Bank i Kredyt 52(3), 2021, 253-266

BANK I KREDYT
BANK & CREDIT

A note on the heterogenous economic effects of COVID-19 on GDP via the sectoral structure

Jakub Muć[*], Michał Rubaszek[*], Karol Szafranek[*]

Submitted: 11 May 2020. Accepted: 2 February 2021.

Abstract

This article shows how the effect of the COVID-19 pandemic on the aggregate activity depends on the sectoral structure of the economy. We show that in a prolonged lockdown scenario, in which we assume that the response of individual sectors is homogenous across countries, the decline in GDP across countries is heterogeneous and can vary in a substantial way purely due to the diverse sectoral structure of economies.

Keywords: COVID-19, production structure, value added

JEL: C67, E01, E23, E27, I15

* SGH Warsaw School of Economics, Collegium of Economic Analysis; correspondence should be directed to: karol.szafranek@sgh.waw.pl.

1 Introduction

Since December 2019 the COVID-19 virus has rapidly spread around the world to become a global pandemic with roughly 50 million people infected and over 1.3 million deaths (as of 7 November 2020). This coronavirus has become a shock to the global economy of an unprecedented scale, which is well illustrated by the rapid downgrades for the global economic outlook issued by the participants of the Refinitiv polls taken in the early 2020, before any hard economic data indicating the extent of the shock were available (Table 1). Even though the evolution of the pandemic as well as the scale of its economic impact remains extremely uncertain, incoming evidence suggests that some sectors can be more vulnerable than others. Consequently, it is justified to put forward a thesis that the economic cost of the COVID-19 will be diverse across countries, depending on the sectoral structure of their economies. Therefore, in this article we focus on one particular feature of the key global economies – their sectoral differences.

To assess how various industries are hit by the pandemic it is necessary to understand through which channels the virus affects the economy. Let us start by discussing the direct channels. First and foremost, COVID-19 is a dramatic shock to human mobility. Naturally, tourism, restaurants, entertainment and transport services are among the most severely hit, especially in the case of low--wage workers (Del Rio-Chanona et al. 2020). Second, it influences the economy through increased mortality and morbidity of employees, which is especially harmful for activities highly exposed to infection. Third, many governments have decided to ban numerous activities requiring human contact, which immediately froze the activity of various sectors providing services ranging from hairdressing to big sport events. Moreover, as Atalay (2017) and Laeven (2020) argue, the complementarities between various industries lead to strong spillover effects, with industry-specific shocks being transmitted across the economy and accounting for the bulk of the aggregate volatility. Apart from these channels, COVID-19 influences the economy through second round effects, of both a supply and a demand nature. From the supply perspective, disruptions in the global value chains constitute the biggest problem. As discussed by Baldwin and Weder di Mauro (2020), in a highly integrated global economy, instability of production lines across the world coupled with travel restrictions force producers to face shortages in required inputs, which are mostly imported. This effect – concentrated in the manufacturing sector – translates into lower production and increases in output costs. From the demand side, uncertainty spikes both across firms and households most likely result in withholding private consumption and the utter cessation of investments. The deteriorating situation on the job market causes many households to adapt the strategy of "wait and see" and postpone purchases of consumer durable goods, as it was observed during the Great Financial Crisis. This mechanism is well described within a novel general equilibrium framework by Eichenbaum, Rebelo and Trabandt (2020) accounting for the epidemic. The authors demonstrate that as it progresses, people decrease their consumption and labour supply, which reduces the severity of the pandemic, but at the same time is detrimental to the economy and spurs an extraordinary recession. In turn, using an extensive DSGE framework, Baqaee and Farhi (2020) argue that supply and demand shocks explain around half the reduction in the US real GDP each.

The main aim of this article is to evaluate how differences in the sectoral structure among key global economies translate into their heterogenous response to the pandemic. We do it by evaluating the impact of the pandemic on the activity in individual industries and mapping these calculations into the dynamics of aggregate activity. Our key result is that even if the impact of COVID-19 on individual sectors is the same across countries, the dispersion in the response of aggregate activity is substantial.

This finding is crucial in designing an appropriate economic policy at the international level, especially by institutions responsible for the functioning of the European monetary union.

Our work is most closely related to the recent study by McKibbin and Roshen (2020), who show differences in the impact of COVID-19 on individual countries by simulating a global DSGE/CGE general equilibrium model describing the dynamics of 20 countries and 6 sectors. It also relates to a wide literature focusing on the interactions between sectoral and aggregate activity, such as the contribution of sectoral shocks to aggregate activity dynamics (Foerster, Sarte, Watson 2011), changes in sectoral composition triggered by aggregate shocks (Tase 2019) or the effects of sectoral shocks on the sectoral composition of economic activity (Moro, Tanaka 2019). In comparison to the above studies, we are contributing to the literature by exploring the role of the sectoral composition of an economy to its susceptibility to the COVID-19 pandemic.

2 Methodology and data

We exploit the data from the World Input-Output Database (Timmer et al. 2015) as it offers a unified detailed sectoral disaggregation across economies. The variables of our interest are gross value added (Y) and gross output (X). They are observed for 56 sectors (s), 43 countries (i) and 15 years (t) from the period 2000–2014 (see Appendix A for the list of sectors and countries). These data enable us to calculate the impact of COVID-19 on aggregate activity (Δy_i) given weights of industries in value added (w_{is}) and its effects on individual sectors (Δy_{is}):

$$\Delta y_i = \sum_{s=1}^{56} w_{is} \Delta y_{is} = \sum_{s=1}^{56} w_{is} \Delta y_s$$

Weights w_{is} are calculated on the basis of gross value added data for 2014. For Δy_{is} we take historical fluctuations of gross output Δx_{ist} adjusted for most recent data. Moreover, we assume a homogenous reaction of sectors across countries, i.e., $\Delta y_{is} = \Delta y_s$, hence the heterogenous response of output (Δy_i) across countries is solely due to different sectoral composition, reflected in weights w_{is} (see Appendix B).

To establish the sectoral impact of COVID-19 (Δy_s) we classify industries into three broad categories: requiring social contact (SC), postponable/durable goods (PPD) and basic necessities (BN). Our assumptions about Δy_s are the mildest for BN sectors and most pessimistic for SC ones due to the reasons discussed in the Introduction. This is reflected in the following automatic calibrating rule when using fluctuations of gross output (Δx_{ist}) for G7 countries, we calculate $\Delta x^*_{is} = \min_t \Delta x_{ist}$, and set:

$$\Delta y_s = \begin{cases} \min\limits_i \Delta x^*_{is} & \text{for} \quad \text{SC} \\ \operatorname{med}\limits_i \Delta x^*_{is} & \text{for} \quad \text{PPD} \\ \max\limits_i \Delta x^*_{is} & \text{for} \quad \text{BN} \end{cases}$$

We use gross output as it is less volatile than gross value added and it is justified to assume a constant structure of input-output tables in the short-term. Apart from the rule, whenever we have additional information, we incorporate correction based on judgement knowledge. To give an example, on the basis of Reuters reports we believe that air transport activity will fall by 75%, whereas based on industrial production data for China we assume that the manufacture of vehicles will halve. The complete classification of sectors as well as our assumptions on Δy_s are reported in Table 2. It can be added that we present calculations for a pessimistic scenario, in which lockdown of most economies will continue throughout 2020.

3 Results

How structural differences across economies translate into output loss among key economies? Figure 1 illustrates that these differences matter substantially. The economies of Malta, Mexico, South Korea, Austria and Spain are most vulnerable to the pandemic, with output loss estimated to be around 15%. On the contrary, Luxembourg, India, Australia, Switzerland and Ireland are among countries least affected by the virus, with GDP declining by around 10%. In the supplementary material, which can be made available in the form of a spreadsheet, we present a detailed contribution of each sector to this decline in economic activity. It shows that the structure of the decline is also heterogenous. In selected countries the decline is driven predominantly by the fall in demand for accommodation and food services (Spain, Greece, Italy), manufacture of motor vehicles (Czechia, Germany, Japan), mining (Australia, Canada, Russia), manufacture of electronics (Taiwan, South Korea, Switzerland) or manufacture of textiles (Turkey).

4 Conclusions and policy implications

In this article we have proposed a method for assessing the impact of the COVID-19 pandemic on the activity in NACE sectors in a situation where available information regarding the nature of the shock is exceptionally scarce. Next, we have evaluated the response of aggregate activity to demonstrate that differences in the sectoral structure lead to a heterogenous reaction of individual countries to the COVID-19 shock. This result indicates that, at an international level, the policy response aimed at easing the forthcoming recession should take into account sectoral differences among countries. For instance, fiscal support might be tailored to the needs of the sectors most severely affected by the shock. The presented evidence on the varying severity of the shock stemming from sectoral heterogeneities is also important for institutions responsible for the conduct of economic policy in a monetary union, the euro area for instance, as the decoupling of business cycles across countries entails additional negative consequences of the virus.

References

Atalay E. (2017), How important are sectoral shocks?, *American Economic Journal: Macroeconomics,* 9(4), 254–480.

Baqaee D., Farhi E. (2020), *Supply and demand in disaggregated Keynesian economies with an application to the COVID-19 crisis,* NBER Working Paper Series, 27152, National Bureau of Economic Research.

Baldwin R., Weder di Mauro B., eds. (2020), *Economics in the Time of COVID-19*, A VoxEU.org Book, CEPR Press.

Del Rio-Chanona R.M., Mealy P., Pichler A., Lafond F., Farmer J.D. (2020), Supply and demand shocks in the COVID-19 pandemic: an industry and occupation perspective, *Oxford Review of Economic Policy*, 36, issue supplement_1, S94–S137.

Eichenbaum M.S., Rebelo S., Trabandt M. (2020), *The Macroeconomics of Epidemics*, NBER Working Paper, 26882, National Bureau of Economic Research.

Foerster A., Sarte P.-D., Watson M. (2011), Sectoral versus aggregate shocks: a structural factor analysis of industrial production, *Journal of Political Economy,* 119(1), 1–38.

Laeven L. (2020), *Pandemics, intermediate goods, and corporate valuation,* CEPR Discussion Papers, 15022.

McKibbin W., Roshen F. (2020), *The global macroeconomic impacts of COVID-19: seven scenarios*, https://www.brookings.edu/research/the-global-macroeconomic-impacts-of-covid-19-seven-scenarios/.

Moro A., Tanaka S. (2019), Sectoral shocks and home substitution, *Economics Letters,* 181, 57–60.

Tase M. (2019), Sectoral dynamics and business cycles, *Economics Letters,* 175, 60–63.

Timmer M.P., Dietzenbacher E., Los B., Stehrer R., de Vries G.J. (2015), An illustrated user guide to the world input–output database: the case of global automotive production, *Review of International Economics,* 23, 575–605.

Watanabe T. (2020), *The responses of consumption and prices in Japan to the COVID-19 crisis and the Tohoku earthquake*, Working Papers on Central Bank Communication, 020, University of Tokyo.

Appendix

Table 1
GDP growth outlook in 2020 from January to early April (the median of Refinitiv polls)

US		Japan		EA		UK	
22.01.2020	1.8	17.01.20	0.5	16.01.20	1.0	16.01.20	1.1
19.02.2020	1.8	13.02.20	0.5	14.02.20	0.9	20.02.20	1.0
19.03.2020	0.5	05.03.20	0.1	05.03.20	0.8	16.03.20	0.5
03.04.2020	-3.0	07.04.20	-2.1	03.04.20	-4.5	03.04.20	-4.1

Source: Refinitiv.

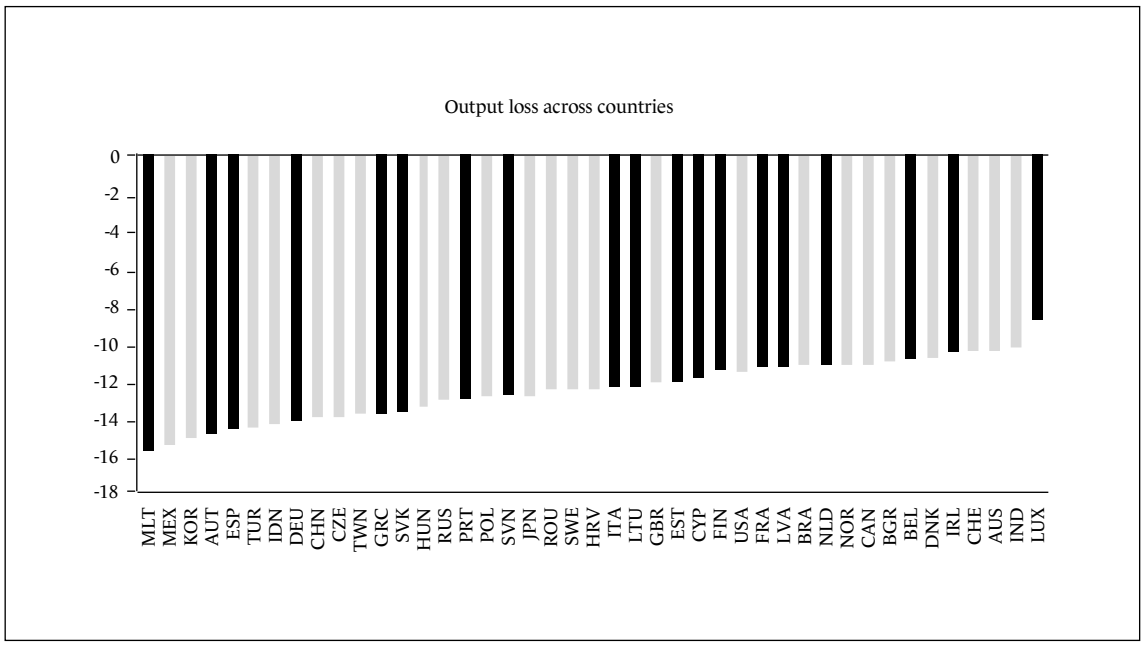
Table 2
Assumptions about the sectoral effects of COVID-19 using the information set available until late March 2020

Industry	Group	Rule	Expert	Remarks
A01	BN	-3.5		
A02	PPD	-9.9		
A03	BN	-3.8		
B	PPD	-12.4		
C10–12	BN	-1.6		
C13–15	PPD	-17.3	-25.0	Chinese IP/RS data
C16	PPD	-13.8		
C17	PPD	-9.7		
C18	PPD	-8.4		
C19	PPD	-15.7	-25.0	Decline in world demand for oil (Refinitiv news)
C20	PPD	-16.4	-25.0	Chinese IP/RS data
C21	BN	-0.8		
C22	PPD	-16.5		
C23	PPD	-13.2	-50.0	Chinese IP/RS data
C24	PPD	-25.1		
C25	PPD	-21.5		
C26	PPD	-20.8	-25.0	Chinese IP/RS data
C27	PPD	-16.0	-25.0	Chinese IP/RS data
C28	PPD	-22.8	-25.0	Chinese IP/RS data
C29	PPD	-25.0	-50.0	Chinese IP/RS data
C30	PPD	-10.1	-25.0	Chinese IP/RS data
C31–32	PPD	-12.5	-25.0	Chinese IP/RS data, Payment card

Industry	Group	Rule	Expert	Remarks
C33	BN	0.0		
D35	BN	-4.3		
E36	BN	0.0		
E37–39	BN	-2.6		
F	PPD	-11.5		
G45	BN	-4.2	-50.0	Chinese IP/RS data
G46	BN	-5.5		
G47	BN	-1.0		
H49	PPD	-8.1	-25.0	Based on declines in IP
H50	PPD	-12.6	-25.0	Based on declines in IP
H51	PPD	-16.0	-75.0	Refinitiv news on flights cancellations
H52	PPD	-8.0	-25.0	Based on declines in IP
H53	BN	-2.9	10.0	High demand for e-commerce services (W2020)
I	SC	-6.4	-75.0	GS2020
J58	PPD	-8.3		
J59–60	SC	-7.3		
J61	BN	2.3		
J62–63	BN	-1.1	10.0	High demand for online content (W2020)
K64	PPD	-4.3		
K65	BN	-1.3		
K66	PPD	-7.2		
L68	PPD	-2.3		
M69–70	PPD	-6.5		
M71	PPD	-8.2		
M72	PPD	-4.4		
M73	PPD	-7.1		
M74–75	PPD	-9.5		
N	SC	-16.8	-25.0	Low demand for package tour services (GS2020, W2020)
O84	BN	-0.3		
P85	BN	-0.1		
Q	SC	-7.8		
R-S	SC	-6.5	-50.0	Cessation of services related to recreation (GS2020, W2020)
T	PPD	-7.1		
U	PPD	0.0		

Notes:
Abbreviations are as follows: BN – basic necessities, PPD – postponable/durable goods, SC – goods requiring social contact, IP: industrial production, RS: retail sales, W2020: Watanabe (2020), GS2020: Goldman Sachs Economic Research US daily from 20 March 2020 "A Sudden Stop for the US Economy".

Figure 1
The effect of COVID-19 on gross value added by countries purely due to sectoral heterogeneity



Note: black bars denote the euro area economies.

Appendix A. Industry codes

Table A1
Industry codes

Code	Description
A01	Crop and animal production, hunting and related service activities
A02	Forestry and logging
A03	Fishing and aquaculture
B	Mining and quarrying
C10–C12	Manufacture of food products, beverages and tobacco products
C13–C15	Manufacture of textiles, wearing apparel and leather products
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C17	Manufacture of paper and paper products
C18	Printing and reproduction of recorded media
C19	Manufacture of coke and refined petroleum products
C20	Manufacture of chemicals and chemical products
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
C22	Manufacture of rubber and plastic products
C23	Manufacture of other non-metallic mineral products
C24	Manufacture of basic metals
C25	Manufacture of fabricated metal products, except machinery and equipment
C26	Manufacture of computer, electronic and optical products
C27	Manufacture of electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C29	Manufacture of motor vehicles, trailers and semi-trailers
C30	Manufacture of other transport equipment
C31–C32	Manufacture of furniture; other manufacturing
C33	Repair and installation of machinery and equipment
D35	Electricity, gas, steam and air conditioning supply
E36	Water collection, treatment and supply
E37–E39	Sewerage; waste collection and management, treatment and disposal activities; materials recovery; remediation activities
F	Construction
G45	Wholesale and retail trade and repair of motor vehicles and motorcycles
G46	Wholesale trade, except of motor vehicles and motorcycles
G47	Retail trade, except of motor vehicles and motorcycles

Code	Description
H49	Land transport and transport via pipelines
H50	Water transport
H51	Air transport
H52	Warehousing and support activities for transportation
H53	Postal and courier activities
I	Accommodation and food service activities
J58	Publishing activities
J59–60	Motion picture, video and television programme production, sound recording, music publishing and broadcasting activities
J61	Telecommunications
J62-63	Computer programming, consultancy and related activities; information service activities
K64	Financial service activities, except insurance and pension funding
K65	Insurance, reinsurance and pension funding, except compulsory social security
K66	Activities auxiliary to financial services and insurance activities
L68	Real estate activities
M69–70	Legal and accounting activities; activities of head offices; management consultancy activities
M71	Architectural and engineering activities; technical testing and analysis
M72	Scientific research and development
M73	Advertising and market research
M74–75	Other professional, scientific and technical activities; veterinary activities
N	Administrative and support service activities
O84	Public administration and defence; compulsory social security
P85	Education
Q	Human health and social work activities
R–S	Other service activities
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	Activities of extraterritorial organizations and bodies

List of countries in the sample

Australia, Austria, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Indonesia, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom of Great Britain and Northern Ireland, United States.

Appendix B. The distribution of weights of respective sectors in value added in 2014

Table B1

Share of respective sector in value added in 2014 (in %)

Sector	Min	Med.	Max	CAN	DEU	FRA	GBR	ITA	JPN	USA
1	2	3	4	5	6	7	8	9	10	11
A01	0.3	1.9	13.8	1.4	0.6	1.5	0.6	2.0	1.1	1.0
A02	0.0	0.2	1.9	0.3	0.1	0.1	0.0	0.1	0.1	0.1
A03	0.0	0.1	2.4	0.1	0.0	0.0	0.0	0.1	0.2	0.1
B	0.0	0.5	22.2	8.4	0.2	0.1	1.6	0.4	0.2	2.6
C10–12	0.6	2.1	6.4	1.6	1.6	2.2	1.7	1.7	3.1	1.4
C13–15	0.1	0.5	4.8	0.1	0.3	0.3	0.4	1.6	0.3	0.2
C16	0.0	0.3	2.5	0.4	0.2	0.2	0.1	0.3	0.2	0.2
C17	0.1	0.3	1.6	0.4	0.4	0.2	0.3	0.3	0.5	0.3
C18	0.0	0.3	0.7	0.4	0.3	0.2	0.3	0.3	0.6	0.2
C19	-0.6	0.2	3.5	0.5	0.2	0.1	0.2	0.1	1.2	1.0
C20	0.1	0.9	3.3	0.5	1.6	0.8	0.6	0.7	0.6	1.5
C21	0.0	0.5	6.2	0.3	0.9	0.7	0.8	0.6	0.8	0.5
C22	0.1	0.6	2.0	0.5	1.0	0.6	0.6	0.8	0.8	0.4
C23	0.2	0.6	2.2	0.4	0.6	0.4	0.3	0.7	0.6	0.3
C24	0.0	0.7	2.7	1.6	0.8	0.2	0.2	0.5	1.3	0.3
C25	0.0	1.0	3.2	0.8	2.0	1.0	1.0	1.9	1.3	0.8
C26	0.0	0.6	14.9	0.6	1.3	0.5	0.7	0.5	2.1	1.5
C27	0.0	0.5	2.1	0.2	1.7	0.3	0.3	0.7	0.8	0.3
C28	0.1	1.0	3.5	0.8	3.5	0.7	0.8	2.3	1.6	0.9
C29	0.0	0.8	4.9	0.8	4.0	0.5	0.7	0.7	2.1	0.8
C30	0.0	0.3	2.0	0.5	0.5	0.7	0.6	0.4	0.6	0.7
C31–32	0.1	0.6	2.6	0.6	0.9	0.4	0.6	0.8	0.4	0.6
C33	0.0	0.5	1.2	0.0	0.6	1.2	0.4	0.6	0.0	0.1
D35	0.5	1.9	3.9	2.1	1.9	1.7	1.5	1.7	1.0	1.6
E36	0.0	0.3	0.8	0.0	0.2	0.2	0.3	0.3	0.4	0.1
E37–39	0.0	0.5	1.0	0.3	0.8	0.6	0.7	0.7	0.3	0.2
F	2.6	5.7	10.1	7.5	4.6	5.7	6.2	4.9	6.4	3.8
G45	0.0	1.3	4.2	1.6	1.5	1.3	1.9	1.1	1.1	1.5
G46	3.2	5.6	11.6	5.1	4.5	4.7	3.2	5.1	7.2	6.0
G47	1.7	4.7	10.6	3.8	3.2	4.2	5.6	4.9	5.0	4.7
H49	0.6	2.4	9.8	2.4	1.8	2.1	1.9	3.1	2.9	1.4

Sector	Min	Med.	Max	CAN	DEU	FRA	GBR	ITA	JPN	USA
1	2	3	4	5	6	7	8	9	10	11
H50	-0.1	0.2	3.6	0.1	0.3	0.1	0.4	0.2	0.4	0.1
H51	0.0	0.3	1.5	0.3	0.2	0.4	0.5	0.0	0.3	0.5
H52	0.4	1.7	4.8	0.8	1.8	1.7	1.1	1.9	0.7	0.6
H53	0.0	0.3	3.2	0.4	0.5	0.4	0.6	0.3	0.3	0.3
I	0.9	2.2	6.9	2.1	1.5	2.7	2.9	3.6	3.0	2.8
J58	0.0	0.4	5.1	0.1	0.6	0.6	0.7	0.2	0.3	1.2
J59–60	0.0	0.4	1.8	0.4	0.7	0.6	0.9	0.4	0.5	1.2
J61	0.5	1.6	3.6	1.9	1.0	1.2	1.7	1.3	2.1	1.9
J62–63	0.0	1.9	5.1	1.7	2.6	2.4	2.9	1.8	2.0	1.9
K64	1.5	3.7	14.8	3.8	2.5	2.9	4.4	4.0	3.4	2.8
K65	0.0	0.9	4.3	1.6	1.0	0.7	2.5	0.6	1.3	2.8
K66	0.0	0.4	8.6	0.0	0.6	0.8	1.3	1.2	0.0	1.4
L68	0.0	9.3	17.8	11.8	11.1	12.9	11.2	14.1	12.6	11.9
M69–70	0.0	2.3	7.2	1.7	3.0	3.5	3.6	3.2	0.0	4.0
M71	0.0	1.2	2.3	1.4	1.5	1.4	1.8	1.3	0.0	1.5
M72	0.0	0.5	2.0	0.9	0.8	1.7	0.6	0.6	0.3	0.8
M73	0.0	0.3	1.2	0.2	0.5	0.5	0.6	0.2	0.3	0.8
M74–75	0.0	0.4	4.8	0.8	0.5	0.3	0.8	0.9	4.8	0.3
N	0.1	3.1	15.4	2.9	4.9	5.4	4.8	2.9	0.9	3.9
O84	3.7	6.3	13.1	9.0	6.2	8.3	5.1	6.9	8.5	13.1
P85	1.1	4.9	7.1	5.4	4.5	5.4	6.2	4.3	3.4	1.1
Q	1.1	5.1	11.1	6.3	7.5	9.5	6.8	6.2	6.6	7.1
R-S	1.5	2.6	10.2	2.1	3.8	2.9	3.9	2.6	3.5	2.6
T	0.0	0.1	1.3	0.0	0.3	0.2	0.4	1.3	0.1	0.1
U	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note:
This table presents the variation in contributions of all sectors to the overall value added across all countries in the sample (columns 2–4) as well as the shares in the value added in G7 economies (columns 5–11). All numbers are based on data for 2014.

Differences in the sectoral structure

We shortly explore the sectoral differences between economies. Table B1 reports weight w_{is}, in particular it presents the smallest (min), median (med) and largest value (max) of w_{is} for each sector s across all the studied economies as well as the detailed structure of value added in G7 economies. All figures refer to 2014.

When looking at sectors most severely affected by COVID-19, for which we used the available expert information, we observe significant differences mostly for sectors that comprise package tour services (N), manufacture of electronics, textiles and vehicles (C26, C13–C15, C29, respectively), wholesale and retail trade in vehicles (G45), land, water, air transport and support activities (H49–H53), accommodation and food service activities (I) or other services mostly related to recreation and culture (R-S). There is also considerable heterogeneity across countries in sectors for which very limited information is available so far (e.g. real estate or financial services), but then their reaction may be highly cyclical.