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A Simple Guide to Estimating the Impact of COVID-19 on Travel and Hospitality Activity

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The COVID-19 pandemic and the associated lockdown measures needed to contain the virus have had a severe impact on the hospitality and travel sectors globally. This note presents a simple methodology to estimate the first-order impact of the crisis on these sectors and documents key facts on their macroeconomic importance. The note finds that among G20 economies the hospitality and travel sectors make up 10 percent of employment on average, and as high as 15 percent in a few countries. A six-month severe disruption to activity, calibrated based on trends observed in high-frequency data since March 2020, would directly reduce GDP by 2½ to 3½ percent. Countries that are heavily reliant on hospitality and travel sectors should expect to see an even more marked decline in GDP in 2020, even as lockdown restrictions are eased in many parts of the world. Finally, the note provides an indication of how a given reduction in final demand for travel and hospitality is translated, through input-output linkages, into reductions in gross output for the various other sectors of the economy.

I. COVID-19 HIT THE HOSPITALITY AND PERSONAL TRANSPORTATION SECTORS PARTICULARLY HARD

Travel restrictions and social distancing measures needed to reduce the spread of COVID-19 have taken a dramatic toll on economic activities that rely on physically close human interactions. By May 2020, flight departures had fallen by about 80 percent from a year ago, restaurant bookings by more than 90 percent, and hotel bookings by more than 70 percent. Requests for driving directions had fallen by more than 50 percent from their January 2020 levels (Figure 1). As some economies have successfully brought new infections down to low levels, lockdowns have been lifted and mobility has increased. Restaurant reservations have picked up in advanced economies, especially in *Germany*. Flight departures increased between May and the end of June,

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especially in the *United States* and *China*. However, amid ongoing needed containment measures, activity in these sectors remains far lower than at the same time in 2019.

This note presents a simple framework to estimate the first-order impact on 2020 GDP from disruptions to tourism and accommodation, food, and transport services activity. The note focuses on G20 countries, but highlights that in many small states that are heavily dependent on tourism, the impact will be much more severe than in G20 countries. The decline in annual GDP growth for 2020 associated with the disruption of each sector is presented as a simple rule of thumb based on multiplying the sector's share in GDP by an assumed intensity of sectoral disruption, which is calibrated to broadly match the evolution of high-frequency indicators between March and May 2020, and by the duration of disruption. Results for GDP growth and employment are presented in percentage point deviations from a counterfactual "business as usual" scenario (no COVID-19 shock).

Figure 1. Recent High-Frequency Indicators in Travel and Hospitality Sectors.
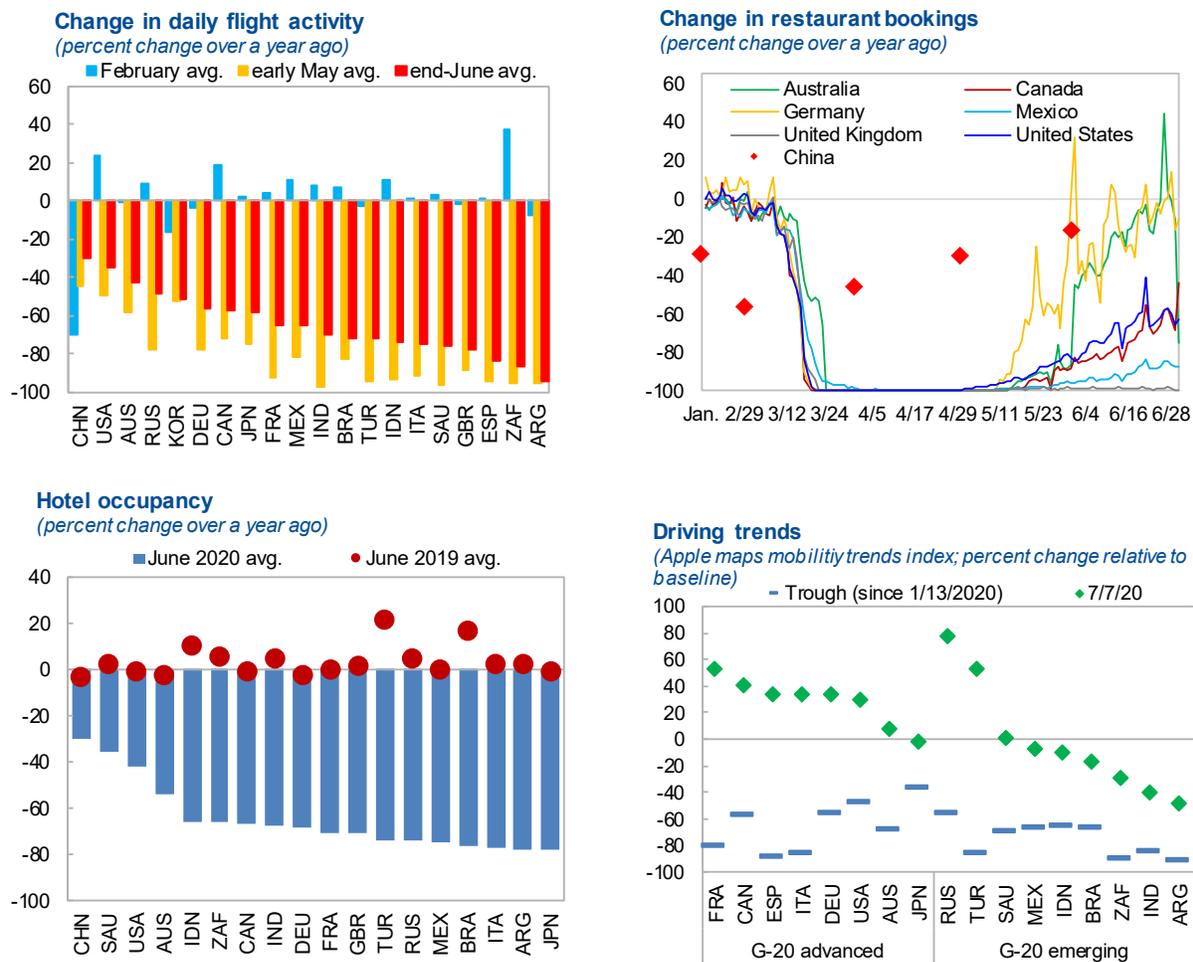
Sources: Assaeroport; Haver Analytics; Incheon statistics; OpenTable; US Transportation Security Administration; and IMF staff calculations.
Note: For restaurant bookings: Data for all countries except China include online and phone restaurant bookings and walk-ins. Data for China are year-over-year monthly retail sales of catering services, not seasonally adjusted.
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The partial elasticities that are calculated provide ballpark estimates for the impact on economic activity caused by needed lockdowns and voluntary social distancing. These elasticities can also be used to assess the reduction in economic activity that will occur even in the post-lockdown world, as significant social distancing

could persist ahead of discoveries of therapies or vaccines. The note also identifies the sectors in the economy that, because of input-output linkages, are more impacted by a fall in intermediate goods demand by the travel and hospitality sectors. A caveat to the analysis is that our calculations do not attempt to estimate general equilibrium or hysteresis effects that can deepen the economic downturn and cause output to remain depressed even after COVID-19 disruptions subside.

The results suggest that a severe six-month disruption to hospitality and personal travel sectors alone reduces average GDP growth across G-20 countries by between 2½ and 3½ percentage points, depending on the breadth of the assumed sectoral disruption. The lower estimate represents a disruption that affects only household consumption in the accommodation, food, and transport sectors.[2] The upper estimate is derived from a scenario wherein direct and indirect impacts to the travel and hospitality sectors are considered, based on aggregate tourism data. Shocks to the final demand for travel and hospitality services would lead, via input-output linkages, to significant reduction in gross output in various other sectors of the economy. *Italy*, *Mexico*, *Spain,* and the *United States* emerge as the hardest hit from the simulated disruptions. Employment would be significantly affected, with 10 percent of all jobs in the average country possibly being lost due just to disruptions in the tourism sector, and more than 15 percent of jobs lost in heavily tourism-dependent economies like *Spain* and *Mexico*.

II. TOURISM

Key Facts

Tourism, defined as all economic activities related to domestic or international travel, for business or personal reasons and with no change in the residence of the traveler, is an important part of employment and GDP in many countries.[3]

The tourism sector is particularly important for some small, non-G20 states that rely heavily on exports of travel services (Figure 2). In these countries' tourism activity is not only an important component of GDP but also the main source of foreign currency inflows for their balance of payments.

While the importance of tourism is less dramatic in many G20 countries, it is nonetheless sizable in some economies. Tourism, directly and indirectly, employs about 10 percent of all workers in G20 countries, on average, and as much as 15 percent of workers in *Mexico* and *Spain* (Figure 3). Travel and tourism services also represent a relatively sizable fraction of GDP. On average across G20 countries, they amount to about 9½ percent of GDP, but they reach 14 percent or more of GDP in *Italy*, *Mexico,* and *Spain*.

Benchmark Impact of COVID-19
The benchmark impact presented is a scenario of a 75 percent disruption to travel and tourism activity for six months. This assumption is calibrated to the average observed declines in flight traffic and hotel occupancy.[4] Southern European countries may be hit even harder, because the ongoing pandemic is occurring during the

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[2] The calculations are limited to the impact on household consumption and are therefore very conservative.

[3] Tourism in this section is measured as the direct and indirect contribution of tourism to GDP (or employment) from the World Travel and Tourism Council. The direct impact is defined as GDP (employment) generated by industries that deal directly with tourists, including hotels, travel agents, airlines, and other passenger transport services, as well as the activities of restaurant and leisure industries that deal directly with tourists. It is equivalent to total internal Travel & Tourism spending (by residents and international visitors) within a country less the purchases made by those industries (including imports). The indirect impact (as described by the OECD Tourism Satellite Accounts) is defined as the impacts generated by the intermediate consumption of the producers who are directly in contact with the visitors plus the induced impacts, defined as the impact generated by the production factors implemented by these producers who are in contact with the visitor.

[4] In reality the size and duration of the "shock" would differ across countries. Given that all the calculations performed in this note are linear, a different scaling of the shock for a particular country would simply translate into a proportional change in the estimated impacts.

spring and summer months, which for these countries represent the peak of the tourism season.[5] At the same time, some partial compensating effects are not considered in the calculations. For instance, tourism could be partly reoriented toward local destinations accessible by road, and more tourists could opt for non-hotel accommodations.

Based on our simple rule of thumb, this six-month disruption could subtract 3½ percent off annual GDP growth, on average across G20 countries (Figure 3). *Mexico, Spain,* and *Italy* emerge as the hardest hit, given their GDPs are most dependent on tourism, with declines in GDP growth in 2020 of over 5 percentage points.[6] Similarly, if 75 percent of all jobs were lost in the travel and tourism industries, this would amount to more than 7½ percent fall in employment in the average G20 country, and the fall would exceed 10 percent in *Germany, Italy, Mexico* and *Spain*.

**Figure 2. Small States: Exports of Travel and Passenger Transport Services**

Travel and tourism
(percent of GDP; 2018)
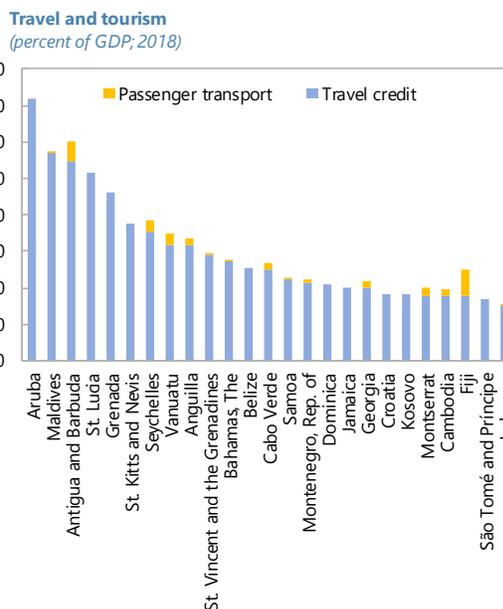
Sources: IMF, *World Economic Outlook*; IMF, *Balance of Payments and International Investment Position Manual, 6th edition* (BPM6); and IMF staff calculations.
Note: Countries with no passenger transport bar have missing values. The balance of payments (BoP) defines transport as services provided in the international transport of nonresidents by resident carriers, and it includes passenger services performed within a territory by nonresident carriers. The BoP defines travel exports as goods and services acquired by nonresidents during visits to the country. It includes local transport (within the country being visited and provided by a resident) but excludes international transport (which is included in passenger transport). See the BPM6 for full details.

Figure 3. Travel and Tourism Disruption

Travel and tourism
(percent; 2018)
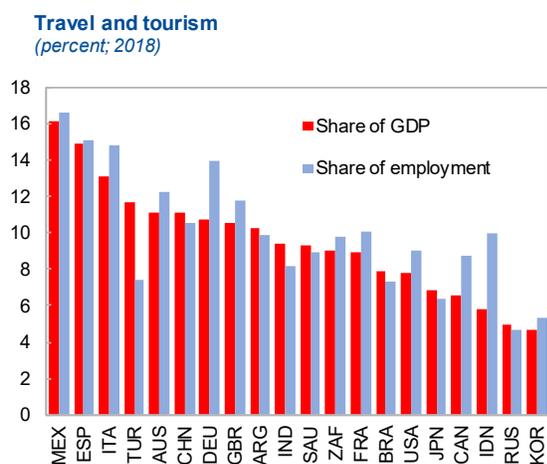
Travel and tourism: Impact of a 6-month disruption
(percentage deviation from baseline)
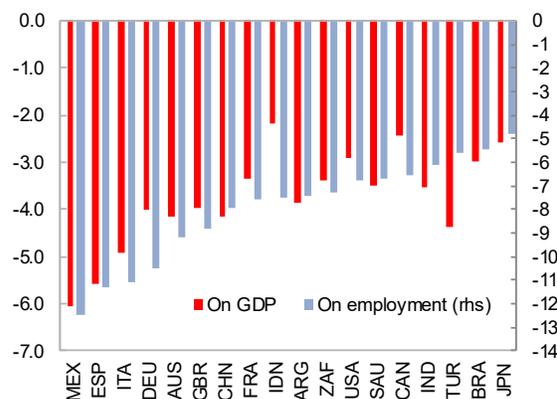
Sources: World Travel and Tourism Council (WTTC); and IMF staff calculations.
Note: The WTTC follows the *Tourism Satellite Accounts* methodology, which defines tourism as domestic and international travel, for business and personal reasons (including education and medical reasons) but excluding travel for seasonal work and as long as there is no change in the residence

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[5] In many cases, tourism activity is strongly seasonal, and the effect on GDP of equivalent travel restriction can significantly differ depending on whether they occur during the high or low travel season. Due to data limitations, the calculations presented in this note are based on annual data and therefore do not accurately take into account seasonality effects that could be more precisely assessed if quarterly data had been available.

[6] These declines could be somewhat offset if some trips are deferred to later in the year.

of the traveler. Tourism includes services provided to domestic tourists before they leave on an international trip, like purchases of luggage, insurance and outbound flights. Tourism excludes indirect tourism activities by suppliers and governments.

## III. HOSPITALITY: RESTAURANTS

Key Facts

Household consumption of restaurant services make up on average almost 4 percent of GDP in G20 economies, with a minimum of about 2 percent in *Mexico* (Figure 4). This means that a sharp decline in activity in this sector would have significantly negative repercussions in all countries. The sector is also important for employment. Accommodation and food services jointly employ about 5 percent of workers in the average G20 country. Countries like *Spain*, where restaurant services account for 8 percent of GDP, are especially reliant on restaurant activity.

High-frequency data show a strong and broad-based decline in restaurant visits between March and May 2020. Restaurant bookings fell by about 99 percent worldwide during the height of lockdowns and had only recovered on average to about 60 percent of their 2019 bookings by the end of June, as lockdowns have eased. However, as a partially compensating effect, one must also recognize that the stoppage in restaurant activity was never total, since even where strict social distancing policies were in place, restaurants were often allowed to operate takeaway and delivery services.

Benchmark Impact of COVID-19

Based on the declines observed in daily restaurant visits, we analyze the effects on GDP growth in 2020 of a

Figure 4. Restaurants Disruption
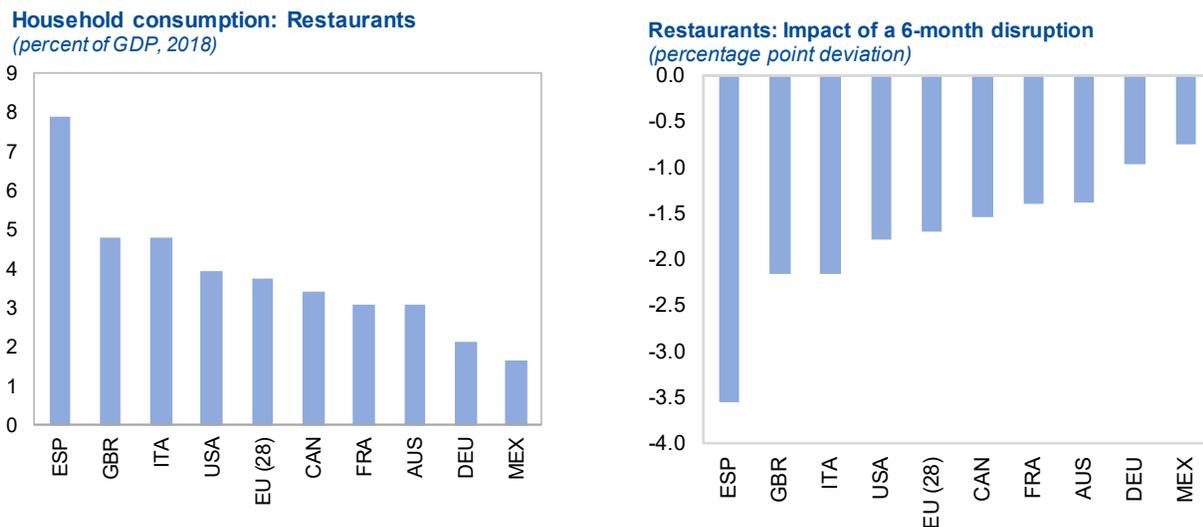
Sources: OECD; IMF staff calculations.
Notes: Data for Canada and the United States are for 2017. EU is for 2016. The consumption data refer to final household consumption of "catering services" within the category of "Restaurants and Hotels". In the right panel, bars represent the annual percent decline in GDP based on the share of consumer expenditure on restaurants times the projected decline in visits. We assume domestic resident visits behave the same way as aggregate bookings.

six-month 90 percent disruption to restaurant activity. Using our basic rule of thumb, this shock would reduce annual GDP growth by 1.7 percentage points for the average country and over 2 percentage points in *Italy, Spain,* and *the United Kingdom,* where restaurants make up a larger share of GDP (Figure 4).

IV. HOSPITALITY: ACCOMODATION

Key Facts

Household consumption of accommodation services, though smaller than for the restaurant sector, represents a non-negligible share of GDP in many G20 countries, reaching 1.5 percent of GDP in *Indonesia* and *Mexico* (Figure 5). As measured by gross value added, the accommodation sector represents a slightly smaller, albeit still important, share of total activity.

Throughout the pandemic, the accommodation sector has been severely affected by a reduction in personal, business, foreign, and domestic travel as well as event hosting. European G20 countries and G20 emerging market economies excluding east Asia saw more than 75 percent declines in hotel occupancy in May relative to one year earlier. Consistent with an earlier outbreak timeline, *China* saw occupancy rates plummet to similarly lows in mid-to-late-February.

Benchmark Impact of COVID-19

Based on its contribution to consumption, a decline of 75 percent in accommodation expenditure lasting for six months would lead to about a ⅓ percent reduction in GDP for the average G20 country (Figure 5).[7] In *Mexico* the negative effect of the reduced consumption would reach almost 0.6 percent of GDP, and slightly less when measured by its value added.[8]

Figure 5. Accommodation Services Disruption
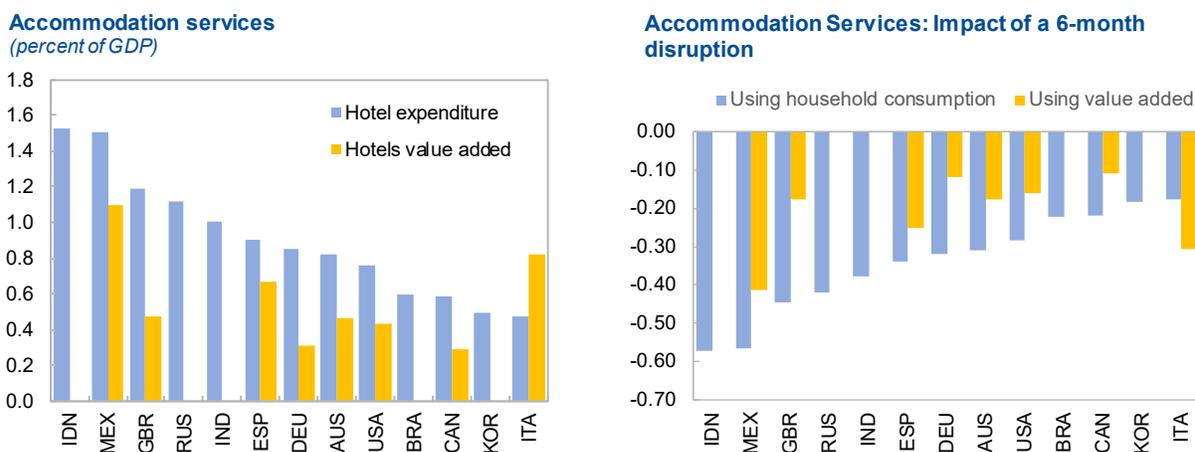
Sources: OECD; and IMF staff estimates.
Note: Value-added data correspond to an estimated share of accommodation in the broader industry Accommodation and Food Services, based on household expenditure shares of accommodation.

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[7] We use a decline of 50 percent based on an average decline in occupancy rates of this amount before the period just before the outbreak to the peak. For example, 80 to 40 percent in Germany, 90 to 10 percent in Italy; 60 to 40 percent in Korea, etc. https://str.com/data-insights-blog/coronavirus-hotel-industry-data-news.

[8] In value-added terms, available data do not separate accommodation and food services. We estimate the share that is accommodation using the share of accommodation expenditure in total household expenditure.
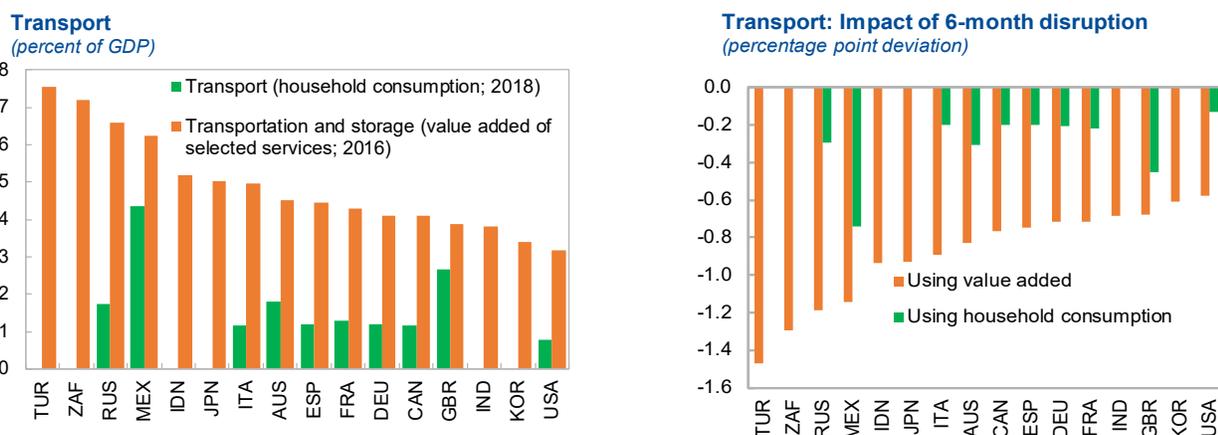
Key Facts

In the median G20 country, value added in the transport and storage sector amounts to some 4½ percent of GDP, and household consumption of transport services alone is equivalent to 1.2 percent of GDP, although data on consumption are not widely available across countries. Latin American households spend an especially large share of income on transport services, due to uneven provision of public transport services (Gandelman Serebrisky, and Suárez-Alemán 2018).

Transport by road, rail, air, and sea has been disrupted by necessary social distancing, border restrictions, and strained global value chains. While personal transport is more affected by necessary social distancing than freight transport, the latter is also disrupted, for example, as border restrictions hold up trucks. Strained global value chains and falling demand for commodities have reduced shipping volumes and frequency. Road traffic, proxied by searches for driving directions in Apple Maps, fell in March to less than 20 percent of their January values in *France, Italy*, and *Spain*. All other G20 countries eventually saw road traffic below 50 percent of their January values between March and May 2020. Beyond driving, public transport has also been severely disrupted, and more so in cities most affected by COVID-19. For example, in New York, subway ridership fell in March to 40 percent of its levels at that time in 2019 (Barclays 2020). Shipping has also been affected by reduced factory production and reduced demand for commodities. Between January and March, the cost of shipping a container fell on average 13 percent, and 25 per cent for routes from *China* and Europe to the *United States*, although these falls are similar to those observed in 2019.[9]

However, the transport sector has also experienced improved business conditions in two respects. First, firms in the sector benefitted from lower fuel prices, which tend to be a major operating cost. Second, as more people work from home, orders at delivery companies have increased.

Figure 6. Transport Services Disruption

Transport
(percent of GDP)

- Transport (household consumption; 2018)
- Transportation and storage (value added of selected services; 2016)

Transport: Impact of 6-month disruption
(percentage point deviation)

- Using value added
- Using household consumption

Sources: Haver Analytics; OECD; and IMF staff calculations.
Notes: Transport data for Canada and Russia are for 2017; South Africa data are for 2014. Transportation and storage data for Canada are for 2014. Value-added data come from the national accounts. Data on household consumption of transport services is missing for India, Indonesia, Japan, Korea, South Africa, and Turkey. The value-added data include storage services.

[9] Based on Freightos Baltic Indices: https://fbx.freightos.com/.

Benchmark Impact of COVID-19

Based on the available information for household consumption, a 40 percent disruption to the transport sector for six months would reduce GDP growth by 0.2 percentage points.[10] However, household consumption of transportation services is only a small fraction of the sector's overall value added (Figure 6). A 40 percent disruption to value added in the transport sector would reduce GDP growth by 0.8 percentage points.[11]

VI. RIPPLE EFFECTS

A decline in final demand in the transportation and storage sector and in the accommodation and food sector has negative effects on the level of gross production across the entire supply structure of the economy, which ultimately provides intermediate goods to the two sectors under consideration. These effects can be traced across the economy using in input-output tables. Following a 1 percent decline in final demand for transportation and storage services, gross output in "other services" would decline by about 0.22 percent on average across G20 countries (Figure 7, left panel).[12] Similarly, gross output from the goods manufacturing sector (excluding food and vehicles) would decline by 0.17 percent, on average. Output from all other sectors would be less severely affected. A decline in final demand for food and accommodation services would have more wide-ranging spillovers, reducing gross output in the food manufacturing sector by 0.19 percent on average, in the other services sectors by 0.18 percent, in wholesale a retail trade by 0.13 percent and in primary goods (which includes agriculture) by 0.11 percent (Figure 7, right panel).[13]

Figure 7. Gross Output Elasticities from a Change to Final Demand in the Transportation and Storage and Accommodation and Food Sectors

G-20: Transportation and storage, 2015
(Index)

G-20: Accomodation and food services, 2015
(Index)
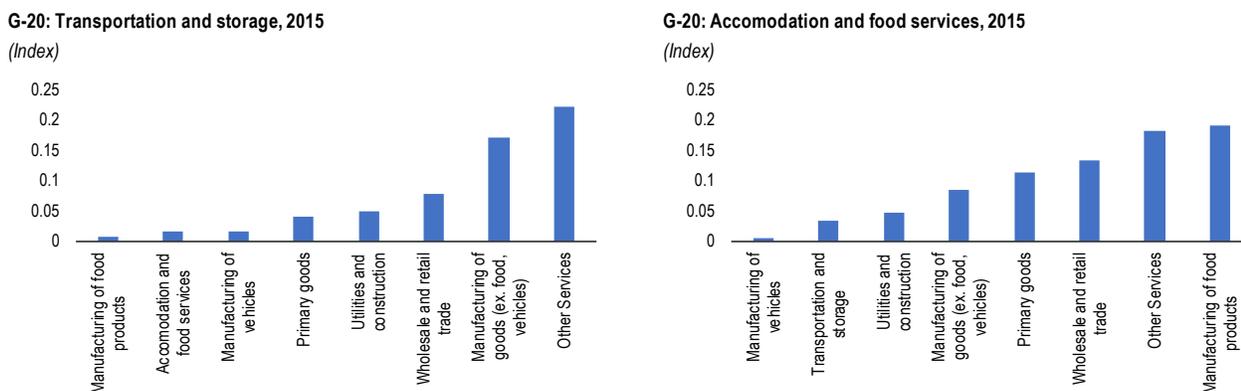
Source: IMF staff calculations using OECD Input-Output Leontief Inverse Matrix data.
Note: G20 includes Spain. Results calculated using the domestic Leontif inverse matrix of the OECD input-output tables. Sectors are grouped into broad categories based on the ISIC 4 Classification. Other services include publishing, telecommunications, information technology, financial and insurance, real estate services, other business sector services, public administration and defense, education, human, health and social work, arts, entertainment and recreation, and private households with employed persons.

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[10] This calculation assumes an import content of transport consumption of 15 percent, drawing on Timmer and others (2015).

[11] Based on more detailed data available for the *United States*, this calculation assumes that transport makes up 90 percent of all activity in the broader "transport and storage" sector.

[12] "Other services" combines publishing, telecommunications, information technology, financial and insurance, real estate services, public administration, education, health, arts, and private household employment.

[13] The impact to own-output for the transport and storage and accommodation and food sectors are not shown. The fall in gross output in these categories is the full 1 percent decline in demand, plus an additional 0.14 percent for transport and storage and 0.01 percent for accommodation and food sector, on average.

The numbers above provide an indication of how a given reduction in household final demand for transport, storage, accommodation, and food services percolates through the production chain and impacts gross output the different sectors of the economy. Still, these calculations do not incorporate the effects of the shock in a general equilibrium sense.[14] Nonetheless, it's reasonable to argue that disruptions to travel and hospitality sectors could also have significant knock-on effects to domestic consumption, not the least because transport, storage, accommodation, and food services account for a sizable 8 percent of labor compensation in the median G20 country. Moreover, these are low-paying sectors characterized by significant degree of informal jobs, with transport and storage and accommodation and food services showing, respectively, the 2nd and 8th lowest labor earnings (per worker) out of 21 sectors (according to the International Labour Organization).[15] Thus, one possible spillover channel is the impact of the shock on low-income households, who are more likely to be liquidity constrained and could therefore cut their consumption significantly following a loss of labor income. These liquidity constraints have in some cases been relaxed by supportive policies, including unemployment insurance, social protections, and monetary policy accommodation.

VII. SUMMARY

Overall, COVID-19 will have severe impacts on GDP in all countries, especially so in those that count travel and hospitality as a large share of their output. Based on aggregate data, which accounts for direct and indirect contributions to the sector, a 75 percent disruption of the tourism sector for six months would lead to a 3½ percentage point reduction in GDP growth in 2020 across G20 countries. Alternatively, summing up a 75 percent disruption of accommodation services together with a 90 percent disruption to restaurants and a 40 percent disruption to travel for six months would reduce GDP growth in 2020 in the average G20 country by 2½ percentage points, based on household consumption information. These shocks would percolate through the production chain and would have significant impacts on other sectors of the economy, especially in services sectors.

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[14] For instance, calculations based on input-output tables do not take into account that substitution effects may cause a fall in demand in certain sectors to be at least partially compensated by increasing demand in others. See for instance Krueger, Uhlig, and Xie (2020).

[15] This discussion does not rule out the possibility that higher-income households cut their consumption too, and even by more than lower-income households, as in Chetty and others (2020).

REFERENCES

Barclays. 2020. "Social Distancing Started Last Week, but Hospital Load Already Near Peaks." Data Science High Frequency Indicators Update. Special Report. March 16.

Chetty, Raj, John N. Friedman, Nathaniel Hendren, and Michael Stepner. 2020. "How Did COVID-19 and Stabilization Policies Affect Spending and Employment? A New Real-Time Economic Tracker Based on Private Sector Data." NBER Working Paper 27431, National Bureau of Economic Research, Cambridge, MA.

Gandelman, Nestor, Tomas Serebrisky, and Ancor Suárez-Alemán. 2018. "Household Spending on Transport in Latin America and the Caribbean: Understanding Transport Expenditure Patterns." Journal of Transport Geography 79.

Krueger, Dirk, Harald Uhlig, and Taojun Xie. 2020. "Macroeconomic Dynamics and Reallocation in an Epidemic." NBER Working Paper 27047, National Bureau of Economic Research, Cambridge, MA.

Timmer, Marcel P., Erik Dietzenbacher, Bart Los, Robert Stehrer, and Gaaitzen J. De Vries. 2015. "An Illustrated User Guide to the World Input–Output Database: The Case of Global Automotive Production." *Review of International Economics* 23(3): 575–605.