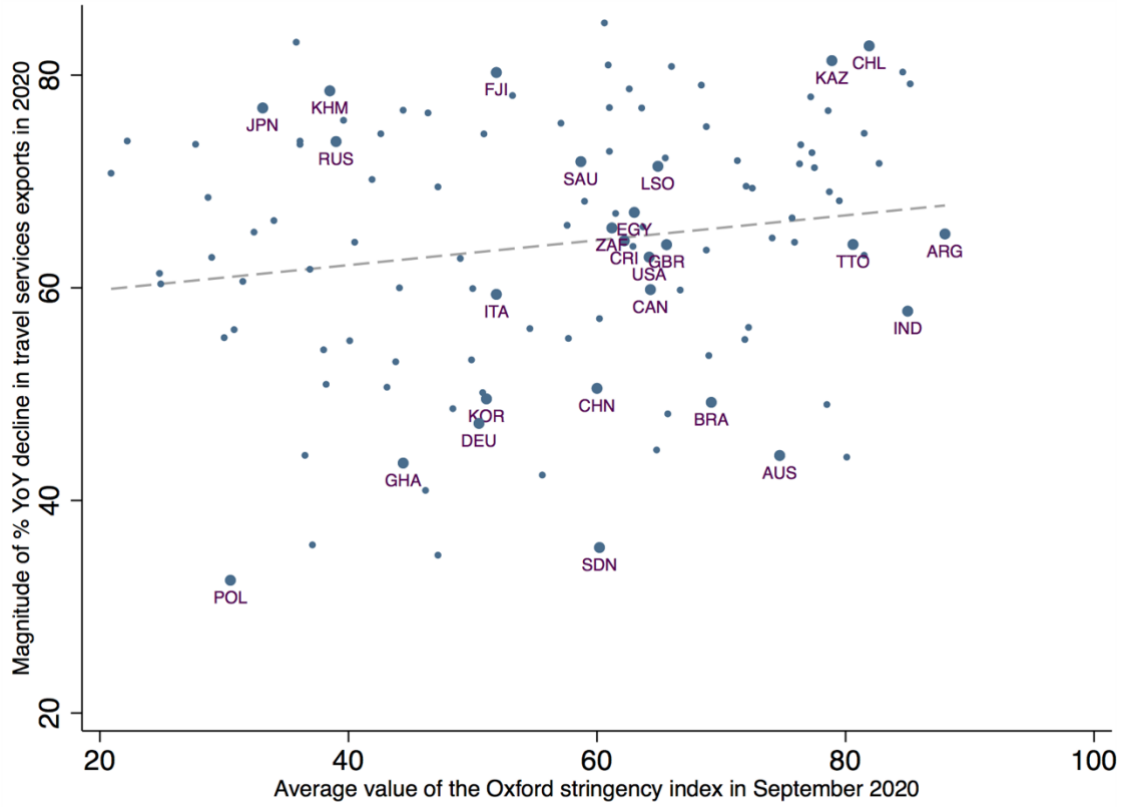
Source: WTO Services Trade and WTO TiSMoS Databases; own calculations

Figure 5: Countries with larger Mode 2-4 shares associated with larger declines in services trade



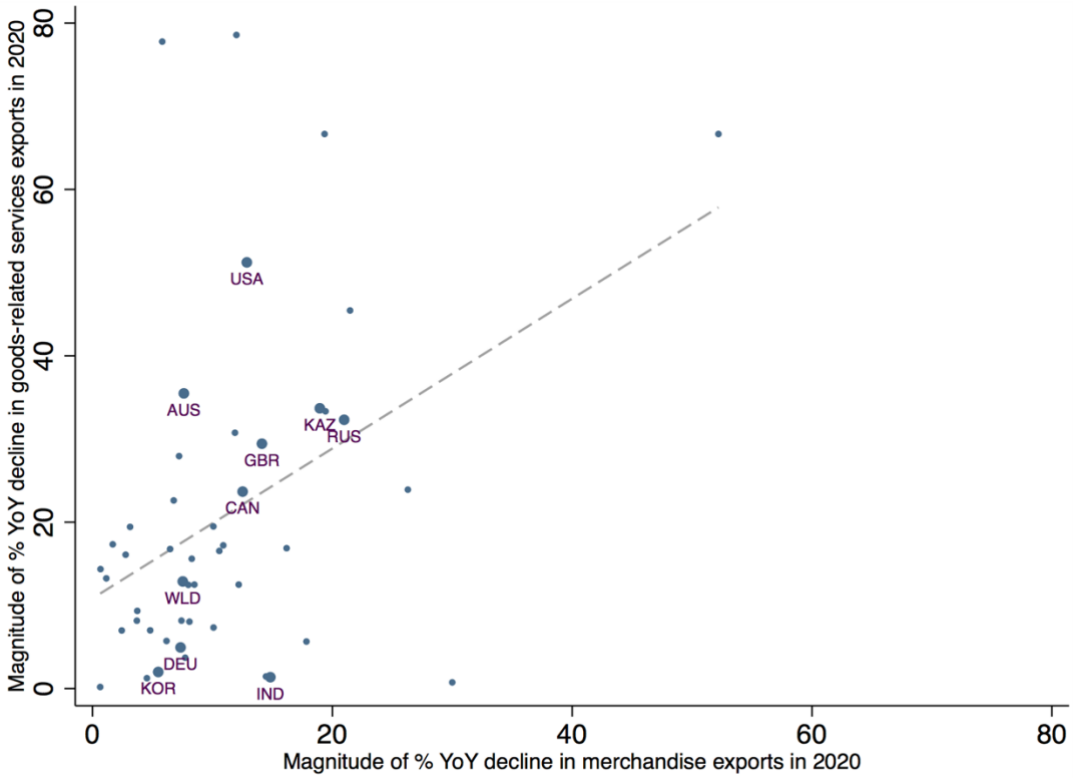
Source: WTO Services Trade and WTO TiSMoS Databases; own calculations

Figure 6: Countries with more stringent lockdowns associated with larger declines in travel services exports



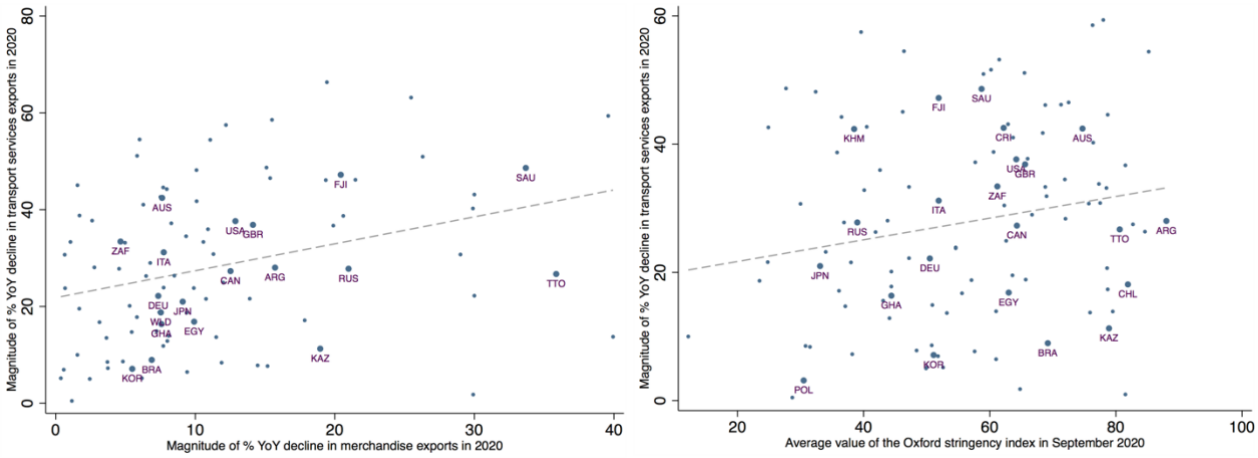
Source: WTO Services Trade Database and Hale et al.(2020); own calculations

Figure 7: Countries with larger declines in merchandise exports associated with larger declines in exports of goods-related services



Source: WTO Trade Database; own calculations

Figure 8: Countries with larger declines in merchandise exports and more stringent lockdowns associated with larger declines in exports of transport services



Source: WTO Trade Database and Hale et al. (2020); own calculations

Table 1: Heterogeneous decline in commercial services trade in 2020 relative to 2019

Sample averages	SX_2019 (USD mln)	SX_YoY (%)	SM_2019 (USD mln)	SM_YoY (%)
OECD	116192	-17.8	101414	-17.0
Non-OECD	16717	-24.2	19058	-25.2
Top 10 traders	332987	-13.8	315952	-17.5
Bottom 10 traders	188	-42.2	344	-27.2
(SX+SM)>$10 bln	75057	-19.2	71145	-19.6
(SX+SM)<$10 bln	1971	-41.3	1844	-28.1
Above- & below-median				
# of COVID-19 cases	150000	-30.1	137000	-25.3
	22400	-36.1	27000	-25.1
Nominal GDP	169000	-27.0	162000	-23.5
	4330	-38.9	2730	-26.8
Nominal GDP per capita	164000	-28.3	155000	-22.5
	9250	-37.6	9180	-27.8
Remoteness	118000	-34.6	108000	-25.8
	55600	-31.1	57000	-24.4
Merchandise trade	168000	-26.1	160000	-23.1
	5390	-39.8	3810	-27.1
Human capital index	181000	-27.9	170000	-21.7
	11900	-37.0	12500	-27.9
Networked readiness index	145000	-31.0	134000	-23.1
	11800	-35.2	11900	-27.0
GVC participation	134000	-29.2	126000	-22.9
	35800	-37.0	35400	-27.5
GVC position	124000	-34.8	119000	-27.7
	47100	-30.8	42700	-22.2
PTA-intensiveness	169000	-26.6	158000	-22.2
	3720	-39.3	6290	-28.0
Government effectiveness	162000	-29.9	152000	-22.3
	11500	-35.5	12600	-27.9
Digital trade restrictiveness	93000	-36.8	89600	-27.4
	70400	-23.1	63400	-19.2

Source: WTO Merchandise and Services Trade Databases; European Centre for Disease Prevention and Control; World Bank, World Development Indicators; World Economic Forum; EORA MRIO database; OECD-WTO BaTiS; Kaufmann et al. (2011); ECIPE; own calculations
Legend: SX = Services exports; SM = Services imports; YoY = Year on Year

Table 2: Disaggregated services trade and associated decline by geographical region (% share in total in 2019 and % YoY changes in 2020)

	Goods-related services				Other commercial services				Transport services				Travel services			
	Exports		Imports		Exports		Imports		Exports		Imports		Exports		Imports	
Region	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**	**Share (%)**	**YoY (%)**
AFR	2.0	-5.4	1.5	-14.4	21.9	-9.0	38.2	-11.2	24.6	-26.1	37.8	-20.6	49.9	-59.7	20.6	-47.3
CISWA	3.1	-10.7	1.0	-8.3	26.9	1.0	30.2	-3.5	31.9	-22.5	35.1	-18.6	38.2	-67.5	33.5	-61.4
EUR	5.2	-5.3	2.9	-9.7	45.3	-1.3	49.8	-0.2	22.6	-20.8	23.5	-17.2	26.4	-56.0	22.7	-54.4
LAC	8.1	32.3	1.7	-16.3	24.5	-2.6	41.6	-11.9	16.1	-27.4	31.7	-24.2	51.5	-67.8	24.7	-66.1
NAM	1.9	-25.0	1.1	-35.6	45.0	0.0	47.4	-3.6	11.3	-33.1	25.7	-29.8	42.8	-59.3	26.0	-67.8
PAC	0.3	-2.5	1.0	-26.5	26.7	-19.8	43.5	-14.3	15.1	-17.9	28.2	-27.6	57.8	-68.7	29.2	-55.6
SA	0.9	51.5	0.5	200.6	56.9	4.3	28.6	-13.9	18.0	-22.2	50.6	-17.4	24.5	-44.7	19.6	-58.2
SEA	3.3	-1.5	3.0	-16.3	34.7	-11.5	39.6	-12.1	19.1	-30.6	24.0	-23.9	43.7	-75.1	33.5	-65.1
WLD	**3.8**	**-12.9**	**2.8**	**-8.6**	**55.7**	**-2.3**	**53.4**	**-2.6**	**16.4**	**-18.8**	**20.7**	**-19.0**	**23.0**	**-63.2**	**24.1**	**-60.0**

Source: WTO Services Trade Database; own calculations

Note: The table reports average sectoral % shares in total commercial services exports and imports in the year 2019 and average % YoY changes in commercial services exports and imports by sector and geographical region. Declines in value exceeding those for the World are marked in red; rises in value exceeding global figures are marked in green. CISWA = CIS and West Asia; PAC = Australia, New Zealand and Oceania.

Table 3: Distribution of global services exports and imports by sector and mode of supply (% shares, 2017)

		Exports				Imports			
Sector code	**Description**	**M1**	**M2**	**M3**	**M4**	**M1**	**M2**	**M3**	**M4**
SA	Manufacturing	0	100	0	0	0	100	0	0
SB	Maintenance & repair	0	93	0	7	0	91	0	9
SC	Transport	47	16	37	0	51	16	33	0
SC1	*Sea*	*72*	*28*	*0*	*0*	*75*	*25*	*0*	*0*
SC2	*Air*	*77*	*23*	*0*	*0*	*77*	*23*	*0*	*0*

SC3	*Road*	*72*	*28*	*0*	*0*	*77*	*23*	*0*	*0*
SD	Travel	0	100	0	0	0	100	0	0
SDA	*Business Travel*	*0*	*100*	*0*	*0*	*0*	*100*	*0*	*0*
SDB1	*Health-related Travel*	*0*	*100*	*0*	*0*	*0*	*100*	*0*	*0*
SDB2	*Education-related Travel*	*0*	*100*	*0*	*0*	*0*	*100*	*0*	*0*
SDB3	*Other Personal Travel*	*0*	*100*	*0*	*0*	*0*	*100*	*0*	*0*
SE	Construction	0	0	92	8	0	0	92	8
SF	Insurance	100	0	0	0	100	0	0	0
SG	Finance	100	0	0	0	100	0	0	0
SH	IP charges	100	0	0	0	100	0	0	0
SI	ICT	82	0	0	18	80	0	0	20
SI1	*Communications*	*100*	*0*	*0*	*0*	*100*	*0*	*0*	*0*
SI2	*Computer*	*76*	*0*	*0*	*24*	*72*	*0*	*0*	*28*
SI3	*Information*	*100*	*0*	*0*	*0*	*100*	*0*	*0*	*0*
SJ	Other business	77	1	0	22	78	1	0	21
SJ1	*Research & development*	*71*	*0*	*0*	*29*	*76*	*0*	*0*	*24*
SJ2	*Professional & management consulting*	*78*	*0*	*0*	*22*	*75*	*0*	*0*	*25*
SJ3	*Tech, trade-related & other business*	*79*	*2*	*0*	*19*	*81*	*2*	*0*	*17*
SK	Personal, cultural & recreational	24	1	66	8	25	2	65	8
SK1	*Audio-visual*	*71*	*10*	*0*	*20*	*71*	*9*	*0*	*20*
SK21	*Health*	*76*	*0*	*0*	*24*	*74*	*0*	*0*	*26*
SK22	*Education*	*65*	*0*	*0*	*35*	*64*	*0*	*0*	*36*
SK23	*Heritage & recreation*	*10*	*0*	*86*	*3*	*10*	*0*	*87*	*3*
SK24	*Other personal*	*13*	*0*	*83*	*4*	*10*	*0*	*87*	*4*
SWSJ34	Distribution	28	0	72	0	30	0	70	0
SOXSW	**TOTAL**	28	10	59	3	28	10	60	3

Source: WTO TiSMoS Database; own calculations

Table 4: Baseline OLS estimates

VARIABLES	(1) Total	(2) GRS	(3) Transport	(4) Travel	(5) Construction	(6) Insurance	(7) Financial	(8) IP	(9) ICT	(10) OBS	(11) PCR
On exports:											
$\ln(COVID_{ct})$	1.735**	0.797	2.032	2.944***	1.803	4.763**	1.879**	3.171***	3.284	1.014	-0.670
	(0.681)	(1.516)	(1.429)	(0.846)	(2.046)	(2.336)	(0.756)	(0.480)	(2.046)	(0.705)	(1.246)
$YoY\_Goods^{X}_{ct}$	0.101*	0.100	0.206*	0.187	0.108	0.007	0.071	-0.088	-0.055	0.147***	-0.000
	(0.058)	(0.284)	(0.117)	(0.115)	(0.284)	(0.040)	(0.099)	(0.186)	(0.218)	(0.052)	(0.051)
Observations	246	143	233	249	116	99	110	96	109	141	149
R-squared	0.944	0.911	0.940	0.982	0.906	0.872	0.929	0.956	0.828	0.937	0.938
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
On imports:											
$\ln(COVID_{ct})$	2.074**	1.417**	0.554	1.846***	2.148	4.297***	2.528***	1.617	2.999*	1.589**	3.548***
	(0.837)	(0.586)	(0.477)	(0.512)	(2.221)	(1.449)	(0.878)	(1.668)	(1.601)	(0.790)	(1.255)
$YoY\_Goods^{M}_{ct}$	0.388***	0.206	0.431***	0.490***	0.511	-0.084	0.161	0.099	-0.653	0.135	-0.008
	(0.115)	(0.303)	(0.111)	(0.186)	(0.523)	(0.342)	(0.283)	(0.214)	(0.437)	(0.201)	(0.263)
Observations	246	156	246	250	111	121	120	134	91	149	137
R-squared	0.960	0.912	0.962	0.982	0.914	0.907	0.855	0.933	0.891	0.903	0.942
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

*Note: Dependent variable is the magnitude of the % YoY decline in total commercial services trade in column (1) and in sectoral services trade in columns (2)-(11) during the first three quarters of 2020, for exports in the top panel and for imports in the bottom panel. GRS = Goods-related services (manufacturing services + maintenance & repair); IP = Charges towards use of intellectual property; ICT = Communications, computer and information services; OBS = Other business services (R&D, professional, management consulting); PCR = Personal, cultural and recreational services (audio-visual, health, education). Standard errors, clustered by country-quarter, included in parentheses. Levels of significance: *10%, **5%, ***1%.*

Table 5: Explaining the heterogenous decline in services exports (OLS estimates)

VARIABLES	(1) Total	(2) GRS	(3) Transport	(4) Travel	(5) Construction	(6) Insurance	(7) Financial	(8) IP	(9) ICT	(10) OBS	(11) PCR
$YoY\_Goods^{X}_{ct}$	0.071	0.067	0.186*	0.202*	0.139	-0.128	0.056	-0.117	0.057	0.191***	0.097
	(0.070)	(0.322)	(0.107)	(0.111)	(0.333)	(0.139)	(0.108)	(0.215)	(0.176)	(0.069)	(0.097)
$\ln(COVID_{ct})$	1.422	1.365	0.837	6.249***	3.421	7.691**	1.491	0.757	-3.207	-5.752*	-6.976**
	(1.946)	(3.525)	(2.067)	(1.121)	(19.761)	(3.775)	(3.134)	(3.123)	(3.938)	(3.078)	(3.390)
$\ln(COVID_{ct})*D\_Share^{M1}_{c}$	-2.781***		0.648		0.800				0.852	3.653	8.491***
	(1.011)		(0.995)		(17.662)				(1.893)	(2.332)	(3.179)
$\ln(COVID_{ct})*D\_Share^{M2}_{c}$	0.509	0.544	-1.455*							1.062	2.636*
	(1.015)	(1.064)	(0.817)							(0.947)	(1.477)
$\ln(COVID_{ct})*D\_Share^{M3}_{c}$	1.099		1.191		1.632						4.023*
	(0.835)		(1.199)		(17.764)						(2.346)
$\ln(COVID_{ct})*D\_Share^{M4}_{c}$	-1.012				-4.098					3.312	-4.861*
	(0.732)				(17.825)					(2.525)	(2.908)
$\ln(COVID_{ct})*D\_GDP_{c}$	1.007	-2.465	-1.003	-1.583**	-2.742	-3.818*	1.419	-1.809	-2.011	-1.695	-3.014
	(1.030)	(1.701)	(0.854)	(0.783)	(2.901)	(2.260)	(1.301)	(2.399)	(1.788)	(1.189)	(2.218)
$\ln(COVID_{ct})*D\_KL_{c}$	-1.014	2.213	0.379	-0.152	0.026	2.764	3.352	7.567**	-1.586	0.916	-0.026
	(1.276)	(3.070)	(1.240)	(0.977)	(2.433)	(3.803)	(2.482)	(3.548)	(1.837)	(1.409)	(2.035)
$\ln(COVID_{ct})*D\_REM_{c}$	0.761	2.047*	1.036	0.133	2.877	3.262	1.552	0.088	1.193	0.840	1.850
	(0.659)	(1.046)	(0.736)	(0.638)	(1.869)	(1.966)	(1.231)	(1.554)	(1.459)	(0.865)	(1.188)
$\ln(COVID_{ct})*D\_REGQUAL_{c}$	1.448	-0.809	-1.320	1.593**	-2.125	-4.055*	0.944	2.963	1.010	2.132	2.616
	(1.073)	(2.536)	(1.372)	(0.730)	(4.509)	(2.230)	(1.834)	(2.276)	(1.204)	(1.600)	(1.948)
$\ln(COVID_{ct})*D\_HK_{c}$	-1.125	1.223	-0.942	-1.817**	0.557	0.522	1.285	-3.874*	-0.574	-1.281	-3.287
	(1.009)	(1.885)	(0.805)	(0.746)	(3.959)	(5.939)	(1.467)	(2.200)	(5.138)	(1.004)	(2.842)

$\ln(COVID_{ct})*D\_GVC_c$	0.319	-0.944	-2.699**	-1.057	-0.103	-4.374*	-0.003	1.025	-0.368	2.109*	3.594*
	(1.025)	(1.644)	(1.128)	(0.764)	(2.397)	(2.350)	(3.156)	(1.838)	(1.379)	(1.082)	(1.872)
$\ln(COVID_{ct})*D\_GVC^{POS}_c$	-0.302	0.575	0.077	-1.212	1.792	-4.246	-0.167	2.046	1.518	3.219***	1.969
	(0.950)	(1.217)	(0.830)	(0.787)	(2.577)	(2.772)	(2.642)	(1.657)	(1.415)	(1.194)	(1.996)
$\ln(COVID_{ct})*D\_SXshare^{PTA/Total}_c$	-1.040	-0.117	2.250**	-0.121	7.467*	-1.454	-3.314	0.883	-1.586	-2.988**	-4.336***
	(1.103)	(2.056)	(1.053)	(0.704)	(4.137)	(2.784)	(2.243)	(1.488)	(2.302)	(1.498)	(1.628)
$\ln(COVID_{ct})*D\_Internet_c$	0.980	-3.967	-1.053	1.075	-4.157**	-2.583	-0.427	-1.065	1.002	2.381*	1.807
	(1.038)	(2.656)	(1.152)	(0.960)	(1.984)	(2.449)	(1.707)	(2.364)	(2.406)	(1.240)	(2.913)
Observations	246	143	233	249	116	99	110	96	109	141	149
R-squared	0.959	0.927	0.951	0.985	0.929	0.920	0.947	0.967	0.931	0.962	0.951
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

*Note: Dependent variable is the magnitude of the % YoY decline in total commercial services exports in column (1) and in sectoral services exports in columns (2)-(11) during the first three quarters of 2020. GRS = Goods-related services (manufacturing services + maintenance & repair); IP = Charges towards use of intellectual property; ICT = Communications, computer and information services; OBS = Other business services (R&D, professional, management consulting); PCR = Personal, cultural and recreational services (audio-visual, health, education). KL = Capital intensity (capital-labour ratio). REM = Remoteness (Baldwin and Harrigan, 2011). REGQUAL = Regulatory quality index (World Governance Indicators, Kaufmann et al. 2010). HK = Human capital index; Internet = % internet usage (World Development Indicators). $SXshare^{PTA/Total}$ = Share of services exports covered in PTAs with deep provisions on services trade in total services exports. M1 = Mode 1; M2 = Mode 2; M3 = Mode 3; M4 = Mode 4. Standard errors, clustered by country-quarter, included in parentheses. Levels of significance: *10%, **5%, ***1%.*

Table 6: Explaining the heterogenous decline in services imports (OLS estimates)

VARIABLES	(1) Total	(2) GRS	(3) Transport	(4) Travel	(5) Construction	(6) Insurance	(7) Financial	(8) IP	(9) ICT	(10) OBS	(11) PCR
$YoY\_Goods^{M}_{ct}$	0.335***	0.329	0.396***	0.491**	0.265	0.140	0.191	0.108	-0.478	0.077	0.240
	(0.109)	(0.333)	(0.122)	(0.203)	(0.535)	(0.406)	(0.403)	(0.235)	(0.530)	(0.241)	(0.295)
$\ln(COVID_{ct})$	-0.657	10.592	-1.580	0.294	13.935	-1.276	-0.274	2.350	-4.275	6.669**	-10.907
	(1.221)	(7.620)	(1.330)	(1.667)	(23.235)	(2.986)	(3.757)	(2.296)	(4.336)	(2.855)	(48.850)
$\ln(COVID_{ct})*D\_Share^{M1}_{c}$	-0.452		0.648		29.945				5.055	-2.730*	49.875
	(0.576)		(0.667)		(22.399)				(5.367)	(1.393)	(44.689)
$\ln(COVID_{ct})*D\_Share^{M2}_{c}$	1.699***	-10.402	0.568							0.558	-1.331
	(0.636)	(6.397)	(0.558)							(1.238)	(1.501)
$\ln(COVID_{ct})*D\_Share^{M3}_{c}$	-0.065		1.222***		-14.578						12.231
	(0.452)		(0.431)		(21.721)						(46.792)
$\ln(COVID_{ct})*D\_Share^{M4}_{c}$	-0.708	-9.860			-10.718				7.239	-1.755	-35.302***
	(0.568)	(6.025)			(20.061)				(5.316)	(1.196)	(6.732)
$\ln(COVID_{ct})*D\_GDP_{c}$	-0.360	-0.893	0.384	0.337	-3.399	-1.638	1.249	-0.075	-3.244	-1.249	-0.558
	(0.536)	(1.750)	(0.597)	(0.776)	(3.120)	(1.718)	(2.801)	(1.249)	(2.030)	(1.672)	(1.469)
$\ln(COVID_{ct})*D\_KL_{c}$	-0.529	1.899	-0.593	-0.749	-0.619	1.009	-1.969	0.377	1.754	0.059	-3.290
	(0.871)	(2.254)	(0.405)	(0.842)	(3.602)	(2.098)	(2.357)	(1.537)	(3.111)	(1.875)	(2.536)
$\ln(COVID_{ct})*D\_REM_{c}$	-0.351	2.104	0.093	0.396	-0.107	2.143	0.358	-0.677	-0.035	-0.403	0.219
	(0.473)	(1.370)	(0.342)	(0.611)	(1.889)	(1.592)	(1.764)	(1.193)	(1.596)	(0.936)	(1.005)
$\ln(COVID_{ct})*D\_REGQUAL_{c}$	2.356***	-1.765	1.007**	2.823***	3.490	-1.827	-0.321	-2.223	3.189*	-0.739	1.850
	(0.660)	(2.065)	(0.473)	(0.743)	(3.183)	(1.123)	(1.598)	(1.574)	(1.899)	(1.751)	(1.894)
$\ln(COVID_{ct})*D\_HK_{c}$	-0.668	-1.798	-0.130	0.254	3.817	-1.920	-3.677**	-0.156	-4.756**	-0.004	2.889

	(0.592)	(1.885)	(0.467)	(0.776)	(3.309)	(1.661)	(1.768)	(1.168)	(1.895)	(2.239)	(1.925)
$\ln(COVID_{ct})*D\_GVC_c$	0.202	-2.353	-0.168	-1.630*	4.677**	-0.474	1.233	-0.318	2.338	0.409	1.245
	(0.576)	(1.724)	(0.532)	(0.840)	(2.198)	(1.890)	(2.464)	(2.091)	(2.278)	(1.497)	(1.591)
$\ln(COVID_{ct})*D\_GVC^{POS}_c$	1.147*	-0.494	0.522	-0.028	0.953	-0.111	-0.080	-0.420	3.608*	0.173	-1.179
	(0.593)	(1.889)	(0.617)	(0.818)	(2.995)	(2.102)	(2.155)	(1.958)	(2.097)	(1.256)	(1.548)
$\ln(COVID_{ct})*D\_SMshare^{PTA/Total}_c$	-0.119	4.382**	-0.502	0.111	-9.862***	2.161	-1.208	0.614	0.360	-1.486	-0.776
	(0.515)	(2.057)	(0.462)	(0.687)	(3.144)	(1.801)	(1.733)	(1.875)	(2.659)	(1.289)	(1.533)
$\ln(COVID_{ct})*D\_Internet_c$	-0.396	-0.260	-0.384	0.722	0.264	0.744	3.738*	-1.738	3.609	-0.516	0.948
	(0.660)	(2.151)	(0.373)	(0.791)	(3.128)	(2.039)	(1.917)	(1.258)	(3.884)	(1.399)	(1.840)
$\ln(COVID_{ct})*D\_DTRI_c$	1.250**	0.135	0.049	1.254*	-3.322**	0.672	-0.620	-1.470	-0.163	-1.296	1.312
	(0.509)	(1.558)	(0.539)	(0.704)	(1.574)	(1.945)	(1.300)	(1.244)	(2.342)	(1.372)	(1.578)
Observations	246	156	246	250	111	121	120	134	91	149	137
R-squared	0.971	0.927	0.969	0.985	0.953	0.938	0.884	0.945	0.939	0.920	0.958
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

*Note: Dependent variable is the magnitude of the % YoY decline in total commercial services imports in column (1) and in sectoral services imports in columns (2)-(11) during the first three quarters of 2020. GRS = Goods-related services (manufacturing services + maintenance & repair); IP = Charges towards use of intellectual property; ICT = Communications, computer and information services; OBS = Other business services (R&D, professional, management consulting); PCR = Personal, cultural and recreational services (audio-visual, health, education). KL = Capital intensity (capital-labour ratio). REM = Remoteness (Baldwin and Harrigan, 2011). REGQUAL = Regulatory quality index (World Governance Indicators, Kaufmann et al. 2010). HK = Human capital index; Internet = % internet usage (World Development Indicators). $SMshare^{PTA/Total}$ = Share of services imports covered in PTAs with deep provisions on services trade in total services imports. M1 = Mode 1; M2 = Mode 2; M3 = Mode 3; M4 = Mode 4. Standard errors, clustered by country-quarter, included in parentheses. Levels of significance: *10%, **5%, ***1%.*

Table 7: GMM results (services exports)

VARIABLES	(1) Total	(2) GRS	(3) Transport	(4) Travel	(5) Construction	(6) Insurance	(7) Financial	(8) IP	(9) ICT	(10) OBS	(11) PCR
LDV	0.012	-0.089*	-0.084	-0.142	-0.231	-0.050	0.068	-0.127	0.244	-0.431***	-0.105*
	(0.087)	(0.051)	(0.084)	(0.087)	(0.191)	(0.139)	(0.098)	(0.182)	(0.171)	(0.133)	(0.059)
$YoY\_Goods^{X}_{ct}$	0.337**	-0.010	0.113	0.597	0.009	1.344	0.388	-0.890	0.044	0.248	0.120
	(0.168)	(0.263)	(0.159)	(0.396)	(0.569)	(1.452)	(0.577)	(1.173)	(0.243)	(0.195)	(0.429)
$\ln(COVID_{ct})$	-6.895**	-6.129	-0.251	-0.576	45.361**	-21.131	-1.900	-24.100	4.974	-12.668	-16.836
	(3.358)	(10.662)	(3.076)	(4.881)	(21.447)	(42.045)	(16.841)	(108.379)	(7.547)	(7.902)	(10.960)
$\ln(COVID_{ct})*D\_GDP_{c}$	1.985	4.175	0.504	0.318	-27.325	17.613	-5.882	-18.480	6.229	-1.883	-24.654**
	(1.975)	(4.543)	(2.028)	(2.902)	(25.535)	(27.845)	(12.913)	(41.681)	(6.355)	(5.391)	(11.266)
$\ln(COVID_{ct})*D\_KL_{c}$	-0.121	-19.848	4.669**	2.247	-12.107	-32.112*	-7.623	3.742	0.431	5.533	12.213*
	(2.216)	(14.502)	(1.990)	(2.982)	(13.016)	(18.619)	(8.004)	(41.854)	(5.369)	(4.061)	(6.570)
$\ln(COVID_{ct})*D\_REM_{c}$	-0.379	-0.065	-0.799	0.612	-8.125	28.391	7.218	-3.240	-1.226	3.355	-8.017
	(1.634)	(3.581)	(1.681)	(2.274)	(9.092)	(17.491)	(8.113)	(36.688)	(4.231)	(3.632)	(6.561)
$\ln(COVID_{ct})*D\_REGQUAL_{c}$	0.232	26.496**	-5.128**	0.971	11.363	-6.435	6.939	-24.671	0.255	-4.889	-0.717
	(2.081)	(12.727)	(2.086)	(3.320)	(25.622)	(12.975)	(9.093)	(31.364)	(7.007)	(4.677)	(9.289)
$\ln(COVID_{ct})*D\_HK_{c}$	0.947	-9.310	0.810	0.675	-19.391	20.157	5.673	-4.962	4.404	0.799	-4.342
	(2.142)	(10.532)	(1.991)	(2.962)	(40.038)	(25.330)	(11.848)	(39.227)	(10.026)	(4.845)	(10.139)
$\ln(COVID_{ct})*D\_GVC_{c}$	3.370	0.385	-1.465	-1.089	6.909	9.497	13.400	11.998	-2.022	8.383**	6.240
	(2.174)	(6.549)	(1.985)	(3.128)	(12.108)	(15.437)	(12.386)	(44.281)	(5.200)	(4.192)	(8.655)
$\ln(COVID_{ct})*D\_GVC^{POS}_{c}$	5.145**	0.959	5.011**	6.095*	-6.490	14.235	5.079	42.037	-9.081	13.766***	46.396***
	(2.228)	(7.919)	(2.202)	(3.436)	(12.839)	(21.941)	(10.907)	(60.117)	(5.617)	(4.437)	(9.090)
$\ln(COVID_{ct})*D\_SXshare^{PTA/Total}_{c}$	-0.214	-7.652	0.747	3.055	-16.188	33.303*	-9.289	51.544	-2.914	8.061	18.660**
	(2.087)	(7.507)	(1.919)	(3.217)	(11.540)	(19.891)	(8.464)	(44.192)	(5.661)	(5.017)	(9.209)

$\ln(COVID_{ct})$*D_Internet$_c$	-1.075	12.223	-5.557***	-3.630	12.712	8.412	8.268	5.956	-5.545	1.704	7.089
	(2.259)	(13.092)	(1.942)	(2.930)	(20.862)	(16.913)	(10.257)	(52.416)	(10.110)	(4.382)	(7.111)
Observations	124	67	114	128	55	35	42	36	46	57	65
Sargan test statistics											
Chi-squared	41.4	25.6	28	22.3	9.7	3.4	8.6	3.9	2.6	18.9	23.5
p-value	0.0075	0.22	0.17	0.44	0.78	0.9	0.38	0.79	0.98	0.09	0.04

*Note: Dependent variable is the magnitude of the % YoY decline in total commercial services exports in column (1) and in sectoral services imports in columns (2)-(11) during the first three quarters of 2020. GRS = Goods-related services (manufacturing services + maintenance & repair); IP = Charges towards use of intellectual property; ICT = Communications, computer and information services; OBS = Other business services (R&D, professional, management consulting); PCR = Personal, cultural and recreational services (audio-visual, health, education). KL = Capital intensity (capital-labour ratio). REM = Remoteness (Baldwin and Harrigan, 2011). REGQUAL = Regulatory quality index (World Governance Indicators, Kaufmann et al. 2010). HK = Human capital index; Internet = % internet usage (World Development Indicators). SXshare$^{PTA/Total}$ = Share of services exports covered in PTAs with deep provisions on services trade in total services imports. LDV = Lagged dependent variable. Standard errors, clustered by country-quarter, included in parentheses. Levels of significance: *10%, **5%, ***1%.*

Table 8: GMM results (services imports)

VARIABLES	(1) Total	(2) GRS	(3) Transport	(4) Travel	(5) Construction	(6) Insurance	(7) Financial	(8) IP	(9) ICT	(10) OBS	(11) PCR
LDV	0.037	-0.048	0.190***	-0.172***	-0.380	0.032	0.226	-0.020	0.151	-0.059	-0.076
	(0.067)	(0.175)	(0.071)	(0.053)	(0.489)	(0.520)	(0.331)	(0.263)	(0.124)	(0.112)	(0.133)
$YoY\_Goods^{M}_{ct}$	0.565***	0.773*	0.766***	0.582**	-2.264	0.113	0.538	0.357	0.248	0.087	0.103
	(0.152)	(0.404)	(0.128)	(0.236)	(1.718)	(1.265)	(0.771)	(0.355)	(0.569)	(0.262)	(0.467)
$\ln(COVID_{ct})$	2.800	-24.543*	-4.524	-6.899	93.164	-54.672*	4.563	-8.509	-11.037	-7.396	-17.276
	(4.081)	(13.821)	(3.164)	(5.450)	(104.174)	(32.217)	(26.625)	(15.904)	(14.013)	(10.944)	(19.983)
$\ln(COVID_{ct})*D\_GDP_{c}$	1.373	5.668	1.511	-1.015	-70.095	1.931	-7.408	3.604	1.688	-0.648	19.649*
	(1.311)	(4.885)	(1.256)	(1.794)	(70.236)	(16.280)	(18.442)	(8.578)	(10.113)	(6.846)	(11.119)
$\ln(COVID_{ct})*D\_KL_{c}$	0.046	-2.443	0.470	2.848	-97.995	13.595	8.075	-2.010	10.660	14.851**	0.042
	(2.508)	(6.097)	(1.717)	(2.847)	(73.524)	(15.458)	(13.448)	(9.433)	(8.149)	(7.129)	(12.641)
$\ln(COVID_{ct})*D\_REM_{c}$	-3.007**	0.556	-1.992*	1.361	-11.172	11.207	-1.308	-5.179	0.386	-0.917	-0.820
	(1.241)	(3.495)	(1.067)	(1.674)	(21.205)	(13.362)	(11.197)	(5.578)	(6.964)	(3.619)	(6.153)
$\ln(COVID_{ct})*D\_REGQUAL_{c}$	1.575	-11.786	-0.424	3.755	146.505	-15.689	-16.314	-1.268	-1.374	-4.440	-5.204
	(2.197)	(7.334)	(1.698)	(2.852)	(111.772)	(12.536)	(12.092)	(8.338)	(13.093)	(5.455)	(9.706)
$\ln(COVID_{ct})*D\_HK_{c}$	0.542	8.862	2.864*	-0.100	-176.950	23.472	15.086	0.440	7.902	-3.969	5.916
	(2.139)	(7.831)	(1.609)	(2.766)	(117.360)	(28.259)	(17.301)	(11.660)	(13.118)	(5.627)	(9.604)
$\ln(COVID_{ct})*D\_GVC_{c}$	-2.247	4.761	2.642*	-1.856	10.981	13.375	16.129	3.173	6.720	5.288	-8.598
	(1.939)	(7.504)	(1.503)	(2.654)	(28.761)	(15.547)	(20.616)	(7.041)	(9.116)	(5.609)	(10.821)
$\ln(COVID_{ct})*D\_GVC^{POS}_{c}$	-2.642	9.215	0.954	3.541	17.948	32.927*	6.317	9.154	-0.270	10.796	-6.617
	(2.575)	(7.200)	(1.959)	(3.241)	(31.370)	(19.259)	(24.366)	(8.618)	(7.648)	(6.713)	(12.585)
$\ln(COVID_{ct})*D\_SMshare^{PTA/Total}_{c}$	-1.149	17.124**	0.235	4.442	-15.236	25.344	-5.162	10.937	11.561	2.770	18.510*
	(2.319)	(7.582)	(1.888)	(3.080)	(27.252)	(17.039)	(14.309)	(9.941)	(7.533)	(5.003)	(10.347)

$ln(COVID_{ct})$*$D\_Internet_c$	-1.698	8.037	-0.945	-0.878	83.529	0.600	-13.359	-1.094	-15.183	-2.807	-6.192
	(2.238)	(5.878)	(1.517)	(2.603)	(67.370)	(14.568)	(15.570)	(9.275)	(12.144)	(5.065)	(10.239)
$ln(COVID_{ct})$*D_DTRI_c	-0.339	7.671	1.164	6.395**	-25.690	15.532	11.549	3.277	5.684	-3.148	6.264
	(2.196)	(6.125)	(1.624)	(2.703)	(34.519)	(18.598)	(14.650)	(8.908)	(9.229)	(6.047)	(10.151)
Observations	129	81	125	130	48	49	45	48	35	58	60
Sargan test											
Chi-squared	31.2	25.7	16.8	21.5	3.1	25	8.9	13.3	9.2	18.7	18.1
p-value	0.15	0.37	0.86	0.61	0.99	0.01	0.35	0.15	0.33	0.10	0.15

*Note: Dependent variable is the magnitude of the % YoY decline in total commercial services imports in column (1) and in sectoral services imports in columns (2)-(11) during the first three quarters of 2020. GRS = Goods-related services (manufacturing services + maintenance & repair); IP = Charges towards use of intellectual property; ICT = Communications, computer and information services; OBS = Other business services (R&D, professional, management consulting); PCR = Personal, cultural and recreational services (audio-visual, health, education). KL = Capital intensity (capital-labour ratio). REM = Remoteness (Baldwin and Harrigan, 2011). REGQUAL = Regulatory quality index (World Governance Indicators, Kaufmann et al. 2010). HK = Human capital index; Internet = % internet usage (World Development Indicators). $SMshare^{PTA/Total}$ = Share of services imports covered in PTAs with deep provisions on services trade in total services imports. LDV = Lagged dependent variable. Standard errors, clustered by country-quarter, included in parentheses. Levels of significance: *10%, **5%, ***1%.*

Annex table 1: Decline in commercial services trade in 2020 relative to 2019 by country (value in USD million)

Country	ISO	OECD	SX_2019	SX_YoY (%)	SM_2019	SM_YoY (%)
United States	USA	Yes	853270	-21.6	564276	-23.1
China	CHN	No	282071	-1.4	497713	-24.1
Germany	DEU	Yes	346735	-12.0	373681	-17.8
United Kingdom	GBR	Yes	399589	-17.3	266756	-27.8
Ireland	IRL	Yes	247233	-2.2	331626	-6.7
France	Frau	Yes	293490	-15.9	269898	-12.0
Netherlands	NLD	Yes	273688	-7.5	265108	-10.6
Singapore	SGP	No	216873	-13.6	207969	-17.0
Japan	JPN	Yes	202793	-24.1	204315	-7.4
India	IND	No	214128	-4.6	178177	-16.3
Switzerland	CHE	Yes	129365	-15.7	122240	-9.1
Italy	ITA	Yes	120378	-29.4	121538	-24.4
Spain	ESP	Yes	156513	-42.7	85238	-29.3
Belgium	BEL	Yes	119279	-5.5	122471	-5.6
South Korea	KOR	Yes	102971	-13.2	128911	-18.6
Canada	CAN	Yes	103712	-18.5	120039	-24.9
Luxembourg	LUX	Yes	112709	-1.8	89283	-1.6
Hong Kong	HKG	No	101085	-37.0	78734	-35.3
Denmark	DNK	Yes	83146	-12.2	75848	-7.3
Russian Federation	RUS	No	60917	-26.1	97323	-34.8
Sweden	SWE	Yes	74752	-10.8	74485	-8.5
Australia	AUS	Yes	70104	-31.9	70853	-47.6
Austria	AUT	Yes	75759	-16.6	65196	-16.3
Thailand	THA	No	80784	-61.6	56563	-21.6
Poland	POL	Yes	69894	-5.3	43298	-10.8
Chinese Taipei	TWN	No	51475	-20.4	56289	-33.7
Brazil	BRA	No	33629	-17.2	67358	-30.7
Norway	NOR	Yes	43288	-18.3	52417	-30.7
Turkey	TUR	Yes	62810	-45.3	26860	-9.9
Israel	ISR	Yes	55325	-3.0	31850	-20.4
Malaysia	MYS	No	40905	-46.8	43366	-23.8
Saudi Arabia	SAU	No	23529	-60.2	55219	-25.5
Finland	FIN	Yes	35457	-17.2	37254	-15.4
Mexico	MEX	Yes	31525	-46.3	39702	-31.9
Indonesia	IDN	No	30911	-54.0	39203	-37.1
Philippines	PHL	No	41011	-23.9	27601	-35.8
Greece	GRC	Yes	44720	-42.3	21104	-17.9
Portugal	PRT	Yes	39278	-38.0	19803	-22.3
Czech Republic	CZE	Yes	30303	-13.9	25723	-15.9

Qatar	QAT	No	18336	-9.4	33648	-7.3
Hungary	HUN	Yes	29997	-25.8	21482	-20.6
Romania	ROU	No	30250	-11.6	20510	-23.5
Macao	MAC	No	43496	-81.9	4894	-40.6
Egypt	EGY	No	24253	-41.8	20415	-16.2
Nigeria	NGA	No	4486	-25.2	38452	-40.7
Kuwait	KWT	No	7480	-10.1	28650	-38.7
Viet Nam	VNM	No	16458	-57.3	18770	-14.1
Argentina	ARG	No	13942	-31.3	19151	-39.8
New Zealand	NZL	Yes	17288	-32.6	15490	-28.4
Ukraine	UKR	No	17154	-11.3	14904	-33.0
South Africa	ZAF	No	14373	-46.0	15300	-33.2
Iraq	IRQ	No	6991	-43.6	22662	-39.0
Malta	MLT	No	16508	-9.6	12582	-0.9
Morocco	MAR	No	18713	-33.5	9212	-29.0
Iran	IRN	No	10734	-45.4	14692	-43.1
Cyprus	CYP	No	14261	-16.9	9472	-6.6
Colombia	COL	Yes	9780	-50.9	13761	-33.9
Slovak Republic	SVK	Yes	12276	-18.2	10917	-18.9
Chile	CHL	Yes	9087	-31.9	14058	-22.5
Croatia	HRV	No	17135	-43.4	5573	-30.0
Lithuania	LTU	Yes	13183	-6.9	7687	-15.3
Ghana	GHA	No	9870	-19.0	10948	-6.9
Kazakhstan	KAZ	No	7504	-33.2	11338	-27.7
Panama	PAN	No	13817	-42.2	5001	-44.0
Peru	PER	No	7025	-56.1	10540	-30.6
Bulgaria	BGR	No	11385	-29.6	5943	-20.3
Slovenia	SVN	Yes	9546	-18.0	6355	-14.1
Belarus	BLR	No	9624	-8.8	5842	-15.7
Serbia	SRB	No	7745	-9.1	6569	-12.3
Pakistan	PAK	No	4567	-2.7	9438	-22.5
Sri Lanka	LKA	No	7453	-49.2	6542	-35.1
Estonia	EST	Yes	7984	-20.3	5739	9.0
Costa Rica	CRI	No	9567	-27.2	4013	-17.8
Dominican Republic	DOM	No	9031	-60.4	3721	-25.9
Algeria	DZA	No	3154	-4.6	9430	-17.5
Bangladesh	BGD	No	3178	8.6	9334	-13.8
Jordan	JOR	No	7718	-65.0	4710	-35.9
Azerbaijan	AZE	No	3727	-31.6	6303	-15.3
Ethiopia	ETH	No	4641	-13.4	5285	-15.2
Uruguay	URY	No	5206	-27.6	4615	-25.7
Latvia	LVA	Yes	6207	-19.6	3526	-16.5
Iceland	ISL	Yes	5655	-51.1	3547	-37.4

Cambodia	KHM	No	5854	-69.1	3238	-36.8
Angola	AGO	No	455	-81.5	8008	-28.6
Uzbekistan	UZB	No	3075	-45.2	5334	-34.8
Kenya	KEN	No	4583	-28.7	3546	-6.8
Ecuador	ECU	No	3205	-52.1	4054	-35.3
Tunisia	TUN	No	4211	-45.6	3025	-24.3
Guatemala	GTM	No	3525	-22.9	3569	-26.6
Jamaica	JAM	No	4305	-55.9	2568	-32.7
Georgia	GEO	No	4510	-61.7	2360	-35.5
Bahamas	BHS	No	4415	-69.5	1639	-23.4
Albania	ALB	No	3743	-38.0	2301	-47.0
Tanzania	TZA	No	4276	-45.2	1669	-30.5
Honduras	HND	No	2917	10.4	2388	-27.1
El Salvador	SLV	No	3104	-22.2	1977	-33.6
Mauritius	MUS	No	2944	-55.9	2113	-38.0
Armenia	ARM	No	2385	-51.4	2414	-53.0
Mongolia	MNG	No	1228	-48.8	3200	-35.9
Uganda	UGA	No	1752	-50.6	2653	2.0
Bolivia	BOL	No	1415	-54.7	2817	-38.2
Mozambique	MOZ	No	931	-18.0	2785	6.0
Aruba	ABW	No	2395	-51.4	1008	-26.2
North Macedonia	MKD	No	1821	-9.3	1414	-20.1
Nepal	NPL	No	1512	-45.1	1677	-36.4
Bosnia and Herzegovina	BIH	No	2343	-44.3	758	-32.6
Moldova	MDA	No	1512	-20.9	1161	-27.9
Sudan	SDN	No	1352	-20.5	1301	-10.8
Trinidad and Tobago	TTO	No	791	-42.7	1855	-22.6
Montenegro	MNE	No	1895	-59.7	744	-26.7
Zambia	ZMB	No	1012	-56.5	1474	-39.4
Madagascar	MDG	No	1449	-53.1	1022	-31.6
Laos	LAO	No	1178	-70.6	1241	-64.2
Brunei Darussalam	BRN	No	599	-44.9	1777	-34.0
Fiji	FJI	No	1510	-66.8	778	-28.5
Curaçao	CUW	No	1350	-35.3	855	-40.1
Paraguay	PRY	No	967	-9.8	1212	-26.9
Kyrgyz Republic	KGZ	No	1080	-56.0	1006	-41.7
Nicaragua	NIC	No	1256	-5.7	797	-30.5
Papua New Guinea	PNG	No	352	-44.9	1648	-14.9
Botswana	BWA	No	858	-41.6	1054	-39.6
Seychelles	SYC	No	1111	-38.4	669	-16.6
Afghanistan	AFG	No	504	18.5	1160	-10.3
Rwanda	RWA	No	747	-56.5	910	-38.7
Saint Martin	MAF	No	907	-54.2	308	-45.1

Namibia	NAM	No	646	-42.9	539	-22.6
Cabo Verde	CPV	No	709	-55.1	350	-33.1
Zimbabwe	ZWE	No	411	-39.2	619	-32.8
Suriname	SUR	No	152	-36.8	807	-26.6
Belize	BLZ	No	624	-43.8	248	-36.3
Tajikistan	TJK	No	239	-41.0	479	-14.4
Lesotho	LSO	No	27	-59.3	401	-23.4
Timor-Leste	TLS	No	76	-56.6	320	-34.7
Solomon Islands	SLB	No	125	-57.6	232	-39.7
Eswatini	SWZ	No	86	4.7	168	-6.0
Tonga	TON	No	94	-52.1	103	-31.1
Sao Tomé and Principe	STP	No	49	-61.2	59	-30.5
World	**WLD**		**6129480**	**-19.9**	**5834350**	**-19.9**

Source: WTO Services Trade Database; own calculations
Note: The countries in the table are arranged in the descending order of the value of commercial services trade (exports plus imports) in the year 2019. Declines in value exceeding 20% are marked in red; rises in value exceeding 5% are marked in green.
Legend: SX = Services exports; SM = Services imports; YoY = Year on Year

Annex table 2: Composition of services trade and associated decline by country (% share in total in 2019 and % YoY changes in 2020)

	Goods-related services				Other commercial services				Transport services				Travel services			
	Exports		Imports		Exports		Imports		Exports		Imports		Exports		Imports	
ISO code	Share (%)	YoY (%)	Share (%)	YoY (%)	Share (%)	YoY (%)	Share (%)	YoY (%)	Share (%)	YoY (%)	Share (%)	YoY (%)	Share (%)	YoY (%)	Share (%)	YoY (%)
ABW	0.0	0.0	0.0	0.0	7.5	15.0	47.0	-15.2	5.0	-51.6	14.0	-25.2	87.5	-57.1	40.0	-39.1
AFG	0.0	0.0	1.7	-75.0	66.0	37.2	7.4	-9.0	22.0	-18.7	76.7	0.2	14.4	-9.7	10.8	-76.7
AGO	0.0	0.0	1.4	-47.6	8.5	15.4	53.8	-28.9	7.0	-59.4	38.8	-33.2	82.6	-93.5	5.9	9.0
ALB	13.8	-3.7	0.1	0.0	17.0	-4.6	12.2	0.0	7.3	-23.9	10.9	-18.0	62.2	-56.2	78.3	-58.6
ARG	0.9	50.4	1.8	-29.9	47.9	-7.4	37.4	-7.8	13.6	-28.0	20.5	-41.9	37.1	-65.1	41.6	-68.1
ARM	1.3	0.0	0.5	-7.7	22.9	-3.3	11.3	-8.3	11.3	-13.5	27.1	-25.7	62.5	-76.5	62.5	-73.3
AUS	0.0	-35.5	1.2	-52.6	27.1	1.0	29.6	0.8	7.9	-42.4	18.3	-30.7	65.7	-44.2	50.7	-82.0
AUT	3.6	0.1	6.3	-7.4	42.1	-5.2	47.7	-3.9	23.7	-14.7	27.7	-13.0	30.3	-35.8	18.5	-58.0
AZE	0.4	92.9	1.0	-71.9	21.9	-11.9	49.2	14.7	29.7	27.3	23.8	-10.1	48.6	-78.0	27.0	-72.0
BEL	3.8	-5.7	3.7	-3.4	67.5	-4.2	60.8	-0.3	20.8	-5.2	21.7	-7.6	7.4	-17.9	15.8	-23.8
BGD	4.7	388.2	0.3	1337.5	62.5	-10.4	29.0	-22.8	19.4	10.1	61.3	-10.1	12.2	-44.1	9.9	-57.2
BGR	4.4	-1.2	1.9	-3.5	39.1	-1.9	40.7	-7.5	20.9	-27.8	27.1	-18.8	39.1	-61.7	30.5	-39.8
BHS	0.0	0.0	0.0	0.0	4.8	-1.4	53.8	-0.8	1.9	-40.2	27.5	-31.2	93.2	-73.5	21.3	-70.7
BIH	13.9	-16.8	0.7	60.0	15.7	-8.5	25.0	4.8	20.9	-26.3	38.2	-30.0	52.2	-70.2	36.8	-62.5
BLR	5.0	-30.8	2.2	-14.3	43.8	4.3	44.8	-6.3	41.7	-8.4	32.8	-5.5	9.4	-60.6	19.0	-55.3
BLZ	0.0	0.0	0.0	0.0	13.7	15.3	56.0	-42.3	4.7	3.4	24.8	-4.8	82.3	-56.3	17.6	-61.4
BOL	0.9	191.7	10.7	-43.8	10.7	-24.3	30.0	-8.9	32.9	-36.7	26.8	-35.8	57.1	-74.5	33.2	-64.7
BRA	1.5	142.1	0.5	-42.2	64.7	-14.0	56.7	-11.8	16.5	-9.0	16.4	-33.8	17.6	-49.2	26.9	-69.3
BRN	0.0	0.0	5.2	-33.3	18.3	-47.6	46.7	-34.9	46.7	-44.2	12.8	-32.9	36.7	-44.2	33.9	-33.3
CAN	2.3	-23.7	0.7	-42.3	59.0	3.2	49.2	2.0	14.0	-27.3	20.0	-28.6	28.0	-59.8	30.0	-66.2
CHE	5.2	-19.2	2.4	-9.0	68.5	-8.5	72.5	0.0	11.5	-15.6	11.7	-12.6	13.8	-50.6	15.8	-48.6
CHL	0.0	0.0	0.0	0.0	40.7	-10.5	47.9	-10.7	33.0	-18.1	35.0	-11.2	26.4	-82.8	17.1	-78.4
CHN	10.7	-15.7	0.8	-3.6	60.7	3.8	28.0	7.3	16.4	25.2	20.0	-9.7	12.5	-50.5	50.0	-47.7

COL	0.2	-45.5	0.5	-21.9	21.4	0.6	39.3	-4.2	20.4	-46.2	22.9	-27.9	58.2	-72.0	35.7	-70.9
CPV	0.4	-66.7	2.3	-25.0	6.9	2.0	40.0	-20.9	21.1	-46.1	34.3	-37.3	70.4	-63.5	24.3	-48.2
CRI	2.3	62.3	0.1	0.0	50.0	1.1	47.5	6.4	5.2	-42.5	30.0	-16.0	41.7	-64.4	23.8	-67.8
CUW	13.6	19.3	4.1	-48.6	29.3	-13.8	40.7	-13.3	3.9	-13.0	15.1	-35.7	50.0	-64.0	39.5	-68.6
CYP	0.7	0.0	0.7	0.0	52.1	9.1	57.9	11.8	25.7	-13.7	24.2	-21.7	22.9	-78.1	16.8	-47.6
CZE	10.3	-9.3	4.2	-17.0	43.3	2.2	50.0	-7.8	23.3	-7.2	23.1	-7.6	24.3	-50.9	22.7	-41.9
DEU	6.6	-4.9	5.1	-6.8	60.0	-2.4	51.4	-2.4	20.0	-22.2	18.9	-12.2	12.0	-47.2	25.1	-56.0
DNK	1.3	-7.0	2.6	23.1	34.9	-10.6	38.2	1.9	54.2	-5.0	46.1	-4.7	10.8	-53.2	13.2	-48.8
DOM	0.6	25.5	0.0	0.0	9.2	-2.2	37.8	-9.1	7.6	-44.6	45.9	-22.9	83.3	-69.0	16.8	-71.6
DZA	0.0	0.0	3.3	0.0	75.0	0.7	54.3	-5.7	20.6	-13.7	36.2	-22.8	3.4	-64.3	6.8	-69.0
ECU	0.0	0.0	0.0	0.0	9.7	10.5	29.3	-5.7	19.4	-6.5	39.0	-30.3	71.9	-72.8	29.3	-71.7
EGY	0.0	0.0	0.0	0.0	11.3	1.0	41.5	-13.8	35.4	-16.9	43.0	-9.0	54.2	-67.1	17.5	-39.1
ESP	3.4	-8.0	1.6	-11.8	0.0		0.0		11.9	-13.9	14.1	-18.0	50.0	-76.9	32.9	-68.6
EST	6.5	-13.4	3.9	-22.9	42.5	4.1	36.8	86.4	28.8	-23.2	31.6	-18.1	21.3	-66.3	28.1	-59.6
ETH	0.0	0.0	0.0	0.0	7.0	-4.7	24.5	7.2	76.1	-17.4	62.3	-15.2	17.0	1.3	12.3	-60.2
FIN	8.0	-19.5	5.9	6.9	68.6	-2.9	62.2	-1.0	14.6	-48.2	18.4	-22.8	10.6	-65.2	15.4	-72.5
FJI	0.8	0.0	0.6	-40.0	3.5	-18.9	26.9	-3.3	32.0	-47.2	51.3	-30.7	64.0	-80.2	21.8	-55.2
FRA	7.6	-1.5	7.4	-6.9	55.2	-7.2	55.6	-0.9	16.2	-7.8	19.3	-12.1	22.1	-48.6	19.3	-45.3
GBR	2.1	-29.4	1.2	-32.6	75.0	-6.3	59.3	-7.5	9.5	-36.9	13.0	-39.4	13.3	-64.1	26.7	-66.4
GEO	0.3	-78.6	0.3	-14.3	4.9	24.1	17.5	-5.2	22.2	-24.9	54.2	-29.4	73.3	-78.7	27.5	-66.8
GHA	5.6	0.0	2.8	0.0	74.7	-14.7	72.7	-5.9	5.1	-16.4	21.8	-8.6	14.1	-43.5	3.0	-18.0
GRC	0.4	-8.2	2.3	-22.8	10.9	0.9	22.9	0.6	42.2	-18.8	61.9	-11.7	44.4	-75.5	14.8	-71.8
GTM	18.0	43.4	0.2	-16.7	34.3	-3.6	33.3	-6.0	13.7	-20.7	44.4	-18.2	34.3	-76.7	22.5	-72.7
HKG	0.4	-36.9	12.7	-17.0	42.0	-4.4	30.4	-4.7	30.0	-30.4	22.8	-19.3	29.0	-90.3	34.2	-80.1
HND	62.1	43.9	0.4	0.0	15.2	-10.8	29.2	-3.7	5.2	-30.8	50.0	-21.6	19.0	-71.3	20.8	-73.1
HRV	3.2	-0.2	2.5	-6.6	20.0	-14.9	51.8	-16.2	8.2	-30.7	14.1	-18.7	70.6	-55.3	32.1	-59.3
HUN	9.0	-16.1	4.1	-12.2	43.3	-10.6	61.9	-14.4	25.0	-28.1	24.8	-18.6	24.3	-53.0	12.9	-56.0
IDN	2.4	4.8	1.4	-42.1	30.0	-16.8	41.0	-3.7	12.9	-37.7	30.8	-36.8	54.8	-80.8	28.2	-83.6

IND	0.2	-1.4	0.7	-32.5	76.2	4.9	47.8	-2.0	10.0	0.7	37.8	-24.3	14.8	-57.8	12.8	-45.8
IRL	1.1	7.4	2.2	10.0	92.0	1.5	93.9	-5.5	3.6	-53.2	1.1	-10.4	2.6	-67.0	2.5	-66.8
IRQ	0.0	-66.7	0.2	-74.1	40.0	-13.2	21.3	-16.0	9.3	-28.4	29.1	-15.5	51.4	-69.6	47.8	-63.6
ISL	1.0	-12.5	4.6	-47.5	22.8	5.8	34.3	-2.4	28.1	-57.5	19.4	-33.5	47.4	-75.8	42.9	-65.6
ISR	0.0	0.0	0.0	0.0	78.2	8.5	50.0	13.0	7.8	-7.7	24.7	-28.2	13.8	-65.9	25.6	-77.4
ITA	5.6	4.6	4.1	-1.1	40.8	-3.4	50.0	-2.9	12.5	-31.2	21.7	-32.6	41.7	-59.4	25.0	-63.9
JAM	0.0	0.0	0.0	0.0	11.2	12.6	53.8	-32.1	5.3	-30.7	35.8	-25.2	83.7	-66.6	10.8	-60.6
JOR	0.0	0.0	0.0	0.0	6.0	-19.2	13.8	0.0	19.5	-51.1	55.3	-24.7	75.3	-72.2	31.9	-72.0
JPN	1.0	17.5	5.5	7.0	65.0	-6.5	70.0	4.5	13.0	-21.0	17.0	-18.2	23.0	-76.9	10.5	-74.5
KAZ	2.5	-33.7	5.2	-9.4	11.7	2.8	50.0	-16.7	53.3	-11.3	22.7	-8.4	33.3	-81.4	25.5	-71.1
KEN	0.0	0.0	0.0	0.0	0.0		0.0		47.8	-31.9	40.0	-16.4	21.7	-53.6	5.7	-50.5
KGZ	0.0	0.0	0.0	0.0	15.5	-19.2	16.0	-17.4	24.5	-33.3	45.0	-24.0	58.2	-75.2	39.0	-72.1
KHM	0.0	0.0	0.0	0.0	5.1	12.9	20.0	-15.1	13.4	-42.4	53.1	-21.0	81.4	-78.5	28.4	-81.4
KOR	2.6	-2.0	8.5	-13.4	52.0	-2.5	43.8	-0.4	27.0	-7.1	22.3	-20.1	21.0	-49.5	25.4	-50.6
KWT	0.0	0.0	0.0	0.0	74.7	-3.6	29.7	-15.3	16.0	-18.9	14.5	-19.6	9.3	-48.1	55.2	-56.4
LAO	0.0	0.0	0.0	0.0	6.4	-49.4	7.2	-55.8	14.2	-62.9	12.5	-44.8	78.3	-73.8	83.3	-67.9
LKA	0.0	0.0	0.0	0.0	20.0	8.2	21.5	-12.9	30.7	-48.7	53.8	-33.1	48.0	-73.5	24.6	-58.3
LSO	0.0	0.0	0.0	0.0	18.5	0.0	15.8	-11.1	3.7	-100.0	14.0	-17.9	77.8	-71.4	70.0	-27.6
LTU	6.2	-13.3	3.0	-14.0	23.8	8.3	29.9	0.5	60.0	-0.5	49.4	-5.4	11.5	-68.5	18.2	-68.4
LUX	0.2	-16.9	5.6	-5.6	90.9	-1.2	84.3	-0.3	5.1	0.7	6.9	-1.6	5.2	-13.9	4.0	-24.5
LVA	1.5	18.5	1.9	-23.1	43.5	3.9	45.7	6.4	38.7	-32.8	31.4	-22.5	16.1	-55.0	21.4	-57.9
MAC	0.0	0.0	0.0	0.0	6.5	-32.2	53.1	-25.5	1.6	-86.1	9.2	-33.6	93.0	-85.3	36.7	-64.2
MAF	0.0	0.0	0.0	0.0	18.7	-21.0	67.7	-36.1	6.4	-41.4	11.3	-37.1	74.7	-63.5	21.6	-74.6
MAR	10.5	-22.6	0.9	-40.0	25.8	2.6	28.3	-15.9	19.5	-29.0	46.7	-24.2	43.2	-59.8	23.9	-53.9
MDA	18.0	-16.5	1.7	-20.0	29.3	0.7	28.3	-18.3	27.3	-33.3	35.0	-26.1	26.7	-34.8	32.5	-38.6
MDG	3.3	-23.9	0.4	-75.0	16.4	-14.3	33.0	-21.8	30.0	-50.9	51.0	-27.8	53.6	-68.1	18.0	-59.3
MEX	0.0	0.0	1.1	-41.6	12.5	-0.6	37.5	-14.6	9.1	-34.5	37.5	-27.4	78.1	-55.1	24.8	-63.8
MKD	16.7	5.6	0.4	-16.7	37.2	1.8	51.4	-12.4	25.6	-11.8	28.6	-14.1	22.2	-36.4	20.0	-47.9

MLT	0.9	-17.2	0.5	-35.3	76.5	2.3	84.6	4.1	7.1	-36.0	5.8	-23.8	11.2	-74.5	4.1	-70.0
MNE	0.2	66.7	1.4	-50.0	14.2	7.0	47.3	-25.5	21.1	-23.8	44.6	-23.3	63.2	-86.4	7.8	-48.3
MNG	0.3	33.3	0.2	-57.1	26.7	-27.9	40.6	-32.6	32.5	-6.9	30.6	-41.8	42.5	-94.2	29.1	-33.8
MOZ	0.0	0.0	0.0	0.0	0.0		75.0	12.7	64.5	3.3	22.5	-14.1	26.9	-64.7	3.4	-5.3
MUS	0.1	-33.3	4.0	-57.1	26.6	-9.1	38.1	-13.0	13.8	-66.3	29.0	-38.5	62.1	-73.8	29.5	-66.9
MYS	8.3	1.2	1.6	-15.7	29.3	-2.4	44.2	-4.9	12.7	-38.8	25.6	-15.0	48.8	-84.9	27.9	-61.0
NAM	20.0	-0.7	5.6	-36.7	8.5	-10.9	55.6	-17.2	16.9	-43.1	25.9	-26.5	53.8	-63.9	14.3	-32.5
NGA	0.0	0.0	0.1	0.0	24.4	-0.1	47.4	-33.0	44.4	2.3	18.2	-15.8	31.1	-81.0	36.8	-63.8
NIC	35.4	49.6	0.0	0.0	17.7	12.0	27.5	-15.4	4.6	-10.0	48.8	-21.6	40.0	-61.7	22.5	-67.4
NLD	4.1	-7.0	3.6	-4.6	74.1	-3.0	74.1	-5.5	17.4	-8.6	14.1	-7.3	7.4	-50.1	8.1	-63.8
NOR	2.6	-5.7	2.1	-10.5	41.9	-2.5	44.2	-3.9	41.9	-17.1	23.1	-18.6	13.7	-73.5	32.7	-77.9
NPL	0.0	0.0	0.0	0.0	47.3	-16.9	21.2	-25.8	7.3	-58.6	36.5	-12.6	46.7	-71.7	41.2	-62.6
NZL	1.2	17.8	2.2	-42.9	24.7	-7.8	49.3	-1.2	13.5	-45.0	22.0	-37.0	64.7	-40.9	29.3	-66.7
PAK	0.2	-77.8	0.5	-26.7	69.6	2.8	44.7	-10.8	18.5	-17.8	37.2	-24.2	10.7	-11.3	18.1	-48.5
PAN	0.1	-12.5	0.1	-57.1	15.7	-15.4	32.0	-19.3	50.7	-26.4	38.0	-44.3	32.1	-80.3	28.0	-72.3
PER	0.0	0.0	0.0	0.0	28.6	-12.4	41.8	-10.8	22.9	-54.4	29.1	-20.5	54.3	-79.2	25.5	-73.7
PHL	11.0	-7.3	0.6	-45.6	58.5	-2.3	35.7	-12.2	7.1	-41.7	18.2	-21.1	23.9	-79.1	42.9	-62.1
PNG	0.0	0.0	0.0	0.0	94.3	-43.6	68.8	-10.5	5.4	-63.2	29.4	-19.4	0.6	-100.0	6.9	-40.0
POL	9.3	0.3	3.7	-12.5	44.3	4.2	53.5	-2.3	27.1	-3.2	21.2	-7.6	20.0	-32.5	21.4	-35.3
PRT	2.8	-15.6	3.0	-14.4	23.6	-2.8	42.5	-3.7	21.3	-37.2	24.0	-31.2	53.8	-55.2	29.5	-42.5
PRY	23.7	59.7	0.1	0.0	4.8	17.0	10.0	-3.3	32.0	-1.0	62.5	-16.7	39.2	-63.1	28.3	-57.8
QAT	0.0	0.0	0.0	0.0	12.2	40.7	29.4	2.2	61.1	-1.8	41.2	8.1	30.0	-44.7	27.9	-40.1
ROU	12.7	-12.5	2.5	-16.5	46.7	1.8	47.1	-6.4	29.7	-12.9	19.5	-27.1	12.0	-60.0	28.6	-50.1
RUS	5.1	-32.3	2.2	-5.2	42.6	-4.3	45.4	-5.5	34.4	-27.8	15.5	-24.9	18.0	-73.8	37.1	-76.3
RWA	0.0	0.0	4.5	-34.1	10.1	-22.4	8.9	3.7	28.0	-33.8	49.5	-25.1	61.3	-72.7	37.4	-67.3
SAU	0.0	0.0	0.0	0.0	10.0	-2.1	40.0	-12.1	19.6	-48.6	32.7	-22.4	66.7	-71.9	27.3	-48.9
SDN	6.4	-12.2	0.8	-9.1	4.0	19.6	26.9	-35.2	27.9	3.9	71.5	-1.1	58.6	-35.6	0.8	-54.5
SGP	3.5	-27.9	2.9	-8.6	59.1	-2.3	52.4	-2.2	28.2	-14.9	31.0	-18.5	9.1	-74.5	12.9	-75.1

SLB	0.0	0.0	1.3	0.0	16.9	4.5	52.2	-33.9	23.8	-38.7	22.2	-33.3	54.6	-83.1	27.0	-56.5
SLV	26.8	54.7	7.0	-47.5	15.5	-1.9	32.0	-9.5	15.8	-46.5	34.5	-23.6	41.9	-69.4	25.0	-74.2
SRB	5.2	-14.4	2.6	-28.5	55.8	1.6	43.9	6.2	19.5	-23.8	24.2	-15.5	20.8	-22.4	27.3	-38.3
STP	0.0	0.0	0.0	0.0	10.2	-20.0	37.3	-27.3	0.0	0.0	32.2	-5.3	89.8	-65.9	30.5	-61.1
SUR	0.0	0.0	12.3	-45.2	40.0	-13.3	63.0	-28.3	26.7	-27.5	13.6	2.8	35.3	-71.7	10.7	-31.0
SVK	7.5	-8.2	2.9	11.7	40.0	-1.6	45.5	-6.3	28.3	-8.5	28.2	-15.3	26.7	-56.1	23.6	-51.2
SVN	3.2	11.2	1.9	-4.9	35.8	7.1	50.0	4.2	29.5	-5.2	20.3	-3.5	32.6	-59.9	26.6	-58.4
SWE	2.7	-19.4	2.8	-11.1	72.0	-4.0	62.2	4.7	13.2	-16.7	16.2	-19.1	12.3	-42.4	18.9	-41.9
SWZ	2.3	0.0	10.0	-5.9	79.1	8.8	54.1	-2.2	1.2	0.0	16.5	-10.7	16.3	-14.3	18.8	-18.8
SYC	0.0	0.0	0.0	0.0	32.7	-8.6	58.2	-8.0	14.5	-21.6	31.3	-23.5	53.6	-61.4	10.0	-44.8
THA	0.0	0.0	0.0	0.0	17.3	-0.7	43.9	-4.1	8.9	-54.5	33.3	-9.0	74.1	-76.4	21.1	-76.7
TJK	9.6	-26.1	1.3	-33.3	4.2	-10.0	17.7	-22.4	79.2	-42.7	79.2	-12.3	5.8	-64.3	1.0	-40.0
TLS	0.0	0.0	0.0	0.0	2.6	-50.0	50.0	-37.5	3.9	133.3	21.3	-17.6	92.1	-62.9	28.8	-41.3
TON	0.0	0.0	2.0	-50.0	18.1	-23.5	28.0	-14.3	19.1	-22.2	33.0	-24.2	62.8	-69.5	40.0	-47.5
TTO	0.0	0.0	0.0	0.0	24.1	-7.8	63.2	-20.8	20.3	-26.7	30.5	-24.0	55.7	-64.1	4.5	-66.3
TUN	0.0	0.0	0.0	0.0	22.6	-16.5	27.7	-16.1	26.2	-42.6	46.7	-9.1	50.0	-60.4	28.3	-56.6
TUR	2.4	3.9	3.1	-11.1	11.6	13.9	44.4	12.2	38.1	-41.0	35.6	-10.5	47.6	-65.7	15.2	-74.7
TWN	9.0	10.4	5.0	-15.6	43.1	5.1	37.5	3.4	21.6	4.7	21.4	-16.2	27.5	-87.2	37.5	-84.6
TZA	0.0	0.0	0.0	0.0	7.4	-33.9	21.2	20.2	32.6	1.4	38.8	-16.2	60.5	-70.8	38.2	-72.8
UGA	0.0	0.0	0.0	0.0	21.1	-13.3	33.7	42.1	10.6	-13.9	55.6	-13.3	66.7	-68.2	7.4	-63.8
UKR	11.2	-17.3	0.6	-27.6	43.5	11.8	25.3	-8.9	37.1	-19.5	16.7	-27.2	9.4	-76.9	56.7	-45.5
URY	0.7	57.9	1.1	-21.6	46.2	-5.3	47.8	-0.9	10.0	-21.6	23.9	-27.6	42.3	-54.2	26.1	-69.6
USA	3.3	-51.2	1.4	-23.0	63.5	-2.6	55.4	1.9	10.7	-37.6	19.6	-33.4	22.4	-62.9	23.2	-73.4
UZB	0.7	13.0	0.3	138.9	10.3	-2.2	9.2	48.2	41.9	-20.1	47.2	-27.5	48.4	-76.7	43.4	-61.5
ZAF	0.3	25.0	0.0	-25.0	27.1	-10.9	37.3	-14.8	15.0	-33.4	43.3	-32.4	60.0	-65.6	20.7	-67.8
ZMB	0.0	0.0	1.6	20.8	15.0	-40.7	22.0	-37.7	4.3	7.0	54.7	-39.0	82.0	-62.8	20.0	-47.0
ZWE	0.2	0.0	0.6	-25.0	14.1	-36.2	46.8	-26.5	48.8	-33.2	21.0	-31.1	36.6	-49.0	30.6	-43.4
WLD	**3.8**	**-12.9**	**2.8**	**-8.6**	**55.7**	**-2.3**	**53.4**	**-2.6**	**16.4**	**-18.8**	**20.7**	**-19.0**	**23.0**	**-63.2**	**24.1**	**-60.0**

Source: WTO Services Trade Database; own calculations
Note: The table reports sectoral % shares in total commercial services exports and imports in the year 2019 and % YoY changes in commercial services exports and imports by sector. Declines in value exceeding 20%, 40% and 70% in goods-related and other commercial services; transport; and travel services, respectively, are marked in red; rises in value exceeding 10% in goods-related and other commercial services, and 5% in transport services are marked in green.

Annex table 3: Variable names, descriptions, data sources and summary statistics

Dependent variables	Description	Source	Obs.	Mean	Std. Dev.	Min	Max
$YoY\_SX^{Tot}_{ct}$	% YoY decline in total commercial services exports	WTO Trade Database	496	-31.5	29.2	-95.3	75.3
$YoY\_SX^{GRS}_{ct}$	% YoY decline in goods-related services exports	WTO Trade Database	307	-0.2	73.5	-87.9	700.0
$YoY\_SX^{Trans}_{ct}$	% YoY decline in transport services exports	WTO Trade Database	469	-25.1	30.4	-97.0	150.0
$YoY\_SX^{Tvl}_{ct}$	% YoY decline in travel services exports	WTO Trade Database	466	-56.6	35.1	-99.8	56.8
$YoY\_SX^{Cons}_{ct}$	% YoY decline in construction services exports	WTO Trade Database	278	4.4	113.9	-94.4	1250.0
$YoY\_SX^{Ins}_{ct}$	% YoY decline in insurance services exports	WTO Trade Database	300	2.8	42.6	-197.8	264.4
$YoY\_SX^{Fin}_{ct}$	% YoY decline in financial services exports	WTO Trade Database	336	13.8	74.9	-83.3	700.0
$YoY\_SX^{IP}_{ct}$	% YoY decline in IP services exports	WTO Trade Database	238	2.6	54.9	-133.3	500.0
$YoY\_SX^{ICT}_{ct}$	% YoY decline in ICT services exports	WTO Trade Database	379	3.8	34.8	-84.5	325.0
$YoY\_SX^{OBS}_{ct}$	% YoY decline in other business services exports	WTO Trade Database	369	3.9	77.1	-83.3	1114.3
$YoY\_SX^{PCR}_{ct}$	% YoY decline in personal, cultural and recreational services exports	WTO Trade Database	277	-12.5	51.1	-92.3	400.0
$YoY\_SM^{Tot}_{ct}$	% YoY decline in total commercial services imports	WTO Trade Database	495	-23.4	22.1	-86.6	80.0
$YoY\_SM^{GRS}_{ct}$	% YoY decline in goods-related services imports	WTO Trade Database	341	9.3	304.7	-95.6	4880.0
$YoY\_SM^{Trans}_{ct}$	% YoY decline in transport services imports	WTO Trade Database	487	-20.4	19.9	-87.2	76.0
$YoY\_SM^{Tvl}_{ct}$	% YoY decline in travel services imports	WTO Trade Database	477	-52.1	36.1	-99.1	163.9
$YoY\_SM^{Cons}_{ct}$	% YoY decline in construction services imports	WTO Trade Database	298	-1.4	72.3	-96.8	600.0
$YoY\_SM^{Ins}_{ct}$	% YoY decline in insurance services imports	WTO Trade Database	381	2.5	49.4	-99.3	566.7
$YoY\_SM^{Fin}_{ct}$	% YoY decline in financial services imports	WTO Trade Database	359	6.2	55.9	-87.8	500.0
$YoY\_SM^{IP}_{ct}$	% YoY decline in IP services imports	WTO Trade Database	325	2.4	79.2	-88.9	962.5

$YoY\_SM^{ICT}_{ct}$	% YoY decline in ICT services imports	WTO Trade Database	383	5.8	50.2	-86.5	700.0
$YoY\_SM^{OBS}_{ct}$	% YoY decline in other business services imports	WTO Trade Database	391	-6.1	29.0	-85.1	167.5
$YoY\_SM^{PCR}_{ct}$	% YoY decline in personal, cultural and recreational services imports	WTO Trade Database	280	-16.4	31.1	-85.7	100.0
Control variables	**Description**		**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
$COVID_{ct}$	Number of COVID-19 cases (millions)	ECDC; Hale et al. (2020)	585	12.8	68.6	0.0	1120.0
$COVID^{D}_{ct}$	Number of COVID-19 deaths (thousands)	ECDC; Hale et al. (2020)	585	395.4	1716.6	0.0	24000.0
$YoY\_Goods^{X}_{ct}$	Decline in goods exports	WTO Trade Database	373	-8.0	20.9	-68.6	237.4
$YoY\_Goods^{M}_{ct}$	Decline in goods imports	WTO Trade Database	369	-10.6	13.2	-57.1	19.3
OSI_{ct}	Stringency index	Hale et al. (2020)	524	55.1	17.9	4.8	97.2
GDP_{c}	Economic size (GDP in USD billion)	WDI	540	583.0	2060.0	0.4	19500.0
KL_{c}	Capital intensity (USD per labour)	WDI	484	7806.7	9293.6	183.7	44942.3
HK_{c}	Human capital index	WDI	492	0.6	0.1	0.3	0.9
ICT_{c}	Internet usage (%, population)	WDI	528	60.8	25.1	7.5	98.3
$REGQUAL_{c}$	Regulatory quality	WGI, Kaufmann et al. (2010)	540	0.2	0.9	-1.6	2.2
GE_{c}	Government effectiveness	WGI, Kaufmann et al. (2010)	540	0.2	0.9	-1.4	2.2
REM_{c}	Geographical remoteness (logged)	WDI, Head et al. (2010)	540	18.9	20.0		22.4
GVC_{c}	GVC participation	EORA-MRIO	520	0.4	0.1	0.2	0.8
GVC^{POS}_{c}	GVC position	EORA-MRIO	520	0.0	0.1	-0.4	0.3
$SXshare^{PTA/Total}_{c}$	PTA-intensiveness (exports)	OECD-WTO BaTiS; Hofmann et al. (2019)	544	37.4	34.4	0.0	96.5
$SMshare^{PTA/Total}_{c}$	PTA-intensiveness (imports)	OECD-WTO BaTiS; Hofmann et al. (2019)	521	39.5	34.2	0.5	94.6
$DTRI_{c}$	Digital trade restrictiveness	ECIPE	256	0.2	0.1	0.1	0.7

Note: ECDC = European Centre for Disease Prevention and Control; WDI = World Development Indicators, World Bank; WGI = World Governance Indicators, World Bank.