

Abstract:

COVID-19 has had an unprecedented negative impact on the global economy, and the effects are felt most acutely in the tourism sector. A safe return of the international tourism sector is essential to the million's of people around the globe who rely on this sector for their livelihood. Given the nature of the international tourism industry, the sector's rebound depends on a coordinated effort among governments to relax cross-border travel restrictions. This paper attempts to quantify the cost if these efforts fail. Using the OECD METRO model, we find that an uneven recovery in the tourism sectors would reduce the gains in real GDP by 1.4 USD trln, relative to an even recovery where all countries simultaneously relax restrictions on the tourism sector to the same degree

COVID-19, Tourism, and the Cost of Uneven Recovery

Christine Arriola, Przemyslaw Kowalski, Frank van Tongeren

Introduction

The COVID-19 pandemic and associated policy responses aimed at containing the virus has had far-reaching economic effects. In many countries, citizens are required to work from home; social interactions are limited; schools, shops and restaurants ordered to close; and governments placed restriction on travel both within and across international borders. Policies, which essentially shuttered economies, have drastically slowed or stopped activity in certain sectors worldwide. Global GDP declined -3.4% in real terms in the first year of the pandemic, and despite the rebound which started in the mid-2020 global GDP is still 3.5 percent lower than projected pre-pandemic levels (OECD, 2021^[1]).

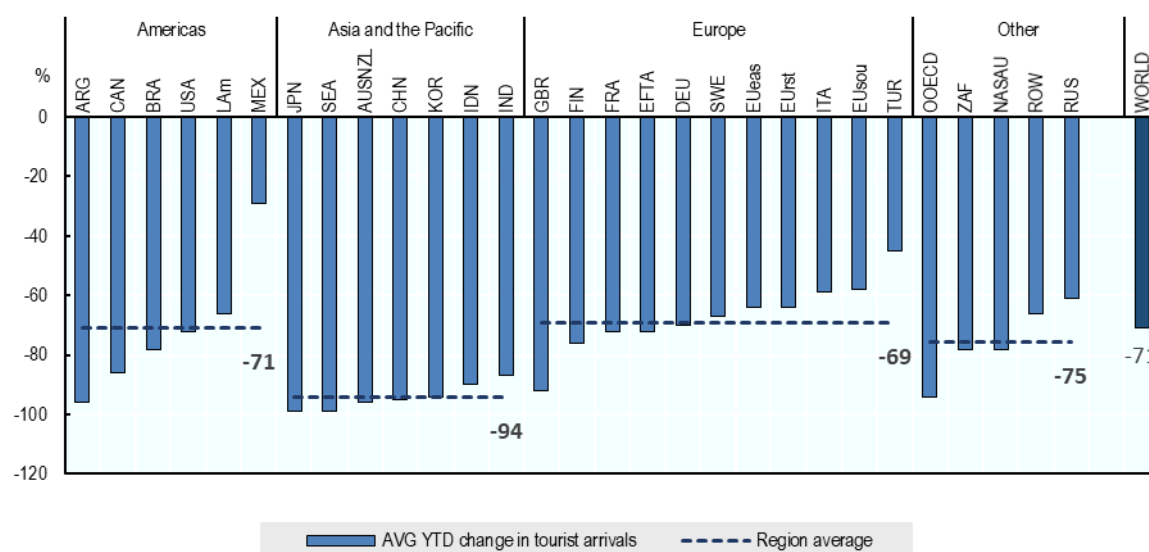
Given the characteristics of the policy measures put in place to limit the spread of COVID-19, it is not surprising that the travel and tourism sectors are among the hardest hit. The number of tourist arrivals in 2020 was 72.6% below the previous year¹. Despite improvements in 2021 as countries relaxed to varying degrees the stringent restrictions put in place in 2020, the growth in these sectors remains below pre-pandemic levels. Tourist arrivals in the third quarter of 2021 was 64% below 2019 levels; similarly, export revenues from international tourism was less than half of the 1.7 trillion USD recorded in 2019 (UNWTO, 2021^[2]).

Moreover the recovery has been uneven (Figure 1). Government strategies to tackle the COVID-19 crisis, vaccination rates, and COVID case rates vary from region to region which translate to an uneven pace of recovery of the tourism sector. Tourist arrivals into the Asia and the Pacific Region was down 94% in 2021 compared to pre-pandemic levels, since non-essential travel was prohibited in many destinations in this region. Europe and the Americas on the other hand opened borders to tourists albeit under certain requirements. The number of tourists arriving into these regions, while still below the levels in 2019 (-69% and -71% respectively), was an improvement compared to other regions (UNWTO, 2021^[2]).

A number of CGE analyses have examined the impact on the tourism. A New Zealand Institute of Economic Research study used a CGE model to investigate the potential local and regional impacts of COVID-19 in New Zealand with a focus on tourism (Leroy de Morel, 2020^[3]). In addition, a study by UNCTAD used CGE analysis to assessed the economic consequences of COVID-19 for the global tourism sector (UNCTAD, 2020^[4]). The Economic Research Institute for ASEAN and East Asia used a CGE model for the Indonesian Economy to analyses the impact of the pandemic along with the measures the government has taken to support the travel and tourism sector in the country (Rum, 2021^[5]). In this paper we move beyond impact and look towards recovery.

¹ UNWTO Dashboard (<https://www.unwto.org/global-and-regional-tourism-performance>) accessed 14 January 2022.

FIGURE 1. INTERNATIONAL TOURIST ARRIVALS 2021 COMPARED TO 2019



Source: UNWTO Tourism Recovery Tracker (<https://www.unwto.org/unwto-tourism-recovery-tracker>) accessed 13 January 2022.

Given the global, economy-wide impacts of COVID-19 and the interconnected nature of the international tourism industry, a global CGE model is well suited to examine the impacts of the pandemic and the recovery. Using the OECD METRO model (OECD, 2020^[6]), this paper proposes to analyse the impact of an uneven recovery of the tourism sector. The analysis will be based on results from a forthcoming OECD report (OECD, Forthcoming^[7]) which incorporates the effects of the global pandemic into the METRO model. Specifically, the analysis incorporates four key COVID-19 factors into the model: (i) labour markets (productivity); (ii) impact on consumer and firm demand; (iii) trade costs for goods (due to border measures) and services (due to travel restrictions) associated with COVID-19 measures; and (iv) fiscal policy support measures (distinguishing between the corporate sector and households).

Using the results from this previous analysis, and in particular the simulated database incorporating the full set of 2020 COVID-19 shocks, we propose two scenarios to assess the economic effect of an uneven recovery in the tourism sector. The first scenario assumes governments ease travel restrictions on a coordinated basis (same amount at the same time). Scenario 1 will remove a portion of the travel restrictions put in place during COVID-19 pandemic in all regions. Specifically 50% of the trade cost due to COVID-19 travel restrictions will be reduced on travel and tourism sectors: air travel, land transportation, hospitality, and recreation. The second scenario will assess an uneven recovery. In scenario 2, we will assume that the relative pace of recovery remains as it was in 2021 (represented in Figure 1). In scenario 2, the size of the reduction in the trade cost is adjusted so that it is inversely proportionate to the relative loss of international tourist arrivals at the end of 2021. A relatively smaller decline in tourist arrivals between 2021 and 2019 translates to larger reductions in trade costs. Comparing the results of scenario 1 and 2 will give a quantitative estimate of the cost of an uneven recovery in the tourism sector.

The paper is organised as follows. First, we give a brief description of the METRO model and database. Second, we describe the two scenarios and how they are implemented in the model. Third, we discuss the impact of COVID-19 measures on the tourism industry using results from (Arriola, Kowalski and van Tongeren, Forthcoming^[8]) which will be the baseline for this analysis. Fourth, we examine the results of the two simulations. And the last section concludes.

Model

The METRO model (OECD, 2020^[6]) is a computable general equilibrium (CGE) model, and it has been calibrated for this analysis to 29 regions, 26 sectors, and 8 production factors. Like many CGE models, METRO relies on a comprehensive specification of all economic activity within and sometimes between countries (and therefore the different inter-linkages that tie these together). The model builds on the GLOBE model developed by (McDonald and Thierfelder, 2013^[9]). The novelty and strength of METRO lies in the detailed trade structure and the differentiation of commodities by end use. Specifically, commodities and thus trade flows are distinguished by whether they are destined for intermediate use, for use by households, for government consumption, or as investment commodities.

The database of the model relies on the GTAP v10 database reference year 2014 (Aguiar et al., 2019^[10]) in combination with the OECD Inter-Country Input-Output Tables, which are the main source of the OECD Trade in Value Added Indicators and allows the model to distinguish trade for use in intermediate production or final demand. Available policy information includes tariff and tax information from GTAP as well as OECD estimates of non-tariff measures on goods (Cadot, Gourdon and van Tongeren, 2018^[11]), services (Benz and Gonzales, 2019^[12]); (Benz and Jaax, 2020^[13]), trade facilitation (OECD, 2018^[14]) and export restricting measures. The METRO database contains 65 countries and regional aggregates and 65 commodities.

The model is firmly rooted in microeconomic theory, with firms maximising profits and creating output from primary inputs (i.e. land, natural resources, labour and capital), which are combined using constant elasticity of substitution (CES) technology, and intermediate inputs in fixed shares (Leontief technology). Households are assumed to maximise utility subject to a Stone-Geary utility function, which allows for the inclusion of a subsistence level of consumption. All commodity and activity taxes are expressed as ad valorem tax rates, and taxes are the only income source to the government.

This analysis was implemented with a version of METRO configured for short-term analysis, featuring, among others, immobile land and capital. The trade balance is assumed to be flexible. Wages are assumed downwardly rigid. The government is assumed to maintain its expenditure in real terms, while taxes remain unchanged and the government balance is allowed to adjust. Investment demand is assumed to be fixed as a share of domestic absorption while private domestic savings are free to adjust.

The starting point for this simulation is based on the analysis (Arriola, Kowalski and van Tongeren, Forthcoming^[8]) where COVID-19 related factors and associated policy responses were incorporated into the METRO model. Specifically, four types of economic shocks related to the COVID-19 containment measures as well as other economic policy responses were incorporated into the model. These include: 1) Changes in labour productivity; 2) Changes in demand; 3) Border measures that affected the cost of trading goods and services; and 4) Governments financial support to households, workers, and firms negatively impacted by the COVID-19 containment measures.

Scenarios

In the COVID-19 scenario, two types of shocks were applied to the tourism sectors, a value added tax (VAT) and iceberg trade costs were calibrated to reproduce observed output changes in 2020. Both parameters serve to simulate a reduction in demand. Additional iceberg costs were applied on the transport sectors based on the increase in the Ad valorem Equivalents of the OECD Services Trade Restrictiveness Indicators (STRI) when additional COVID-19 related border measures are in place.^{2,3} In the recovery

² For more information on the STRI, please see: [Services Trade - OECD](#)

³ See (Arriola, Kowalski and van Tongeren, Forthcoming^[8]) for more details on the COVID-19 simulation shocks.

scenarios for this analysis, the shocks are reduced to account for increase demand and relaxed border regulations.

The analysis compares two different types of recovery scenarios. The first scenario is one where all regions have a similar rate of recovery. Specifically all regions gain back half of the shocks applied in the COVID-19 scenario in the tourism sectors (air, water, and land transport as well as hospitality and recreation sectors), due to governments closing borders or shutting down sectors that required face-to-face interaction. Meaning if in the COVID-19 scenario, a 10% value add tax was applied on the hospitality sector in region A and 20 % tax in region B, then a 5% and 10% subsidy would be applied in the hospitality sector in the respective regions for the even recovery simulation.

A second scenario assumes an uneven recovery across regions. Using data from the UN World Tourism Organisation's (UNWTO), the relative rate of the recovery of the tourism sector in a region would reflect the relative change in tourist arrivals before and after the COVID period (the change between 2021 and 2019). Mexico, for example, had the lowest reduction of tourist arrivals between the two periods. In the uneven recovery scenario. We assume that Mexico would gain back half of the shock applied in the COVID-19 scenario. Tourist arrivals in the Southern European Union (EU South) which consists of Spain, Greece, Cyprus, and Portugal, is still 58% lower than in 2019. Accordingly, the assumed recovery for EU South is half of what is assumed for Mexico and this region would gains back only 25% of the shock applied in the COVID-19 scenario. So if for example in the COVID-19 scenario a 20% value added tax was applied on the hospitality sector in EU South, then for the uneven recovery scenario a 5% subsidy would be applied to the hospitality sector in this region. Table 1 summarizes the shocks applied in the even and uneven scenarios.

TABLE 1. SHOCKS APPLIED IN RECOVERY SCENARIOS

Region	Change in tourist arrivals 2019-2021	Average reduction applied in recovery scenarios (additive)					
		Even recovery			Uneven recovery		
		share of negative COVID-19 shock recovered	iceberg cost	VAT	share of negative COVID-19 shock recovered	iceberg cost	VAT
Argentina	-96.0	50.0	0.023	-43.0	15.1	0.007	-12.98
AUSNZL	-96.0	50.0	0.020	-10.9	15.1	0.006	-3.28
Brazil	-78.0	50.0	0.023	-15.0	18.6	0.008	-5.58
Canada	-86.0	50.0	0.022	-18.9	16.9	0.007	-6.39
China	-95.0	50.0	0.025	-2.3	15.3	0.008	-0.69
United Kingdom	-92.0	50.0	0.009	-24.2	15.8	0.003	-7.65
France	-72.0	50.0	0.021	-24.4	20.1	0.008	-9.82
Germany	-70.0	50.0	0.020	-5.4	20.7	0.008	-2.24
Italy	-59.0	50.0	0.021	-17.1	24.6	0.010	-8.43
Sweden	-67.0	50.0	0.021	-9.8	21.6	0.009	-4.24
Finland	-76.0	50.0	0.021	-13.6	19.1	0.008	-5.19
EU east	-64.0	50.0	0.018	-8.8	22.7	0.008	-3.98
EU south	-58.0	50.0	0.020	-36.0	25.0	0.010	-17.98
EU all other	-64.0	50.0	0.018	-15.5	22.7	0.008	-7.04
EFTA	-72.0	50.0	0.019	-17.4	20.1	0.008	-6.99
Indonesia	-90.0	50.0	0.026	-2.6	16.1	0.008	-0.82
India	-87.0	50.0	0.019	-25.6	16.7	0.006	-8.55
Japan	-99.0	50.0	0.018	-13.8	14.6	0.005	-4.04
Korea	-94.0	50.0	0.028	-9.8	15.4	0.009	-3.01
Mexico	-29.0	50.0	0.013	-72.4	50.0	0.013	-72.35
Russia	-61.0	50.0	0.016	-18.8	23.8	0.008	-8.93
South Africa	-78.0	50.0	0.018	-10.7	18.6	0.007	-4.00
Turkey	-45.0	50.0	0.012	-11.5	32.2	0.008	-7.40
United States	-72.0	50.0	0.020	-13.2	20.1	0.008	-5.30
Other OECD	-94.0	50.0	0.021	-15.7	15.4	0.006	-4.82
Latin America	-66.0	50.0	0.024	-12.8	22.0	0.010	-5.63
South East Asia	-99.0	50.0	0.020	-18.9	14.6	0.006	-5.51
NASAU	-78.0	50.0	0.000	0.1	18.6	0.000	0.05
Rest of the world	-66.0	50.0	0.015	-15.4	22.0	0.007	-6.77

Note: Simple average across relevant tourism sectors

Source: UNWTO Tourist Tracker and OECD METRO Model

Tourism sector

The tourism industry is an important sector in most regions as a source of employment, tax revenue, and foreign exchange. Tourism sectors⁴ accounted for 9 % of total world output in the pre-COVID-19 database, though it has varying importance in different regions. In Turkey, the Southern EU, Australia and New Zealand tourism sectors account of at least 10 % of total output, where as in Canada, China, and North Africa and Saudi Arabia tourism accounts for less than half that (Figure 2).

⁴ “Tourism sectors” refer three transport service sectors (air, water, and other transport not elsewhere classified) as well as the hospitality and recreation service sectors.

Interlinkages among the sectors of the economy funnel shocks in one sector to the rest of the economy. The tourism industry is linked to rest of the economy as it requires inputs for the other sectors of the economy (Figure 3). The hospitality and recreation sectors, for example, use inputs from the retail trade, food, business and communication services sectors. The transportation service sector needs considerable inputs from other manufacturing (accounting for 41 % of its inputs), warehousing, and other services. Moreover, the tourism sectors are an important user of certain commodities. Almost a quarter of the other manufacturing are used as intermediate goods in the tourism sectors. And, 23% of food and 43% of beverage and tobacco are used as inputs for the tourism industry as well. Factors affecting the tourism industry could have far-reaching economic implications.

The linkages of the tourism industry extend beyond a country's borders. International tourism, exports of tourism sectors for household use, is a channel through which one country's policies could affect another country's domestic industry. International tourism⁵ accounted for a little over 2 % all total world exports in the pre-COVID-19 baseline. However, international tourism in certain regions play a more important role in the export sectors. For example international tourism in EU South, Turkey, and Australia and New Zealand account for 8, 6, and 4% of the region's total exports respectively.

A good bit of international personal travel stays within the larger geographic region. Distance, time, culture, cost, most likely play a role in where people decide to vacation. For countries in the Asia and the Pacific region and Europe⁶ about 30 and 50 % of international tourism stays within the respective regions. For the tourist in the Americas only about 15% of international tourism stays within the region. Nevertheless, a large share households travel outside the region. Figure 5 shows the bilateral trade of the tourism sectors. Europe accounts for the largest share of exports and imports⁷ (43.2% and 43.8% respectively). For households in the Americas, Europe is their top destination accounting for 43% of tourism imports. Whereas households in the Asia and the Pacific regions import tourism services from Europe and within the Asia and Pacific regions almost equally (30 % and 33 % respectively).

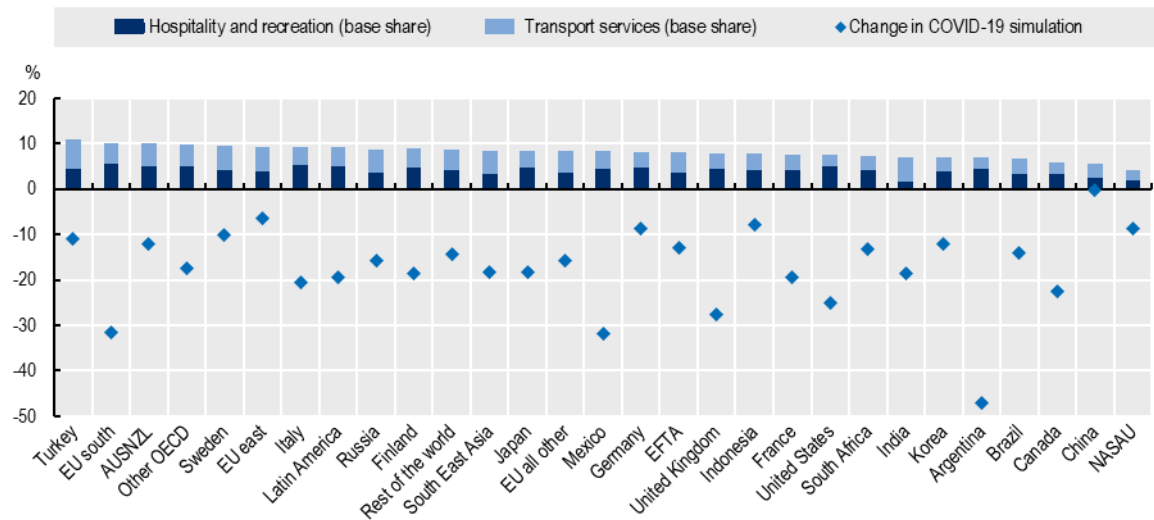
Given the integral nature of cross border trade in the international tourism sector and social aspect of the industry, government measures aimed at containing the COVID-19 virus has had devastating effects on this industry.

⁵ International tourism is defined in this paper as tourism sectors traded for household use. Region's that export of tourism sectors are the tourist destination region, while the households in countries importing the services would be considered the "tourist".

⁶ See Table A 0.1 in the Annex for the classification of the model regions.

⁷ Exporters of tourisms sectors are the destination regions while Importers of tourism sectors are regions where the household or "tourists" reside.

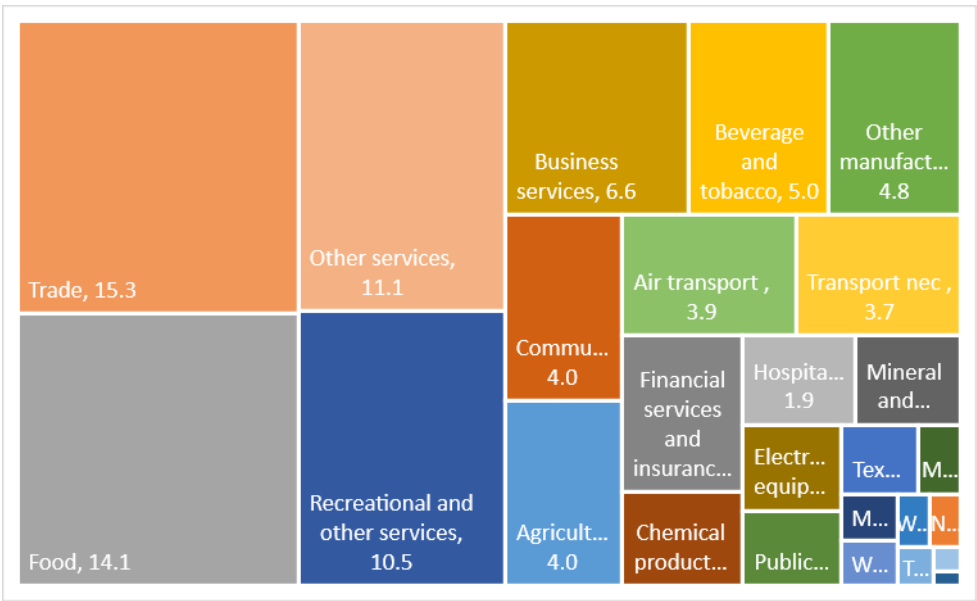
FIGURE 2. THE IMPORTANCE OF THE TOURISM SECTOR IN A COUNTRY’S OUTPUT VARIES



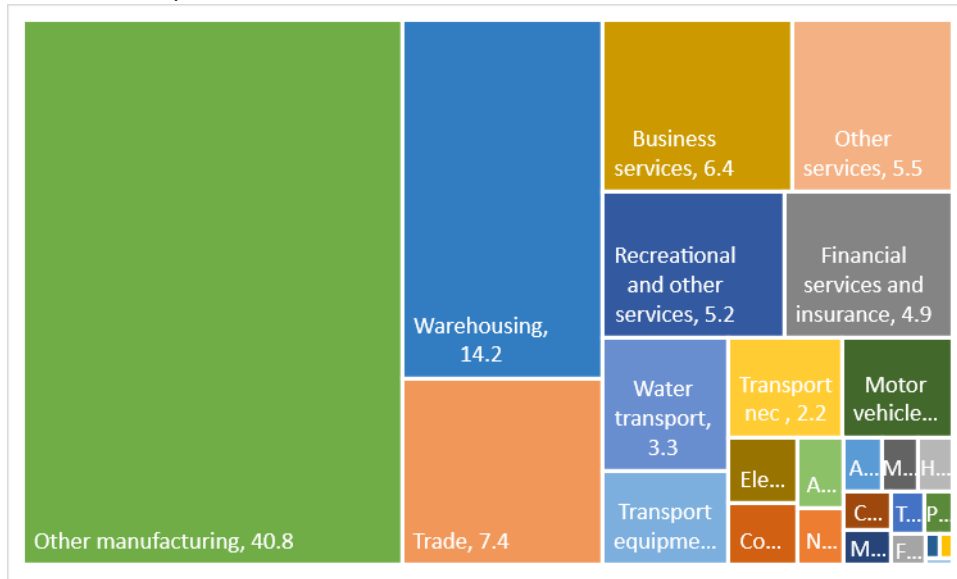
Source: OECD METRO model COVID-19 simulations (Total sectoral output)

FIGURE 3. INPUTS INTO TOURISM SECTORS

Panel A Hospitality and recreation sectors

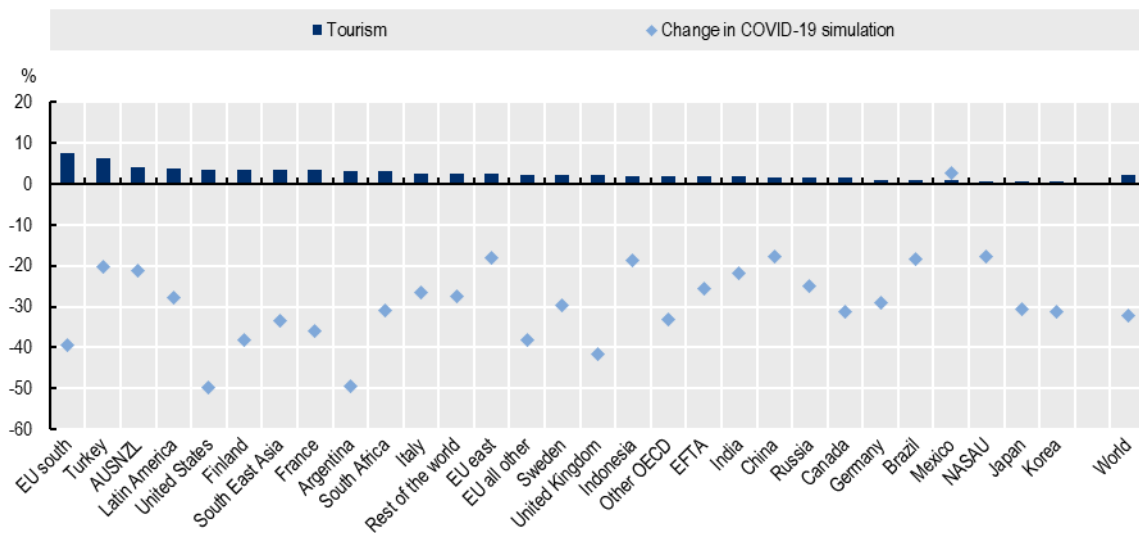


Panel B: Transport sectors



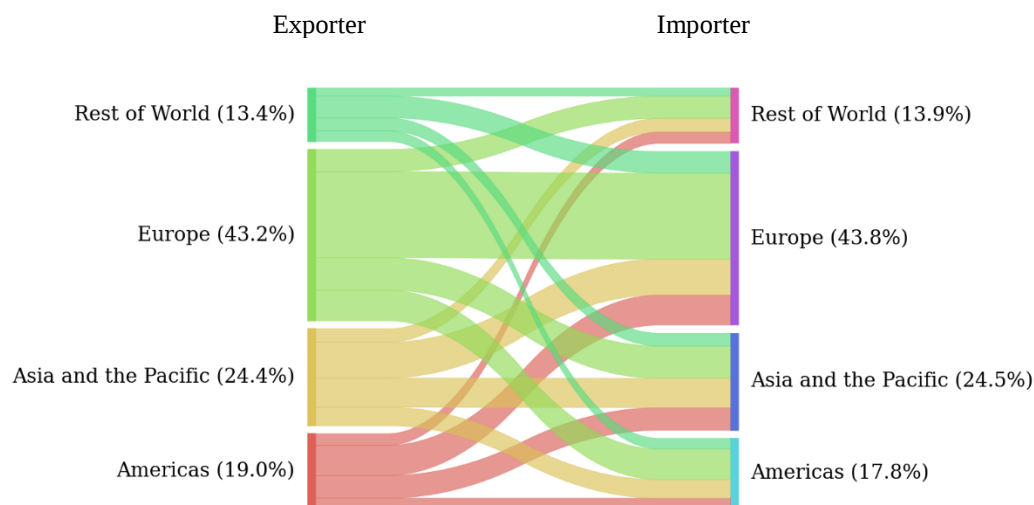
Source: OECD METRO model

FIGURE 4. TOURISM TRADE VARIES IN IMPORTANCE ACROSS REGIONS



Note: Share of exports of tourism sectors for household use. Change due to covid-19

Source: OECD METRO Model

FIGURE 5. BILATERAL TRADE OF TOURISM SECTORS FOR USE HOUSEHOLDS USE PRE-COVID-19

Note: Covers bilateral trade of air, water, and transport services as well as hospitality and recreation sectors for household use. Exporters of tourist service providers are on the left hand side and Importers of those services are on the right hand side.

Source: OECD METRO Model

Tourism sector and COVID-19

Almost immediately after the first COVID-19 case was detected in China at the end of 2019, countries closed their borders limiting entry to only essential travel. In addition, governments closed public places and shuttered non-essential businesses as precautionary measure to control the spread of the virus. The tourism sectors were hit particularly hard. Consumer demand shifted from services sectors, that were forced to shutdown, towards home nesting goods and products needed to work from home like electronics and communication services. The simulation from (Arriola, Kowalski and van Tongeren, Forthcoming^[8]) reproduced in Figure 6 includes these shifts in demand and decomposes the effect of the various COVID-19 related factors. Air transport, hospitality and recreation are among the sectors with the highest decrease in consumer demand. The decrease is mostly attributed to the government measures trying to limiting social interaction ("Demand" shock in the chart). Cross border trade restrictions also contributed to the decline in consumer demand in the transport sectors.

In the model simulation, world total trade declined 6% but the trade in international tourism declined 32%. Exports of air transport, hospitality and recreation where the three hardest export sectors worldwide (Figure 7).

Two years after the start of the pandemic, countries have relaxed some though not all COVID-19 containment measures. Restaurants and museums opened their doors to visitors. Countries have started to allow leisure travellers across borders, although some still require tests or proof of vaccinations. Moreover, the extent to which governments relaxing these rules vary by region (Figure 8). Asia and the Pacific region have maintained their strict cross border movements since the start of the pandemic. Europe has only recently relaxed its border regulations. While the Americas and rest of world have had the least number of COVID-19 related border requirements since the end of 2020.

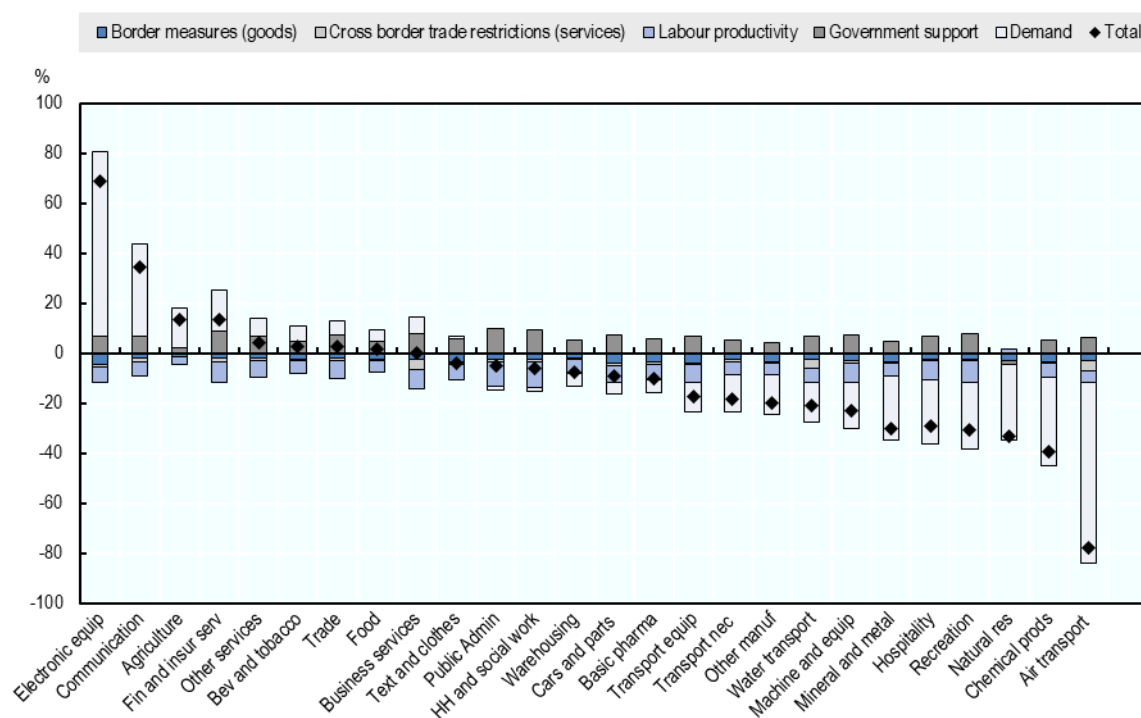
The relative restrictiveness of the border regulations are reflected in the number tourist arrivals presented in Figure 1. Tourist arrivals in the Asia and the Pacific Regions are still well below the 2019 levels (on average 94 % below 2019). Tourism in the Americas have recovered at a stronger pace. The decline in

tourist arrivals in this region averaged only - 71%, but varied across countries. Tourist arrivals in Mexico was down only 29% compared to 2019 levels, while Argentina was still down 96%.

There is an economic cost to this uneven recovery in the tourism sectors. The simulations tries to quantify this cost by comparing the economic effects of an even recovery, where tourism in all regions recover at the same rate with one where the relative rate of recovery of the tourism sector reflects the current situation. Countries in the Asia and Pacific region, maintain most of their border regulations as well as social distancing rules, while countries in the Americas, Mexico in particular removes about half.

FIGURE 6. CONSUMER DEMANDS SHIFTS FROM SERVICES TOWARDS HOME NESTING PRODUCTS

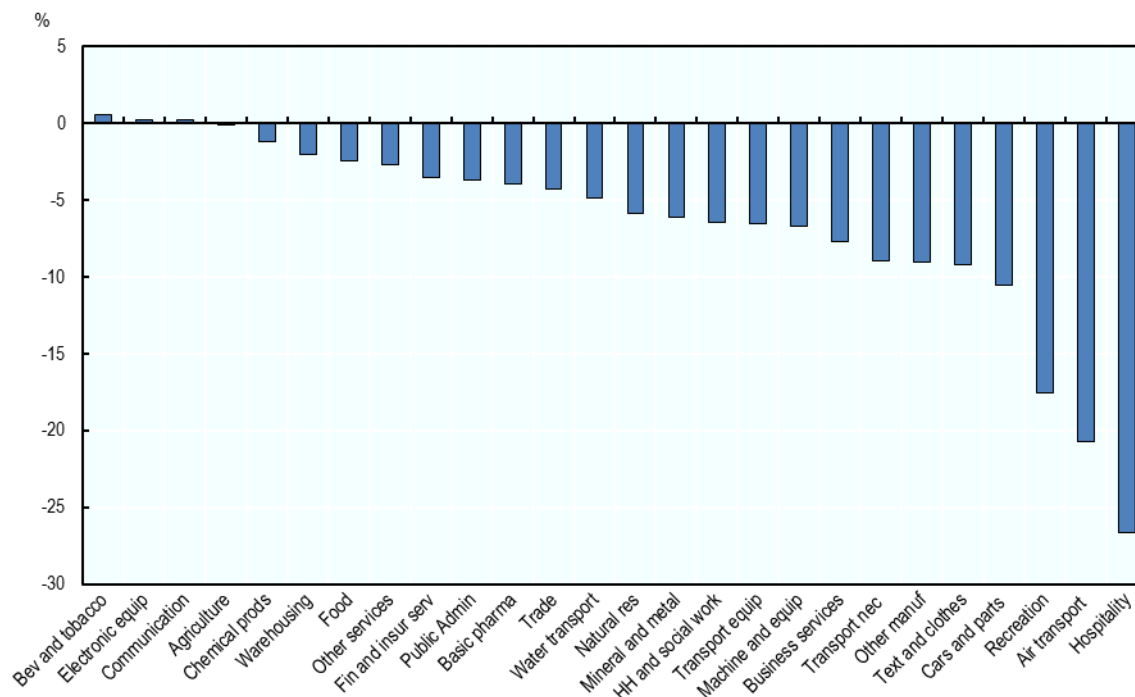
Per cent change from base



Source: OECD METRO model COVID-19 simulation

FIGURE 7. EXPORTS OF SECTORS IN THE TOURISM INDUSTRY HARDEST HIT BY COVID-19 MEASURES

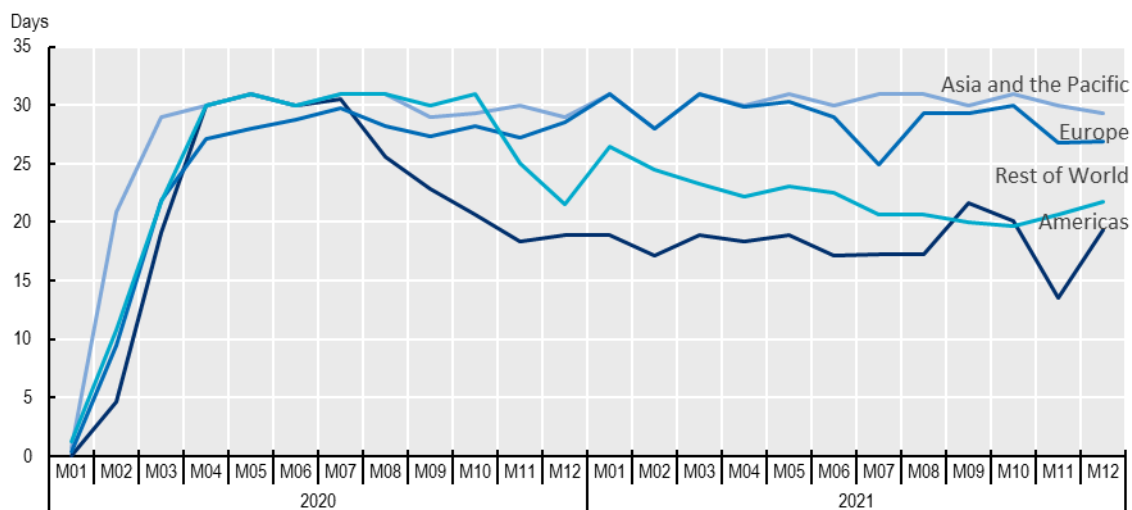
Per cent change from base



Note: Includes all COVID-19 factors implemented in the model

Source: OECD METRO Model COVID-19 simulation

FIGURE 8. RELAXATION OF BORDER MEASURES VARY ACROSS REGIONS



Note: Chart displays the average number of days across the countries in each aggregate region that governments required screening of arrivals, quarantine, or banned arrivals from any or all regions.

Source: Oxford Coronavirus Government Response Tracker.

Recovery

An even recovery in the tourism sectors would increase real GDP with respect to the COVID-19 baseline by 3.3%. The Americas region would see the strongest recovery (6%) and Europe second (3.9%). If regions open up their borders and their economies at different paces, then real GDP improves only by 1.4% from the COVID-19 baseline. World real GDP loss from an uneven recovery would amount to 1.4 USD trln and half the loss would be accounted for by the Americas (Table 1).

At the detailed region level, EU south would benefit the most from an even recovery, followed by Argentina, United Kingdom and United States (Figure 9). In the uneven recovery scenario, the United States would be the biggest loser in terms of absolute losses. The United States would lose 566 USD bln compared to the even recovery scenario which amounts to half the amount gained if all regions recovery at the same rate.

International tourism trade increases just over 10% worldwide in the even recovery scenario (Table 3). If regions relax their restrictions on these sectors at varying degrees, then the gain would be reduced to around 3%. The loss would amount to 20.5 USD bln in export revenue compared to the even recovery scenario. More than half of this loss is accounted for by the hospitality and recreation sector who would lose 13.5 USD bln due to an uneven recovery. Moreover, the tourism sectors in the two aggregate regions where intra-regional tourism trade accounted for 30% or more, Europe and the Asia and Pacific region, have the most to gain from an even recovery scenario in absolute terms. Europe would gain almost 1 USD bln in tourism exports if recovery among regions was even rather than uneven. In Asia and the Pacific region, the gain would be 0.77 USD bln.

Recovery of the tourism sectors has positive effects on the broader economy. The tourism sector directly benefited from a relaxation of government COVID-19 measure in the simulation. Global production of the tourism sectors increases 7% in the even recovery scenario. Inputs into the tourism industry also benefited from the increase consumer demand of the sector. Global production of food and beverage increased 3 %. Retail trade, a main input of the hospitality sector increased 4%. Global production of other manufacturing and warehousing, the top two inputs in the production of the transportation sectors, increased around 2% each.

An uneven recovery in the tourism sectors would see total global output increase by only 1.3% which translates to a loss in global production of 2.5 USD trln relative to the even recovery scenario. The tourism sectors would be the most worse off, dropping, on average, about 4 percentage points from the even scenario gains in production. Other sectors used as inputs into the tourism sector would lose about 2% in terms of production volumes relative to the even scenario – sectors like food, beverage and tobacco, communication, finance and other business services.

Conclusion

COVID-19 and the associated policy responses to contain the virus has had a negative impact on global economies and international trade. Given the characteristics of the policy measures put in place to limit the spread of COVID-19, it is not surprising that the travel and tourism sectors are among the hardest hit.

Two years after the start of the pandemic, countries have reduced some of the COVID-19 containment measures. However, the recovery and relaxation of the measures have not been at the same pace. This paper tries to quantify the cost of the uneven recovery of the tourism industry. Using the OECD METRO model and the results from (Arriola, Kowalski and van Tongeren, Forthcoming^[8]) which incorporated the full set of 2020 COVID-19 shocks into the model database, we analysed two scenarios to assess the economic effect of an uneven recovery in the tourism sector.

We found that an even recovery in the tourism sectors would increase real world GDP with respect to the COVID-19 baseline by 3.3%, but an uneven recovery reduces the gains to 1.4%. This translated into a cost of uneven recovery of 1.4 USD trln. International tourism trade increases just over 10% worldwide in the even recovery scenario, but only 3% at the current uneven pace of recovery. An uneven recovery in the tourism sectors would see total global output increase by only 1.3% which translates to a loss in global production of 2.5 USD trln relative to the even recovery scenario.

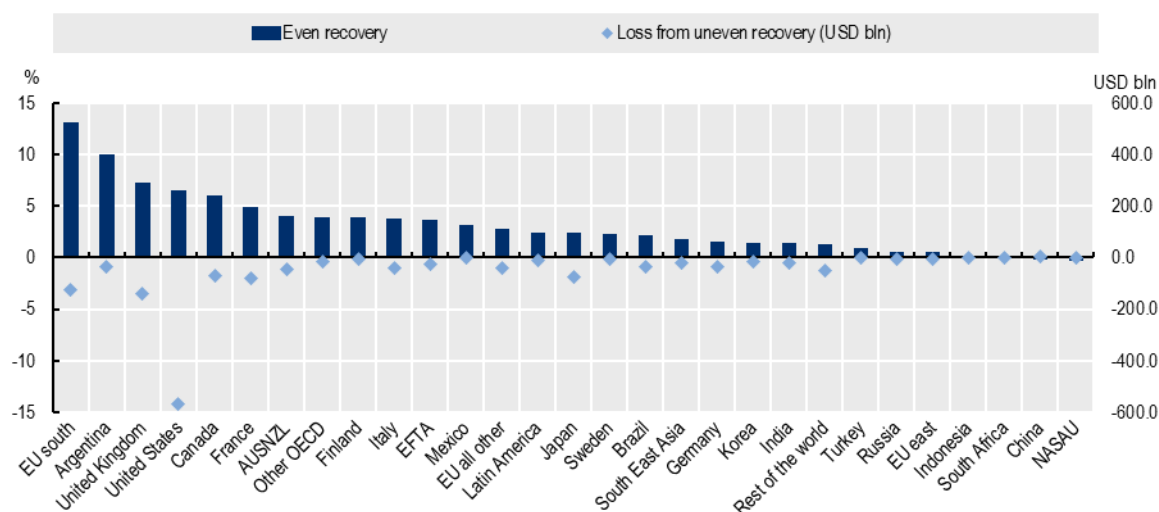
COVID-19 has had an unprecedented negative impact on the global economy, and the effects are felt most acutely in the tourism sector. A safe return of the international tourism sector is essential to the million's of people around the globe who rely on this sector for their livelihood. However, the sector's rebound depends on a coordinated effort among governments (UNWTO, 2021^[2]). This paper has attempted to quantify the cost if these efforts fail.

TABLE 2. CHANGE IN REAL GDP

	Recovery relative to COVID-19 scenario		Cost of an uneven recovery (USD bln)
	Even (%)	Uneven (%)	
World	3.3	1.4	-1,442.3
Americas	5.8	2.8	-710.2
Asia and the Pacific	1.0	0.3	-164.1
Europe	3.9	1.6	-503.7
Rest of World	1.3	0.5	-64.3

Note: Cost of an uneven recovery is the level change between the Uneven and Even scenario
Source: OECD METRO Model

FIGURE 9. CHANGE IN REAL GDP POST COVID-19



Source: OECD METRO Model

TABLE 3. INTERNATIONAL TOURISM EXPORTS

	Recovery relative to COVID-19 scenario		Cost of Uneven recovery (USD bln)
	Even (%)	Uneven (%)	
Tourism			
World	9.8	3.60	-20.47
Americas	15.5	4.92	-0.58
Asia and the Pacific	11.1	3.82	-0.77
Europe	16.3	5.15	-0.96
Rest of World	11.9	3.76	-0.19
Hospitality and recreation			
World	11.9	4.33	-13.53
Americas	17.3	5.50	-0.43
Asia and the Pacific	10.9	3.75	-0.47
Europe	16.2	5.07	-0.63
Rest of World	12.5	3.84	-0.11
Transport services			
World	7.3	2.76	-6.94
Americas	11.8	3.78	-0.15
Asia and the Pacific	11.4	3.94	-0.31
Europe	16.5	5.29	-0.33
Rest of World	11.3	3.66	-0.08

Note: International Tourism trade covers exports tourism sectors for household use

Source: OECD METRO Model

TABLE 4. WORLD PRODUCTION INCREASES IN ALL SECTORS OF THE ECONOMY

Aggregate sectors	Sector	Recovery from COVID-19 scenario		Cost of Uneven recovery (USD bln)
		Even (%)	Uneven (%)	
Agriculture	Agriculture	1.4	0.6	-44.1
	Natural resources	1.4	0.6	-35.1
Food	Food	3.2	1.3	-102.6
	Beverage and tobacco	3.6	1.4	-24.8
Manufacturing	Textile and wearing apparel	2.7	1.1	-45.0
	Other manufacturing	2.4	1.0	-139.1
	Basic pharmaceuticals	1.4	0.6	-8.2
	Chemical products	1.9	0.8	-45.4
	Mineral and metal products	1.4	0.6	-76.0
	Electronic equipment	2.6	1.2	-104.7
	Machinery and equipment	1.8	0.8	-41.9
	Motor vehicles and parts	2.6	1.2	-56.0
	Transport equipment	2.1	0.9	-16.2
Tourism	Hospitality	13.6	5.1	-229.0
	Recreational and other services	9.3	3.7	-178.2
	Transport nec	2.4	1.1	-54.4
	Water transport	2.0	0.9	-9.2
	Air transport	5.1	2.0	-22.8
Other services sectors	Trade	4.1	1.7	-262.0
	Warehousing	2.6	1.1	-21.9
	Communication	3.5	1.5	-118.7
	Financial services and insurance	4.3	1.8	-177.9
	Business services	3.4	1.4	-157.5
	Public Administration and defense	0.7	0.3	-26.2
	Human health and social work activities	1.7	0.7	-71.8
	Other services	2.9	1.2	-472.7
Total	Total	3.0	1.3	-2,541.5

Source: OECD METRO Model

Références

- Aguiar, A. et al. (2019), "The GTAP Data Base: Version 10", *Journal of Global Economic Analysis*, Vol. 4/1, pp. 1-27, <https://www.igea.org/resources/igea/ojs/index.php/igea/article/view/77>. [10]
- Arriola, C., P. Kowalski and F. van Tongeren (Forthcoming), "Understanding Structural Effects of COVID-19 on the Global Economy: first steps". [8]
- Beckman, J., F. Baquedano and A. Countryman (2021), "The impacts of COVID-19 on GDP, food prices, and food security", *Q Open*, Vol. 1/1, <https://doi.org/10.1093/qopen/qoab005>. [18]

- Benz, S. and F. Gonzales (2019), "Intra-EEA STRI Database: Methodology and Results", *OECD Trade Policy Papers*, No. 223, OECD Publishing, Paris, <https://dx.doi.org/10.1787/2aac6d21-en>. [12]
- Benz, S. and A. Jaax (2020), "The Cost of Regulatory Barriers to Trade in services; New Estimates of ad valorem Tariff", *OECD Trade Policy Paper.*, <http://www.oecd.org/publications/the-costs-of-regulatory-barriers-to-trade-in-services-bae97f98-en.htm>. [13]
- Cadot, O., J. Gourdon and F. van Tongeren (2018), "Estimating Ad Valorem Equivalents of Non-Tariff Measures: Combining Price-Based and Quantity-Based Approaches", *OECD Trade Policy Papers*, No. 215, OECD Publishing, Paris, <https://dx.doi.org/10.1787/f3cd5bdc-en>. [11]
- Keogh-Brown, M. (2020), *The impact of Covid-19, associated behaviours and policies on the UK economy: A computable general equilibrium model*. [16]
- Lahcen, B. (2020), *Green Recovery Policies for the COVID-19 Crisis: Modelling the Impact on the Economy and Greenhouse Gas Emissions*. [15]
- Leroy de Morel, L. (2020), *The potential local and regional impacts of COVID-19 in New Zealand; With a focus on tourism*, <https://nzier.org.nz/publication/the-potential-local-and-regional-impacts-of-covid-19-in-new-zealand-with-a-focus-on-tourism-nzier-public-discussion-paper-20203>. [3]
- McDonald, S. and K. Thierfelder (2013), *Globe v2: A SAM Based Global CGE Model using GTAP Data, Model Documentation*, <http://cgemod.org.uk/Global%20CGE%20Model%20v2.pdf>. [9]
- OECD (2021), *OECD Economic Outlook, Volume 2021 Issue 2*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/66c5ac2c-en>. [1]
- OECD (2020), "METRO Version 3 Model Documentation", *TAD/TC/WP/RD(2020)1/FINAL.*, [https://one.oecd.org/document/TAD/TC/WP/RD\(2020\)1/FINAL/en/pdf](https://one.oecd.org/document/TAD/TC/WP/RD(2020)1/FINAL/en/pdf). [6]
- OECD (2018), *Trade Facilitation and the Global Economy*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264277571-en>. [14]
- OECD (Forthcoming), "Understanding structural effects of COVID-19 on the global economy: first steps". *TAD/TC/WP(2021)23*. [7]
- Rum, I. (2021), *Policy Strategies to Strengthen the Travel and Tourism Sectors from the COVID-19 Pandemic Shocks: A Computable General Equilibrium Model for the Indonesian Economy*. *ERIA Discussion Paper Series*. No. 406., <https://www.eria.org/publications/policy-strategies-to-strengthen-the-travel-and-tourism-sectors-from-the-covid-19-pandemic-shocks-a-computable-general-equilibrium-model-for-the-indonesian-economy/>. [5]
- UNCTAD (2020), *COVID-19 and Tourism. Assessing the Economic Consequences.*, https://unctad.org/system/files/official-document/ditcinf2020d3_en.pdf. [4]

UNDP (2020), *COVID-19 Economic and Social Impact Assessment in Cambodia*, [17]
<https://www.kh.undp.org/content/cambodia/en/home/library/covid-19-economic-and-social-impact-assessment-in-cambodia.html>.

UNWTO (2021), *World Tourism Barometer Excerpt. Volume 19. Issue 6. November 2021.*, [2]
https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-12/UNWTO_Barom21_06_November_excerpt.pdf.

TABLE A 0.1 UNWTO REGION CLASSIFICATION OF METRO REGIONS

(UNWTO	METRO regions
Americas	Canada
Americas	United States
Americas	Mexico
Americas	Argentina
Americas	Brazil
Americas	Latin America
Asia and the Pacific	AUSNZL
Asia and the Pacific	China
Asia and the Pacific	Japan
Asia and the Pacific	Korea
Asia and the Pacific	Indonesia
Asia and the Pacific	South East Asia
Asia and the Pacific	India
Europe	United Kingdom
Europe	Germany
Europe	France
Europe	Italy
Europe	Finland
Europe	Sweden
Europe	EU east
Europe	EU south
Europe	EU all other
Europe	EFTA
Europe	Turkey
Europe	Russia
Rest of World	Other OECD
Rest of World	South Africa
Rest of World	NASAU
Rest of World	Rest of the world

Source: Authors' compilation