

IV. The direct effects of the COVID-19 pandemic on exports across the euro area

By Eric Meyermans

This section examines the direct impact of the lockdown measures to contain the spread of the COVID-19 virus on the exports of goods and services of the euro area Member States. A first look at the data suggests that the initial drop in aggregate exports from the euro area to the rest of the world was sharper during the pandemic than during the global financial crisis, but that it also showed a faster rebound. Furthermore, the exports of services were harder hit than the exports of goods especially at the onset of the crisis. This is in strong contrast with the global financial crisis, when the share of services in total exports increased strongly on impact. Focusing on the lockdown measures affecting social interactions, business operations, people crossing borders and logistical support infrastructure, the econometric analysis suggests that the lockdown measures had a significant direct negative impact on exports, but with their impact on goods exports on average only about two thirds of the impact on services exports. This analysis also suggests that the impact of the lockdown measures weakened over time suggesting that economic agents learned with each new wave of infections. For the export of services, the strongest negative direct impact of the lockdown measures is recorded for Spain and Portugal, followed by Italy and Greece, which are all Member States with an important tourism sector. For the exports of goods, the strongest negative impact is recorded for Italy, Portugal, France and Spain. The estimates also suggest that vaccination had a significant positive impact on the recovery of the export of services ⁽¹²²⁾.

IV.1. Introduction

Following the outbreak of the COVID-19 pandemic ('the pandemic'), total exports declined sharply across the euro area during the first quarter of 2020. For the euro area as a whole, total exports were down by more than 20% in the second quarter (compared with the same quarter in 2019). At the same time, Member States recorded strong differences, with Spain recording the largest decrease at almost 40%, but Ireland recorded a modest rise at almost 4%.

Although the overall economic and health situation remained highly uncertain, by the end of 2020 goods exports started already to show signs of recovery while services exports remained subdued. At the same time, the exports of services experienced a very strong shift in its composition, away from contact-intensive services such as travel. This shift persisted for as long as the roll-out of COVID-19 vaccines had not become effective, allowing for a relaxation of the lockdown measures.

Across the euro area, Member States' exports were also severely affected, with the countries showing a high share of contact-intensive services recording

the sharpest decreases. While it is too early to draw conclusions on whether any of these developments will have long-term effects, this section presents a quantitative analysis of developments in exports during the pandemic and their drivers. It is organised as follows.

The second subsection describes developments in exports during the pandemic and compares them with developments during the global financial crisis. While total exports were severely affected during both periods, exports of services were much harder hit than that of goods during the pandemic, while the reverse occurred during the global financial crisis.

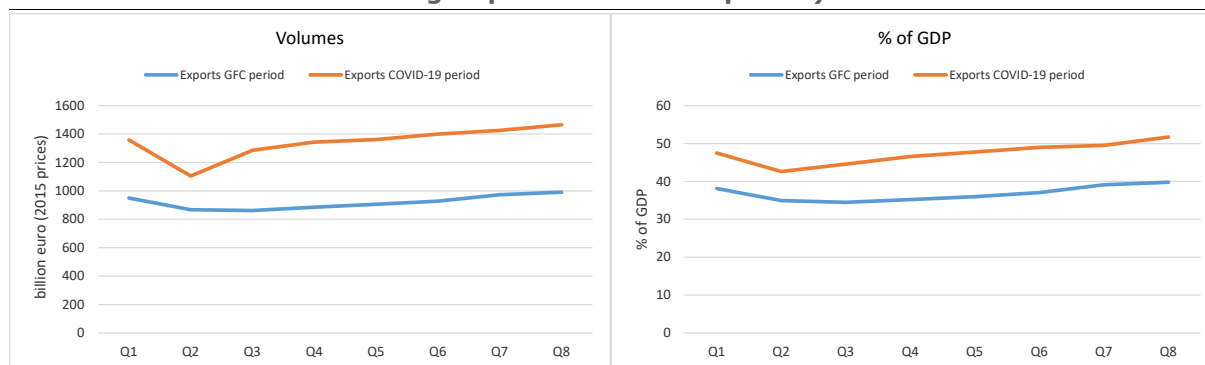
The third subsection briefly reviews some pandemic-specific factors that affected exports such as the measures to confine the spread of the COVID-19 virus and rising freight costs for international shipping ⁽¹²³⁾.

The fourth subsection assesses the significance and magnitude of the direct impact of the lockdown measures on Member States' total exports of goods

⁽¹²²⁾ The author wishes to thank Goran Vuksic for useful comments. This section represents the author's views and not necessarily those of the European Commission.

⁽¹²³⁾ UNCTAD (2021), *High freight rates cast a shadow over economic recovery* argues that during the pandemic these rising freight costs were caused by a surging demand for maritime transport services following strong rises in working from home and online shopping, and on the supply side by container shortages and global port congestion.

Graph IV.1: Euro area total exports – global financial crisis and COVID-19 pandemic (first eight quarters of each episode)



(1) Q1 of the global financial crisis (GFC) period refers to the fourth quarter of 2008, Q1 of the COVID-19 period refers to the first quarter of 2020.

Source: Eurostat National Accounts.

and services⁽¹²⁴⁾. More specifically, the empirical analysis assesses differences in the responsiveness of exports to the lockdown measures across the euro-area Member States, over time and between various types of lockdown measures.

The fifth subsection examines the impact of the lockdown measures on the product composition of exports of goods and services⁽¹²⁵⁾, which allows us to have a closer look at developments in specific export categories such as tourism and machinery⁽¹²⁶⁾. The last subsection draws some conclusions.

The analysis examines exports from a macroeconomic perspective that is without investigating specific micro channels that were affected by the pandemic such as container shortages and port shutdowns⁽¹²⁷⁾ or the severance of exporter-importer relationships. In addition, the empirical analysis adopts a partial macroeconomic approach as it does not analyse the

pandemic's impact on text-book macroeconomic factors that affect exports growth such as real GDP growth of the exports destination countries, export prices and exchange rates.

IV.2. A first look at the data

This subsection provides a brief overview of export developments following the outbreak of the pandemic until the start of the war in Ukraine⁽¹²⁸⁾. First, it focusses on exports of goods and services of the euro area as a whole to the rest of the world. Next it focuses on the exports of the Member States to other countries including the other euro-area Member States.

The overview focusses on changes in aggregate trade volumes. While the study of the severance of firms' trade relationships with foreign importers may also be a useful dimension to assess the pandemic's impact on exports⁽¹²⁹⁾, harmonised

⁽¹²⁴⁾ It does not try to assess the (indirect) impact of the pandemic on macroeconomic factors that affect exports (in normal times) such as the real effective exchange rate or real GDP of the export destination countries.

⁽¹²⁵⁾ While the analysis in subsection III.3 makes use of quarterly data covering all euro-area Member States over the 2000-2010 period, in subsection III.4 the analysis makes use of annual data for the period from 2003 until 2021 for goods and from 2010 until 2021 for services. Data in current and constant prices are available for the exported goods, but only in current prices for the exports of services and for a selected set of Member States. These data issues have been dealt with as discussed in subsequent subsections and Box IV.1.

⁽¹²⁶⁾ Data limitations hinder a smooth analysis of changes in the geographical distribution of exports

⁽¹²⁷⁾ For a survey of the latter see for instance UNCTAD (2021), *Review of Maritime Transport*. The econometric analysis will include a variable measuring freight costs that increased notably during the pandemic.

⁽¹²⁸⁾ I.e. from the first quarter of 2020 until the fourth quarter of 2021.

⁽¹²⁹⁾ It is easier to recover from decreases in trade volumes and prices (intensive margin) than to recover from broken international trade relations (extensive margin). However, available studies suggest that euro area Member States adjust mainly on the intensive margin in the face of severe shocks. For instance Brussevich, M., C. Papageorgiou and P. Wibaux (2022), 'Trade and the COVID-19 Pandemic: Lessons from French Firms', *IMF Working Paper* WP/22/81 illustrates this for the case of French firms showing that they adjusted mainly along the intensive margin during the pandemic. Minondo, A. (2021), 'Impact of COVID-19 on the trade of goods and services in Spain', *Applied Economic Analysis*, Vol. 29 No. 85, pp. 58-76 reports that the intensive margin explained 95.3% of the decrease in Spanish exports during the COVID-19 pandemic. Similarly, Behrens, K., Coreos, G. and G. Mion (2013), 'Trade crisis? What trade crisis?', *The Review of Economics and Statistics*, Vol. 95, No. 2, pp. 702-709 estimate that about 97% of the export loss of Belgian firms can be ascribed to decreases in volume rather than losses of trade relations during the global financial crisis.

international trade data at firm level are not readily available.

IV.2.1. Euro-area level: strong fluctuations in exports driven by services

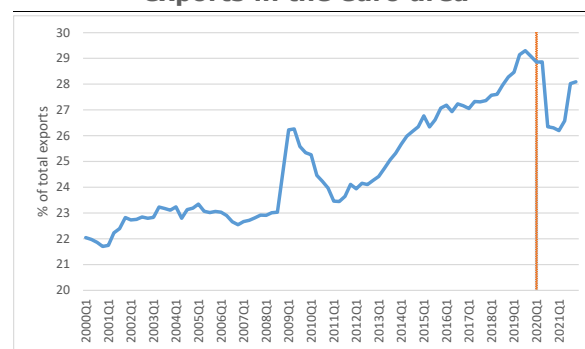
Total exports of the euro area as a whole were strongly hit by the outbreak of the pandemic and the measures to contain the spread of the virus. For the euro area as a whole, exports (in constant prices) were down by about 21% in the second quarter of 2020 compared with the same quarter in 2019 (left-hand pane of Graph IV.1), while exports as a percentage of GDP were down by 5.6 pps in the second quarter of 2020 compared with the same quarter the year before.

Comparing total exports of the euro area during the first eight quarters of the pandemic with total exports during the first eight quarters of the global financial crisis suggests that while the initial drop in total exports was sharper during the pandemic, it showed a faster rebound (right-hand pane of Graph IV.1). While during the global financial crisis international trade was primarily affected by strong decreases in aggregate demand, during the pandemic international trade was harshly affected by severe supply-side shocks (such as firm closures and social distancing) giving also rise to large decreases in aggregate demand as the demand effects of the shock got transmitted to less contact-intensive sectors⁽¹³⁰⁾ and gave rise to unprecedented uncertainty in economic decision-making⁽¹³¹⁾.

The exports of goods (-18% quarter-on –quarter) and services (-20%) decreased strongly in the second quarter of 2020. However, in subsequent quarters both showed a different path as illustrated by the developments of the share of services in total exports in the euro area as a whole (Graph IV.2). While exports of goods recovered gradually, exports of services remained weak in the second half of 2020, bottoming out only in the first quarter of 2021. Exports of services increased strongly in

the third quarter of 2021 and in the fourth quarter, they settled at about 1pps below the level recorded in the last quarter of 2019.

Graph IV.2: Share of services in total exports in the euro area



(1) Share of services exports is equal to services exports divided by total exports.

Source: Eurostat National Accounts.

These developments reflect the fact that during the pandemic the delivery of most services was severely hindered by the need for social distancing and international travel bans⁽¹³²⁾. They also are in strong contrast with the global financial crisis when the share of services in total exports increased strongly initially as the exports of goods (especially durable capital goods) were hindered by growing external financial constraints in the wake of severe financial market disturbances⁽¹³³⁾.

IV.2.2. Member State level: large country differences

The euro-area Member States showed strong differences in terms of export growth during the pandemic. In 2020, Spain and Greece, followed by Portugal and Italy, recorded very sharp drops in the export of services, down by about 50% in Spain and Greece (first pane of Graph IV.3). Given the importance of contact-intensive tourism in these Member States, such outcomes should not be surprising as the lockdown measures limited physical proximity and hindered cross-border travel. This was especially acute in April and May 2020, when hotels were shut down and reopened only gradually as of June 2020.

⁽¹³⁰⁾ Especially those sectors complementary to the contact-intensive sectors. See Werning, I., G. Lorenzoni, L. Straub and V. Guerrieri (2020), 'Viral recessions: Lack of demand during the coronavirus crisis', *VoxEU*. See also Baldwin, R. (2020), 'The Greater Trade Collapse of 2020: Learnings from the 2008-09 Great Trade Collapse', *VoxEU*.

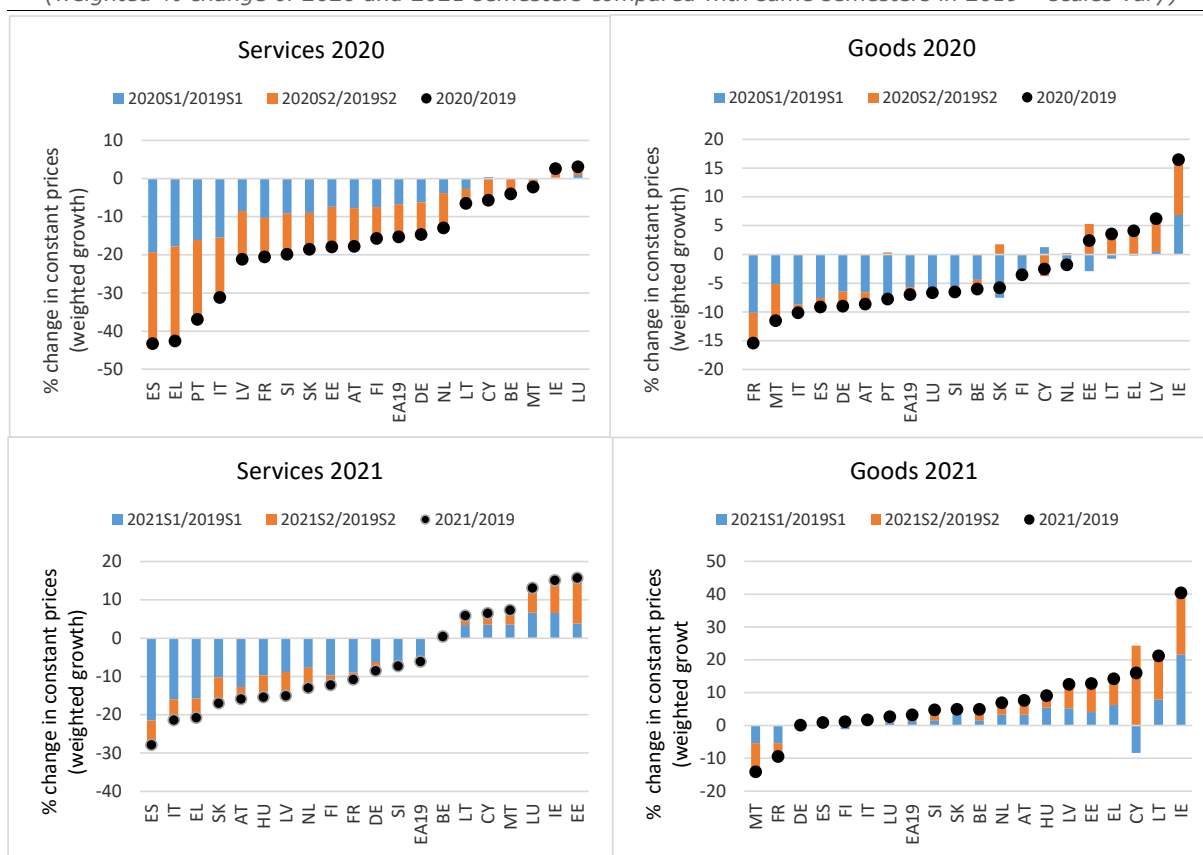
⁽¹³¹⁾ Kay, J. and M. King (2020), *Radical Uncertainty: Decision-Making Beyond the Numbers*, W. W. Norton & Company. Kay, J. and M. King, 'The radical uncertainties of coronavirus', *Prospect*, March 2020.

⁽¹³²⁾ As further explored in the following subsections.

⁽¹³³⁾ The production and international trade of goods is usually in more need of external financing. Borchert, I. and A. Mattoo (2010), 'The crisis-resilience of services trade', *The Service Industries Journal*, Vol. 30, No. 13.

Graph IV.3: **Exports of goods and services: euro-area Member States between 2020 and 2021**

(weighted % change of 2020 and 2021 semesters compared with same semesters in 2019 – scales vary)



Growth rates weighted with share of respectively 2019S1 and 2019S2 exports in total 2019 exports. As such the blue (S1) and orange bars (S2) add up to the year total change (black dot).

Source: Eurostat National Accounts.

Developments in the exports of goods were less dramatic in 2020. Nevertheless, several Member States recorded decreases of about 10% or more with France showing the strongest decrease (second pane in Graph IV.3). An outlier was the strong export growth in Ireland reflecting its sharp rise in the exports of pharmaceuticals ⁽¹³⁴⁾.

In 2021, goods exports rebounded to such an extent that in most Member States – and the euro area as a whole – they exceeded their 2019 level (as shown by a positive growth rate between 2019 and 2021 in the lower-right pane of Graph III.3). By contrast, in 2021, services exports in most Member States – and in the euro area as a whole – were still below or close to the level of 2019 (as shown in the lower-left pane of Graph IV.3).

⁽¹³⁴⁾ Although its growth eased somewhat it settled at a historically high level in 2021. See Irish Ministry of Finance (2022), *Economic Insights – Spring 2022*.

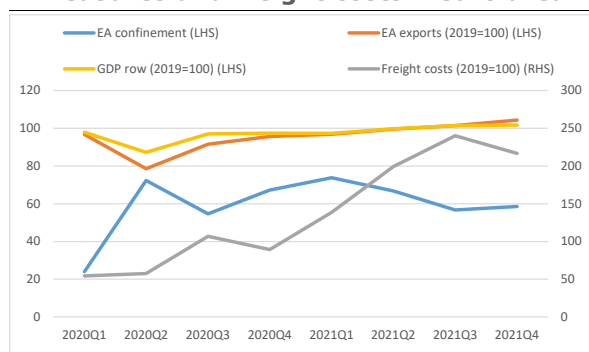
IV.3. Pandemic-specific macroeconomic factors

The COVID-19 lockdown measures ⁽¹³⁵⁾ started to become effective in the first quarter of 2020 and were tightened sharply in the second quarter. In

⁽¹³⁵⁾ The level of lockdown measures has been gauged with the Oxford COVID-19 Government Response Tracker (OxCGRT) prepared by the Blavatnik School of Government of the University of Oxford. This aggregate indicator (with values between 1 and 100) covers (i) lockdown and closure measures (including school closing, workplace closing, cancellation public events, restrictions on gathering size, closing of public transport, stay-at-home requirements, restrictions on internal movement, and restrictions on international travel), (ii) economic response (including income support, debt/contract relief for households, fiscal measures and giving international support) and (iii) health system measures (including public information campaign, testing policy, contact tracing, emergency investment in health, investment in COVID19 vaccines, facial coverings and vaccination policies). See Halle, T. et al. (2020), 'A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)', *Nature Human Behaviour*, Vol. 5, pp. 529–538.

subsequent quarters they were eased but raised again toward the beginning of 2021 to be loosened during the subsequent quarters. Not surprisingly, a strong correlation between exports and the lockdown measures can be detected, as shown for the euro area as a whole in Graph III.4.

Graph IV.4: Total exports, lockdown measures and freight costs – euro area



LHS: left-hand side; RHS: right-hand side. EA confinement is EA average of the Oxford COVID-19 Government Response Tracker using population weights (indicator value between 0 and 100). Freight costs are measured by Baltic Dry Index (BDI) deflated by the export prices of the euro area as a whole and rescaled to 2019=100. GDP row is effective real GDP of rest of the world rescaled to 2019=100. Total exports in constant prices rescaled to 2019=100.

Source: The Oxford COVID-19 Government Response Tracker, Baltic Dry Index Historical Rates (BADI) – Investing.com, Eurostat, OECD database, ECB Statistical Data Warehouse.

The pandemic and lockdown measures also had a direct impact on international logistics and the maritime industry. Tanker shipping recorded the hardest hit, while containerised trade, gas shipments and dry bulk commodities fell sharply in the first half of 2020 but rebounded somewhat by the end of 2020 ⁽¹³⁶⁾. Consequently, freight rates also showed strong increases, with the global cost of bulk shipping ⁽¹³⁷⁾ more than doubling between the fourth quarter of 2020 and the fourth quarter of 2021 with a peak in the third quarter of 2021 (Graph III.5) ⁽¹³⁸⁾.

As the pandemic was a global phenomenon, economic activity in the rest of the world also weakened adversely affecting the demand for euro

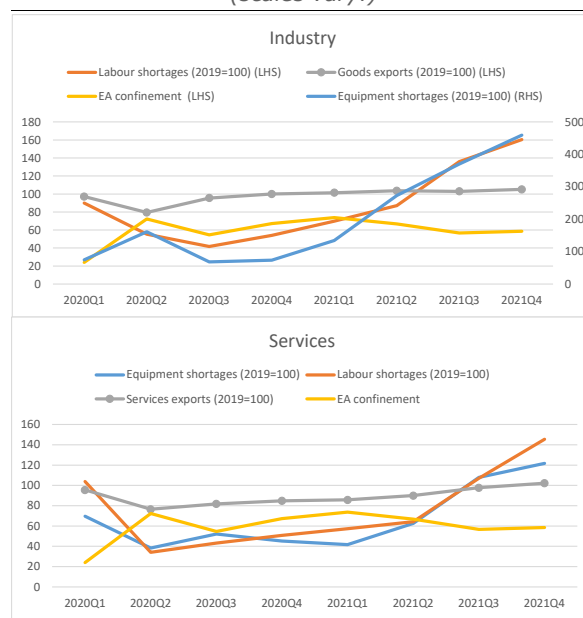
⁽¹³⁶⁾ UNCTAD (2021), *op. cit.*

⁽¹³⁷⁾ I.e. the Baltic Dry index which measures average prices paid for the transport of dry bulk materials across more than 20 routes.

⁽¹³⁸⁾ However, a sustained surge in demand for shipping containers combined with no slack capacity in container ships continues to elevate shipping costs. See for instance WTO (2021), ‘COVID-19 and rising shipping rates: What are the factors in play and what can be done?’, Video conference [COVID-19 and Rising Shipping Rates: What Are the Factors in Play and What Can Be Done? – Zoom](#).

area exports. Effective real GDP of the exports destination countries showed a strong decrease in the second quarter of 2020 and rebounded gradually.

Graph IV.5: Exports of goods and services and input shortages – euro area (scales vary!)



(1) Equipment also includes space.

Source: Business and Consumer Surveys; Eurostat National Accounts.

Focussing on the inputs in the production of goods and services, Graph IV.5—upper panel suggests that equipment shortages in industrial production increased very sharply since the first quarter 2021, reaching unprecedented levels by the end of 2021. This strong shortage of equipment was caused, among other factors, by logistic issues due to impediments to road transports, as seen in the US and China, and to global port congestion, in combination with a lower turnover of empty containers and increased (albeit volatile) demand following the modest rebound in 2021 ⁽¹³⁹⁾.

Labour shortages increased also in 2021 but at a less dramatic pace than equipment shortages (Graph IV.5-lower pane). Beyond contact-intensive services, labour shortages were particularly acute in the information and communication sector as the pandemic accelerated the digital transformation the countries face challenges in digital skills acquisition

⁽¹³⁹⁾ VCFI (2021), Annual Report of Valencia Containerised Freight Index.

among workers⁽¹⁴⁰⁾. The pandemic has also complicated procedures to apply for and obtain work permits increasing labour shortages in sectors where migrants make up a large part of the labour force such as agriculture and healthcare⁽¹⁴¹⁾. However, Graph IV.5 also suggests that the relation between supply bottlenecks at the world level the lockdown measures at local level is a complex one. While the intensity of bottlenecks peaked almost a year after the intensity of the lockdown measures reached its peak on average, one should consider that the geographical dimension of the two variables differ: at the time the confinement measure was going down in Europe, it was increasing markedly in Asia (in China lasted until the end of 2022: in China, for instance, supply bottlenecks were almost gone at the time lockdown intensity was high)⁽¹⁴²⁾.

The following subsections will breakdown the impact of these factors on total exports at the level of the euro area countries.

IV.4. Total exports of goods and services: direct effects of pandemic lockdown measures

This subsection provides estimates of the direct impact of the pandemic lockdown measures on the exports of goods and services across the euro area.

IV.4.1. Methodology

The starting point of the analysis is that exports of goods and services are determined by standard macroeconomic factors, such as price competitiveness and real GDP of the export destination countries. This specification is then augmented for the pandemic period with the Oxford COVID-19 Government Response Tracker for the COVID-19 period⁽¹⁴³⁾. In order to

⁽¹⁴⁰⁾ Causa, O., Abendschein, M., Luu, N. Soldani and C. Sorio (2022), 'The Post-Covid-19 Rise in Labour Shortages', *OECD Economics Department Working Papers* No. 1721.

⁽¹⁴¹⁾ Adăscăliței, D. and W. Tina (2021), 'The pandemic aggravated labour shortages in some sectors; the problem is now emerging in others', EuroFound

⁽¹⁴²⁾ Exports and the shortage indicators show all a positive contemporaneous correlation, while one would expect a negative correlation indicating that exports would decrease as the shortages increases.

⁽¹⁴³⁾ A database with a qualitative description of measures affecting specifically the exports of goods and services during the pandemic is to be found in WTO (2022), *COVID-19: Measures affecting trade in goods* and WTO (2022), *COVID-19: Measures affecting trade in services*. However, translating them into quantitative indicators that

capture the possible impact of measures implemented in the past, the regression equation also includes lags of the variables related to lockdown measures.

First, the direct impact of changes in the aggregate lockdown indicator (as discussed in Subsection III.3) on exports is estimated, which provides an overall assessment of the pandemic's impact. Next, the impact of a selected decomposition of the lockdown measures (i.e., the travel restrictions, economic support and vaccination) is estimated⁽¹⁴⁴⁾.

The impact of the pandemic lockdown measures is estimated by pooling the data of the 19 euro-area Member States. Several variants have been estimated with a view to get a better understanding of changes in the transmission mechanisms over time⁽¹⁴⁵⁾, across countries⁽¹⁴⁶⁾ and between types of lockdown measures such as international travel restrictions and vaccinations. Box IV.1 discusses in more detail the methodology⁽¹⁴⁷⁾.

IV.4.2. Exports' responsiveness to COVID-19 lockdown measures

Different variants of the baseline model have been estimated as shown in Table A of Box IV.1. The first set of regressions (i.e., variants S1 and G1 in Table A) shows a significant negative impact of the contemporaneous and lagged lockdown measures on the exports of services. For services the impact of the lockdown measures of the previous quarter is almost half the size of the impact of the contemporaneous measures. For the exports of

can be used in the regression analysis would be beyond the scope of this section.

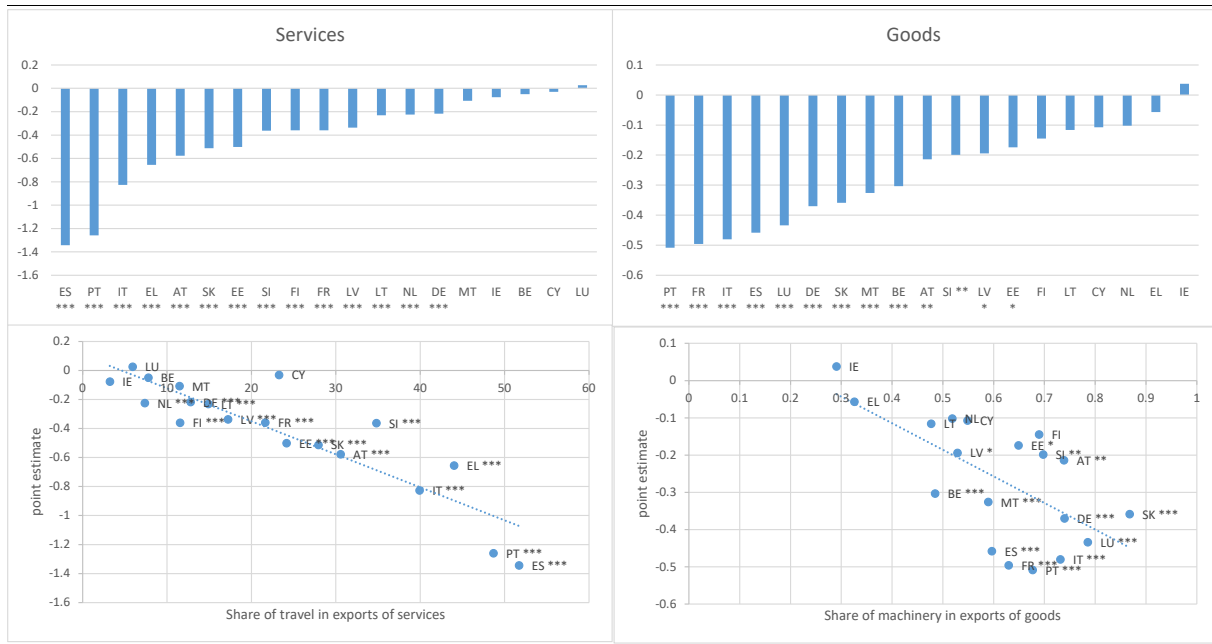
⁽¹⁴⁴⁾ The subsequent analysis does not cover the indirect channels such as changes in real GDP in the export destination countries induced by lockdown measures. Covering also such type of transmission channels would require a complete model also specifying the channels via with the lockdown measures may affect the real GDP of the export destination countries and relative prices. In other words, the explanatory macro-variables are considered to be predetermined in the subsequent analysis. See Box III.1 for some additional comments on possible simultaneity.

⁽¹⁴⁵⁾ Over time the responsiveness to lockdown measures may change as for instance, exporters learn or uncertainties w.r.t. the impact of the pandemic temper.

⁽¹⁴⁶⁾ For instance, differences in trade patterns may give rise to differences in Member States' exports responsiveness to the lockdown measures.

⁽¹⁴⁷⁾ In Box III.1 the reduced form equation also includes a measure of freight costs which may have an impact on the propensity to export. Factors that may affect the production of export products such as labour and equipment shortages are also discussed, but no significant effects of these factors could be found.

Graph IV.6: **Responsiveness to a change in lockdown measures and selected export shares**



(1) Significance *** $p < 0.001$, ** $p < 0.05$ and * $p < 0.01$.

Source: Authors' estimates based on variants S2 and G2 in Table A of Box III.1.

goods only a significant impact could be found for the contemporaneous lockdown measures, at about two thirds of the impact on the export of services⁽¹⁴⁸⁾.

The estimation results also suggest that the impact of the lockdown measures was strongest at the onset of the pandemic, decreasing over time (i.e., variants S3 and G3) which may suggest that economic agents learned with each new wave of infections or may be related to the fact that in certain countries, like China, the refinement of COVID-19 measures focused on guaranteeing the smooth operation of supply, with the bulk of containment imposed on consumption.

Rising freight costs had only a limited significant negative impact on the exports of goods, while no significant effects was obtained for labour or equipment shortages (variant S6 and G6)⁽¹⁴⁹⁾.

Large variation across Member States

Examining country differences, the regression analysis (i.e., variants S2 and G2) suggests that the

impact of lockdown measures differed strongly across Member States (top left-hand side pane of Graph IV.6). For services exports, the strongest and very significant negative responsiveness is recorded by Spain and Portugal, followed by Italy and Greece, which are all Member States with an important tourism sector. Belgium and Cyprus⁽¹⁵⁰⁾ recorded the lowest responsiveness and the estimated coefficients also show a low statistical significance.

Overall, the responsiveness to changes in the lockdown measures is weaker and less significant for goods exports, with Italy, Portugal, France, and Spain recording the strongest negative responsiveness (top right-hand side pane of Graph IV.6). Greece and Lithuania recorded a weak responsiveness, with Ireland even recording a positive responsiveness⁽¹⁵¹⁾.

The strong correlations in the two lower panes of Graph IV.6 suggest that these cross-country differences in responsiveness reflect to a large extent differences in the size of the share of travel

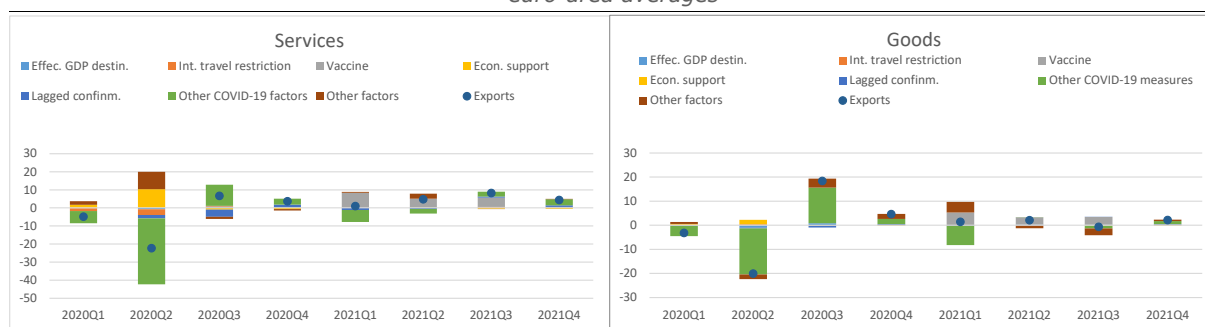
⁽¹⁴⁸⁾ Rising freight costs was found to have only a significant negative impact on the exports of goods after 3 quarters.

⁽¹⁴⁹⁾ Remember that subsection III.3 indicated that these shortages seem to have reacted with a stronger lag to the outbreak of the pandemic and its lockdown measures.

⁽¹⁵⁰⁾ Luxembourg is the outlier with a positive point estimate, but not significant.

⁽¹⁵¹⁾ Due to the large export share of pharmaceuticals used to contain the spread of the COVID-19 virus.

Graph IV.7: **Impact of vaccination, travel restrictions and economic support**
euro-area averages



(1) See footnotes (36) to (38) for an explanation of the selected COVID-19 measures. The label “Other COVID-19 factors” refers to a (0,1) dummy for each of the quarters from the first quarter of 2020 until the fourth quarter of 2021. It is a general measure for all other COVID-19 related factors affecting exports.

Source: Authors’ estimates based on variants S4 and G4 in Table A of Box III.1.

in services exports and of the share of machinery in the goods exports, albeit to a lesser degree ⁽¹⁵²⁾.

Selective decomposition of lockdown measures

Many measures have been implemented to stop the spread of the virus and speed up the recovery. The left-hand pane of Graph IV.7 zooms in on three specific factors that have been crucial for the rebound in especially services exports (variants S4 and G4). In these variants the aggregate indicator related to all lockdown measures has been decomposed into three specific indicators (i.e., vaccination ⁽¹⁵³⁾, intentional travel controls ⁽¹⁵⁴⁾ and economic support ⁽¹⁵⁵⁾) and a dummy variable (labelled “other COVID-19 factors”) for each of the quarters from the first quarter of 2020 until the fourth quarter of 2021 ⁽¹⁵⁶⁾. While the vaccination ⁽¹⁵⁷⁾ became only in full swing as of early 2021, the within sample simulations suggest

that it had a notable impact on exports, especially the exports of services (grey bar in the chart).

The apparent low contribution of the international travel control variable (dark orange bar) seems to suggest that people were imposing themselves voluntary self-control not to travel with or without explicit travel bans. The contribution of economic policy support was especially important for export growth in the first quarters (light orange bar).

The factor labelled ‘Other COVID-19 factors’ shows a very strong impact in the second quarter of 2020, but it reverses in the third quarter of 2020 and peters out in subsequent quarters. This factor captures the channels related to the pandemic that are not explicitly covered by the three specific lockdown measures discussed in this subsection. Factors not explicitly modelled that have driven the switch in the third quarter of 2020 may include economic agents increased reliance on technological solutions to facilitate their working and shopping from home ⁽¹⁵⁸⁾, changes in lockdown measures not covered by the ones included in the regression equation and export restrictions associated with COVID-19 that contributed to supply chain disruptions in specific sectors like medical devices or pharmaceuticals.

The right-hand pane of Graph IV.7 shows a similar impact of these measures on the exports of goods, although the statistical significance of the underlying point estimates is less strong.

⁽¹⁵²⁾ I.e. a coefficient of correlation equal to -0.89 for services exports and equal -0.64 for goods exports.

⁽¹⁵³⁾ The OxCGRT vaccination indicator (h7) is based on vaccination of different groups ranging from key workers and clinically vulnerable groups to universal coverage.

⁽¹⁵⁴⁾ The OxCGRT international travel controls indicator (C8) covers policies such as a PCR test and quarantine of visitors, and entry prohibition for non-vaccinated non-residents.

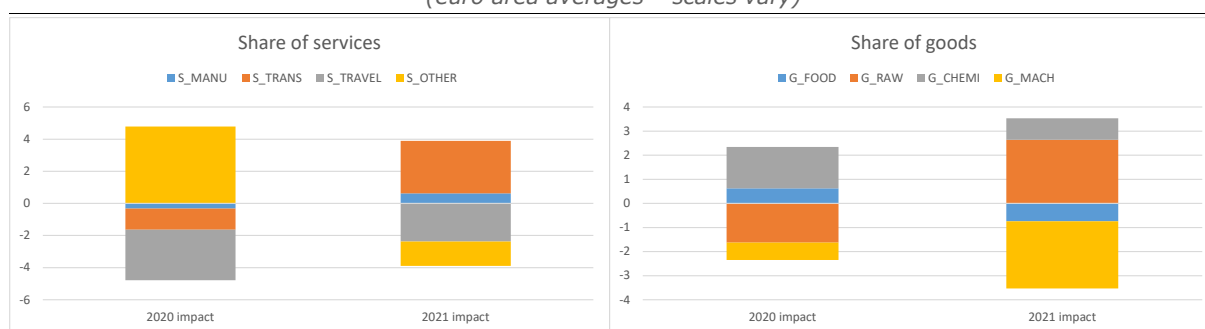
⁽¹⁵⁵⁾ The OxCGRT economic support indicator covers announced economic stimulus spending including direct cash payments to people who lose their jobs or cannot work, debt relief, etc. The variable “economic support” does not measure money effectively spent, but reflects ordinal indicators whereby policies are ranked on a simple numerical scale, e.g. the income support sub-indicator is equal to 0 if no income support, equal to 1 if the government is replacing less than 50% of lost salary, and equal to 2 if the government is replacing 50% or more of lost salary (includes payments to firms if explicitly linked to payroll/salaries).

⁽¹⁵⁶⁾ I.e. dummy variables equal to 1 in the corresponding quarter and equal to zero in the other quarters.

⁽¹⁵⁷⁾ For the case of services exports the point estimates of vaccination and economic policies are at a 0.01 confidence level different from zero.

⁽¹⁵⁸⁾ See for instance WTO (2020), World trade volume rallies in third quarter after COVID-19 shock.

Graph IV.8: The impact of lockdown measures on the allocation within total exports of services and goods – euro area
(euro area averages – scales vary)



(1) Point estimates of tables A3 and A4 are evaluated for the euro-area unweighted average value of the aggregate lockdown indicator for the exports of goods and the international travel restrictions indicator for the exports of services.

Note: Services - S_TRANS refers to transport services, S_TRAVEL refers to travel services, S_MANU refers to manufacturing services on physical inputs owned by others and maintenance and repair services; and S_OTHER refers to all other services.

Note: Goods - G_FOOD refers to food, drinks and tobacco, G_RAW refers to raw materials and also mineral fuels, lubricants and related materials; G_CHEMI refers to chemicals and related products, and G_MACH refers to machinery.

(2) Estimates for services include BE, DE, EE, IE, EL, FR, IT, LV, LU, NL, AT, PT, SI, and SK.

(3) Euro averages.

Source: Estimates based on point estimates reported in Table B in Box III.1.

IV.5. The composition of total exports of goods and services: direct effects of the COVID-19 lockdown measures

The previous subsection analysed developments in total exports of goods and services, this subsection shows how the pandemic affected the allocation⁽¹⁵⁹⁾ among the various types of exports of goods and services⁽¹⁶⁰⁾ – within the limits set by data availability⁽¹⁶¹⁾.

The point estimates in Table B of Box III.1 suggest that the contemporaneous and lagged lockdown measures had a significant direct impact on the composition of exports of goods and services⁽¹⁶²⁾.

Such direct impacts may be explained by various factors induced by the pandemic such as breakdowns in international logistics, changes in consumption preferences or increased uncertainty.

Graph IV.8 summarises these point estimates by showing how the composition of the exports of goods and services changed on average as a direct consequence of the confinement measures in 2020 and 2021⁽¹⁶³⁾. Most striking, but not unexpected, is the sharp drop in the share of international travel⁽¹⁶⁴⁾ in total exports of services (grey bar in left-hand pane of Graph IV.8) in 2020, which was offset by a rise in the share of other services which include telecommunications, computer and information services, and financial services (light orange bar).

The share of exports of raw materials in total goods exports (dark orange bar in right-hand pane of Graph IV.8) experienced the strongest decrease in 2020 as a direct result of the implementation of

⁽¹⁵⁹⁾ Technically speaking, the econometric approach in this section assumes a representative economic agent for each Member State who in a first stage decides the total export volume of goods and services and in a second stage the allocation of this total volume.

⁽¹⁶⁰⁾ In the absence of price changes and changes in total exports, the export shares should be constant in normal times. However, during the pandemic there was an additional factor (as measured by the Oxford COVID-19 Government Response Tracker) that affected these budget shares. It is the latter effect that is discussed in more detail in this subsection. This specification using export shares is inspired by the seminal paper (using budget shares) Deaton, A. and J. Muellbauer (1980), 'An Almost Ideal Demand System', *The American Economic Review*, Vol. 70, No. 3, pp. 312-326 - albeit that (due to data limitations) in this subsection relative prices of the individual items are replaced by an aggregate relative price (i.e. price of exports of respectively goods or services relative to the GDP deflator of the export destination countries).

⁽¹⁶¹⁾ In particular data are only available at annual level, and for services exports limited to 14 Member States covering the 2010-2021 period. No data is available for Spain that was hardest hit in terms of exports of services! See Box IV.1 for more details.

⁽¹⁶²⁾ However, as the available data have only an annual frequency it was not possible to establish the richness of the dynamics of this impact.

⁽¹⁶³⁾ Graph III.8 does not cover the impact of price changes that were for instance notable for the exports of raw materials in 2020 and 2021. However, such price developments may also affect the changes in the export shares. It would be beyond the scope of this section to investigate to what extent these price changes were caused by the pandemic.

⁽¹⁶⁴⁾ In the statistics of international trade in services travel encompasses goods and services consumed by non-residents in the economy that they visit. Travel is defined as covering goods and services for own use or to be given away, acquired from an economy, by non-residents during visits to that economy. It covers stays of any length, if there is no change in residence.

the lockdown measures ⁽¹⁶⁵⁾ but increased in 2021. While the share of food (blue bar) increased in 2020 in the wake of the lockdown measures, it decreased in 2021 partly reflecting the lagged impact of past lockdown measures. Such lagged impacts may reflect that exporters or export destination countries wanted to correct past overreactions to the unexpected and dramatic events.

IV.6. Conclusions

Immediately following the worldwide outbreak of the pandemic and the ensuing lockdowns, global trade contracted at an unprecedented rate, down by about 9 per cent in 2020 compared with the level in 2019.

While goods trade rebounded quickly, trade in services started to recover only slowly in the second half of 2021, to a large extent supported by effective vaccination campaigns and a gradual lifting of the lockdown measures in the developed countries.

However, against this background of deteriorating international trade, not all euro-area Member States were affected in the same way. Member States with a strong tourism sector experienced the sharpest decreases in exports of services, while other Member States, especially Ireland with a strong medtech industry, experienced a sharp rise in exports of goods.

Thus, all in all, the estimation results in this section do not allow to conclude that the pandemic will have permanent effect on exports.

⁽¹⁶⁵⁾ The graph only shows the changes in the export shares triggered by changes in preferences, logistics and similar factors in the wake of the pandemic. The graph does not show the effects of price changes during the pandemic (including possible price changes induced by the pandemic).

Box IV.1: Estimation results

Within the limits set by data availability, this box provides estimates of the impact of the COVID-19 lockdown measures on (i) the total exports of goods and services and (ii) the composition of the exports of goods and services. The starting point of the analysis is that the exports of goods and services are affected by standard macroeconomic factors, such as the real GDP of export destination countries and the real effective exchange rate, and by specific COVID-19 related factors such as the measures implemented to contain the spread of the virus. Moreover, rigidities prevent an immediate adjustment of the export volumes to the desired volumes.

I. Total exports of goods and services

After pooling the data of the 19 euro-area Member States and assuming that short-term dynamics are driven by an error-correction mechanism, the short-term equations for goods (q=G) and services (q=S) read as follows:

$$(1) \quad \Delta \ln(EXP_{q,i,t}) = \alpha_{q,i} + \beta_q \Delta \ln(EGDP_{q,i,t}) + \gamma_q \Delta \ln \left[\frac{P_{q,i,t} NEER_{q,i,t}}{EGDP_P_{q,i,t}} \right] + \sum_{j=0}^T \delta_{q,j} \Delta ST_{i,t-j} + \sum_{j=1}^n \tau_{q,j,t} \Delta X_{i,j,t} + \varphi_q ECT_{q,i,t-1} + u_{q,i,t}$$

for q = S, G, i = BE, DE, EE, IE, EL, ES, FR, IT, CY, LV, LT, LU, MT, NL, AT, PT, SI, SK and FI and t = 2001Q3, ..., 2021Q4.

- $EXP_{q,i,t}$ stands for exports of product q (in constant prices) by Member State i in quarter t;
- EGDP is the effective real GDP of export destination countries;
- P is the price of the exported product (in euro);
- EGDP_P is the effective GDP deflator of export destination countries (in foreign currency);
- NEER is the nominal effective exchange rate (number of foreign currency per euro);
- ST is the Oxford COVID-19 Government Response Tracker;
- ECT is the error correction term ⁽¹⁾.

The current and lagged lockdown measures ST are included as it is assumed that in quarter t exports will still be adjusting to measures taken in previous quarters ⁽²⁾. u is a random component. X covers any other relevant factor such as shipping costs in the case of goods exports, as well as shortages of input factors in production (i.e. the variables discussed in subsection III.3).

A. The data

Data on total exports of goods and services are retrieved from the Eurostat national accounts. The effective real GDP and GDP deflator of export destination countries and the real effective exchange rate are constructed based on data retrieved for the OECD database, with the export weights for goods and services

⁽¹⁾ ECT is obtained from the long-term equation that reads: $\ln(EXP_{q,i,t}) = \alpha_{q,i} + \beta_q \ln(EGDP_{q,i,t}) + \gamma_q \ln \left[\frac{P_{q,i,t} NEER_{q,i,t}}{EGDP_P_{q,i,t}} \right] + \sum_{j=1}^n \tau_{q,j,t} X_{i,j,t} + w_{q,i,t}$. For services exports, the null hypothesis of no cointegration can be rejected at a fairly high confidence level by applying the Kao residual cointegration test (augmenting the equation with a trend variable), with the Dicky-Fuller p-val equal to 0.0059. The long-run point estimates are $\beta_q = 0.16$, $\gamma_q = 0.69$, and the parameter associated with the trend is equal to 0.01. For goods exports, the null hypothesis can be rejected at 0.0020 confidence level. In this case, the long-run point estimates are $\beta_q = 0.11$, $\gamma_q = 0.68$, and the parameter associated with trend is equal to 0.01. In both cases the γ_q does not have the expected negative sign.

⁽²⁾ The long-term equation (1) does not include the lockdown measures ST implying that the lockdown levels do not leave a permanent trace in equilibrium. This does not exclude that the pandemic may have indirect effects such as a decrease in the potential output of the countries that import euro area products.

(Continued on the next page)

Box (continued)

retrieved from the ECB Statistical Data Warehouse ⁽³⁾. The COVID-19 Government Response Tracker is obtained from the Blavatnik School of Government department of the University of Oxford. This indicator varies between 1 and 100 (1= very loose, 100 = very tight) and covers (i) lockdown and closure measures; (ii) economic response and (iii) health system measures ⁽⁴⁾. The Baltic Dry indicator, which measures the cost in US \$ of one metric tonne of cargo shipped is obtained from Investing.com ⁽⁵⁾. The data on labour and equipment shortages are obtained from the Business and Consumer Survey database.

B. Estimation results

Table A summarises the estimation results of the short-term dynamics, showing six variants. These variants have been estimated assuming that the explanatory variables are predetermined. It is in fact common practice in the literature to assume that the random component of the exports of a country is not correlated with the real GDP of export destination countries ⁽⁶⁾. This is a necessary condition to avoid simultaneity bias in the point estimates. No country fixed effects are included as the dependent and explanatory variables are demeaned. This is needed because variants S5 and G5 include interactions between variables. The sample covers 19 euro-area Member States for the period from Q3 2001 until Q4 2021.

Table A: Impact of COVID-19 on short-run exports dynamics

Dependent variable: first difference of logarithm of exports in constant prices

-
- ⁽³⁾ Apart from the other EU countries, the effective foreign variables also cover Australia, Canada, Japan, New Zealand, Norway, Switzerland, the UK and USA. The same weights apply for real GDP and GDP deflator of the export destination countries, and the nominal effective exchange rate. Depending on the product type, the weights contain information on exports of goods or services.
 - ⁽⁴⁾ Components of this indicator that measure factors such as the level of vaccination and international travel bans have also been retrieved to estimate more refined variants of equation (1) – see variants S4 and G4 below. See Halle, T. et al. (2020), ‘A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)’ for more details on this indicator.
 - ⁽⁵⁾ In the regression analysis these shipping costs have been deflated by the price of exports.
 - ⁽⁶⁾ See for instance Senhadji, A. and C. Montenegro (1999), ‘Time series analysis of export demand equations: a cross-country analysis’, *IMF Working Paper WP/98/149*.

(Continued on the next page)

Box (continued)

(one quarter compared to the previous quarter)

	Services						Goods					
	S1	S2	S3	S4	S5	S6	G1	G2	G3	G4	G5	G6
Effective foreign GDP (EFG)	0.24 ***	0.20 ***	0.07	0.07	0.20 ***	0.26 ***	0.17 ***	0.15 ***	0.08 *	0.08 *	0.21 ***	0.31 ***
EFG*Confinement 2020-2021					3.00 ***						2.65 ***	
Real effective exchange rate (REER)	-0.31 ***	-0.28 ***	-0.29 ***	-0.33 ***	-0.27 ***	-0.37 ***	-0.24 ***	-0.23 ***	-0.27 ***	-0.28 ***	-0.24 ***	-0.15 **
REER * Confinement 2020-2021					-0.93 ***						-0.76 **	
Confinement 2020-2021	-0.38 ***	See Graph III.6			-0.06 *	-0.36 ***	-0.24 ***				0.03	-0.20 ***
Lagged Confinement 2020-2021	-0.18 ***	-0.14 ***		-0.08	-0.19 ***		0.03	0.04 *		-0.02	0.02	
Confinement 2020 Q1			-0.35 ***						-0.20 **			
Confinement 2020 Q2			-0.26 ***						-0.04			
Confinement 2020 Q3			-0.12						0.15			
Confinement 2020 Q4			-0.21 **						-0.17			
Confinement 2021 Q1			-0.12						-0.39 **			
Confinement 2021 Q2			0.08						0.10			
Confinement 2021 Q3			0.36 ***						0.14			
Confinement 2021 Q4			-0.32 **						0.11			
Lagged confinement 2020 Q2			-1.17 ***						-1.16 ***			
Lagged confinement 2020 Q3			-0.33 ***						-0.17 **			
Lagged confinement 2020 Q4			-0.19 *						0.19			
Lagged confinement 2021 Q1			-0.21						0.39 **			
Lagged confinement 2021 Q2			-0.30 **						-0.07			
Lagged confinement 2021 Q3			-0.39 ***						-0.06			
Lagged confinement 2021 Q4			0.35 **						0.01			
Economic support				0.16 ***						0.03		
Vaccination				3.81 ***						2.42 *		
Travel restrictions				-0.15 *						0.02		
Other COVID-19 factors 2020 Q1				-0.07 ***						-0.04 **		
Other COVID-19 factors 2020 Q2				-0.36 ***						-0.19 ***		
Other COVID-19 factors 2020 Q3				0.12 ***						0.15 ***		
Other COVID-19 factors 2020 Q4				0.03 *						0.02		
Other COVID-19 factors 2021 Q1				-0.07 **						-0.08 **		
Other COVID-19 factors 2021 Q2				-0.03						0.00		
Other COVID-19 factors 2021 Q3				0.03						-0.01		
Other COVID-19 factors 2021 Q4				0.03 **						0.01		
Shipping cost							-0.09 ***	-0.09 ***	-0.05	-0.04	-0.05	-0.08 **
Shortage of input materials						0.09						-0.02
Shortage of labour						0.06 **						0.02
GFC dummy	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.04 ***	-0.04 ***	-0.04 ***	-0.04 ***	-0.04 ***	-0.04 ***
Error correction term (ECT)	-0.07 ***	-0.07 ***	-0.04 ***	-0.04 ***	-0.04 ***	-0.07 ***	-0.10 ***	-0.10 ***	-0.09 ***	-0.09 ***	-0.10 ***	-0.10 ***
ECT*Confinement 2020-2021						-0.07 **					0.04	
Adjusted R-squared	0.27	0.43	0.36	0.36	0.35	0.26	0.15	0.17	0.21	0.20	0.20	0.15
Durbin Watson	1.93	1.91	1.99	2.16	1.91	1.93	2.18	2.15	2.19	2.22	2.20	2.16
Total number of observations	1596	1596	1596	1558	1596	1153	1558	1558	1558	1558	1558	1453
Total number of explanatory variables	6	24	19	16	9	7	7	25	20	17	10	8

Note: sample: 2001Q3-2021Q4; demeaned dependent and explanatory variables; OLS estimates; shipping costs 3 quarters lagged; significance *** p<0.001, ** p<0.05 and * p<0.01.

Note: in variants S4 and G4 the indicators Other COVID-19 factors 2020Q1, ..., Other COVID-19 factors 2021Q4 are dummies equal to 1 in the corresponding quarter and equal to zero in the other quarters. They implicitly capture the confinement measures other than vaccination, travel restrictions and economic support. Shipping cost is Baltic Dry indicator deflated by export price. REER is defined as the export price deflated by GDP deflator of export destination countries adjusted for nominal exchange rate.

Note: no country fixed effect as dependent and explanatory variables are demeaned. All variables (except confinement measures, shortages and dummies) in natural logarithm.

The variants with the prefix S refer to services exports and those with the prefix G to goods exports. The variants differ according to the way the impact of the lockdown measures is specified. Variant S1 and G1 show the baseline export function (1) with the current and one quarter lagged lockdown indicator. For this variant the current lockdown measures show a significant negative impact for the exports of both goods and services, with the latter two-thirds the size of the former. Lockdown measures one quarter lagged show only a significant negative impact for services exports. The other variants allow for more flexibility in the parameters associated with lockdown measures. Variants S2 and G2 which are discussed in more detail in the main text allow the parameter of the current lockdown indicator to vary across the 19 Member States ⁽⁷⁾. Variants S3 and G3 allow the responsiveness to vary from Q1 2020 to Q4 2021 ⁽⁸⁾, suggesting that the responsiveness to lockdown measures weakened somewhat over time. This may indicate that when time progressed economic agents learned to respond to the lockdown measures and that global uncertainty was ebbing away. Variants S4 and G4 provide a further disaggregation of the lockdown measure into measures that affect international travel, economic support and vaccination. In these variants the indicators Other_COVID-19_factors_2020Q1, ..., Other_COVID-19_factors_2021Q4 are dummies equal to 1 in the corresponding quarter and equal to zero in the other quarters; they implicitly capture the pandemic related factors other than vaccination, travel restrictions and economic support. These variants are discussed in the main text. Variant S5 and G5 are variants with the parameters of effective foreign GDP, the real exchange rate and the error correction term that interact with the lockdown indicator ⁽⁹⁾. These variants suggest that the pandemic

⁽⁷⁾ However the same parameter across countries for the lagged lockdown indicator in order to save on the limited degrees of freedom.

⁽⁸⁾ Similar variation in the lagged lockdown measures.

⁽⁹⁾ As some variants allow for interaction between the lockdown measures and the macroeconomic variables, the dependent and explanatory variables have been demeaned (to avoid possible biases in point estimates).

(Continued on the next page)

Box (continued)

amplified the impact of real GDP decreases in export destination countries ⁽¹⁰⁾ ⁽¹¹⁾. Variant S6 and G6 also include variables that measure shortages in labour and equipment. No significant point estimates with the expected negative sign were found for these variants ⁽¹²⁾.

II. The composition of total exports of goods and services

This part investigates how the pandemic affected the composition of the exports of goods and services, whereby a distinction is made between 4 types of goods ⁽¹³⁾ and 4 types of services ⁽¹⁴⁾. The starting point is an econometric allocation system ⁽¹⁵⁾ whereby the budget share of the different product types is explained in terms of a scale variable, prices and a stochastic component - along with some shift variables that capture changes in preferences ⁽¹⁶⁾. Focusing on the short-run dynamics, the equation for goods is specified as

$$(2) \quad \Delta(\text{SHARE}_{q,i,t}) = \alpha_{q,i} + \gamma_q \Delta \ln(\text{EXP}_{G,i,t}) + \rho_q \Delta \ln \left[\frac{P_{G,i,t} \text{NEER}_{q,i,t}}{\text{EGDP}_{P,q,i,t}} \right] + \delta_q \Delta ST_{i,t} + \sum_j \tau_{qj} \Delta X_{j,t} \\ + \sum_{j=1}^3 \varphi_{qj} (\text{ECT}_{q,j,t-1} - \text{ECT}_{q,A,t-1}) + u_{q,i,t}$$

where subscript q refers to the goods as specified in footnote 15, the subscript i refers to the country, and SHARE refers to the budget share of a good q in the total export of goods. $\alpha_{q,i}$ is a country fixed effect for country i's product q. A similar equation holds for the composition of total services exports.

As the sum of the changes in the shares add-up to zero, and the same explanatory variables appear in each of the equations, the adding-up constraints for the 4 types of goods and 4 types of services read as $\sum_{q=1}^4 \alpha_{q,i} = 0$, $\sum_{q=1}^4 \gamma_q = 0$, $\sum_{q=1}^4 \rho_q = 0$, $\sum_{q=1}^4 \delta_q = 0$, $\sum_{q=1}^4 \tau_{qj} = 0$, $\sum_{q=1}^3 \varphi_{qj} = 0$ and also that $\sum_{q=1}^4 w_{q,i,t} = 0$. ⁽¹⁷⁾

The error correction term ECT is derived from the long-run equation ⁽¹⁸⁾. The point estimates of the lagged own-error-correction term (with an expected value between 0 and -1) measures how much of the disequilibrium in the previous quarter is carried over to the present quarter. Past disequilibria in a specific component will also spill over to the other components of the allocation system, hence their inclusion in the other equations. ⁽¹⁹⁾ Their point estimate is expected to be between -1 and +1.

A. The data and estimation results

Annual data for the various components of goods exports and services exports are obtained from Eurostat ⁽²⁰⁾. The sample for goods exports covers the 19 Member States from 2002 until 2021, while the sample for services exports covers 14 Member States ⁽²¹⁾ from 2010 until 2021. No data for services exports in constant prices are available. In other words, in equation (1) the price effect is captured by the price of total goods and services exports respectively to the effective GDP deflator of export destination countries (converted by nominal effective exchange rate). The scale effect is captured by the total exports of goods or services. While the aggregate Oxford indicator has been used for the composition of the export of goods to measure the level of

⁽¹⁰⁾ A further disaggregation of these macroeconomic variables did not change the qualitative nature of the major findings.

⁽¹¹⁾ The inclusion of the lockdown measures of export destination countries did not provide significant point estimates with the expected negative sign. This may be due to multicollinearity.

⁽¹²⁾ See subsection III.3 for a discussion of possible reason for this low statistical significance.

⁽¹³⁾ Labelled G_FOOD refers to food, drinks and tobacco, G_RAW refers to raw materials and also mineral fuels, lubricants and related materials, G_CHEMI refers to chemicals and related products, and G_MACH refers to machinery.

⁽¹⁴⁾ Labelled S_TRANS refers to transport services, S_TRAVEL refers to travel services, S_MANU refers to manufacturing services on physical inputs owned by others and maintenance and repair services, and S_OTHER refers to all other services include telecommunications, computer and information services, as well as financial services.

⁽¹⁵⁾ In line with the specification proposed by Deaton, A. and J. Muellbauer (1980), 'An Almost Ideal Demand System', *The American Economic Review*, Vol. 70, No. 3, pp. 312-326.

⁽¹⁶⁾ For the subsequent analysis the lockdown measures

⁽¹⁷⁾ See for instance Theil, H. (1971), *Principles of Econometrics*, John Wiley and Sons, Inc.

⁽¹⁸⁾ The long-run equation in levels has a similar structure $\text{SHARE}_{q,i,t} = \alpha_{q,i} + \gamma_q \ln(\text{EXP}_{G,i,t}) + \rho_q \ln \left[\frac{P_{G,i,t} \text{NEER}_{q,i,t}}{\text{EGDP}_{P,q,i,t}} \right] + \delta_q ST_{i,t} + u_{q,i,t}$

⁽¹⁹⁾ However, as there is perfect multicollinearity between the error terms, they have been introduced in relative terms.

⁽²⁰⁾ International trade by Standard International Trade Classification product group (code: ext_lt_interttd) for goods and international trade in services (since 2010) (code: bop_its6_det) for services.

⁽²¹⁾ BE, DE, EE, IE, EL, FR, IT, LV, LU, NL, AT, PT, SI, SK.

(Continued on the next page)

Box (continued)

lockdown measures, the sub-indicator covering the level of international travel controls ⁽²²⁾ has been used for the exports of services.

Table B summarises the estimation results by pooling the data and estimating the equations of the systems with least squares ⁽²³⁾. The point estimates of the current and lagged lockdown measures show a strong significance. These point estimates are discussed in the main text. The point estimates of the total export volumes show a fairly high significance, especially for services. As total exports grows (in normal times), only the share of travel increases while the share of the other services decreases. These shifts are much smaller for the shares of goods components. Overall the point estimates of the real effective exchange rate are insignificant, except for the strong significance of machinery and raw materials, which have an opposite sign indicating that (in normal times) a real appreciation lowers the share of exports of machinery and increases the share of raw materials. Rising shipping costs induce a decrease in the share of exports of chemicals and raw materials. The point estimates of the lagged own error correction terms are all significant and have a value between 0 and -1. Most of the point estimates of the other error correction terms are also significant ⁽²⁴⁾.

Table B: The impact of COVID-19 on exports composition

Dependent variable: change in share of service/good *i* in total exports of services/goods

	Services				Goods			
	S_MANU	S_TRANS	S_TRAVEL	S_OTHER	G_FOOD	G_RAW	G_CHEMI	G_MACH
Total exports (goods or services)	-0.05 ***	-0.12 ***	0.26 ***	-0.08 ***	-0.04 ***	0.06 ***	-0.03 **	0.01
Real effective exchange rate	0.04	0.10	-0.06	-0.07	-0.02	0.16 ***	0.02	-0.16 ***
Confinement	-0.14	-0.56	-1.35 ***	2.05 ***	0.01 **	-0.03 ***	0.03 ***	-0.01
Lagged confinement	0.29 *	1.47 ***	-0.85 *	-0.90 **	-0.02 ***	0.06 ***	0.01	-0.05 ***
Shipping costs					0.00	-0.01 ***	-0.00 *	0.01 ***
A Error correction term	-0.24 ***	-0.09	-0.30 *	0.62 ***	-0.26 ***	-0.01	0.14 ***	0.13
B Error correction term	0.11 ***	-0.20 ***	0.29 ***	-0.19 ***	0.08 ***	-0.19 ***	0.10 ***	0.01
C Error correction term	0.08 ***	0.16 ***	-0.05	-0.18 ***	0.11 ***	0.12 **	-0.28 ***	0.05
D Error correction term	0.06 *	0.13	0.06	-0.25 ***	0.06 ***	0.08 ***	0.04 *	-0.19 ***
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.38	0.27	0.75	0.62	0.30	0.25	0.19	0.10
Durbin Watson	2.10	1.91	1.70	1.80	1.78	1.97	2.14	1.76
Total number of observations	135	135	135	135	361	361	361	361
Total number of explanatory variables	21	21	21	21	27	27	27	27

Note: sample goods: 2003-2021; sample services: 2011-2021; OLS; significance *** p<0.001, ** p<0.05 and * p<0.01.

Note: see footnotes 11 and 12 in this box for details on product labels; services covers BE, DE, EE, IE, EL, FR, IT, LV, LU, NL, AT, PT, SI, SK

⁽²²⁾ The OxCGRT international travel controls indicator (C8) covers policies such as a PCR test and quarantine of visitors, and entry ban for non-vaccinated non-residents.

⁽²³⁾ The values of the point estimates should not be affected if they would have been estimated as a system that takes explicitly into account that the stochastic components are correlated across equations, as in the case of – for instance – the SURE (seemingly unrelated regression equations) estimator. In that case, the standard errors and t-values are affected. It is worth noting that the covariance matrix of the stochastic components is singular because these elements meet the adding-up constraint. This implies, that one equation of the system has to be deleted when estimating the equations as a system, but the estimation results should not depend on the equation deleted if properly specified. See Theil (1971), *op.cit.*

⁽²⁴⁾ In an allocation system, past disequilibria in the other goods categories will also spill over to the other goods categories of the allocation system, hence their inclusion in the other equations.