

KEY POINTS

- New analysis using the Global Trade Analysis Project model estimates that the global economic impact of COVID-19 could reach \$5.8 trillion (6.4% of global GDP) under a 3-month containment scenario, and \$8.8 trillion (9.7% of global GDP) under a 6-month containment scenario. This updates estimates published in the *Asian Development Outlook 2020* on 3 April, which predicted global COVID-19 losses of between \$2.0 trillion and \$4.1 trillion.
- The potential economic impact on Asia and the Pacific is estimated at \$1.7 trillion (6.2% of regional GDP) under a 3-month containment scenario and \$2.5 trillion (9.3% of regional GDP) under a 6-month containment scenario, with the region accounting for 30% of the overall decline in global output.
- Government policy responses—such as direct income and revenue support—could soften the COVID-19 impact by as much as 30%–40%, reducing the global economic loss to \$4.1 trillion–\$5.4 trillion (4.5%–5.9% of global GDP).
- Policy makers should work together to quickly limit the pandemic—the longer the containment period, the more difficult and prolonged the recovery will be. Strong income and employment protection are critical to support the most vulnerable and avoid long-term economic scarring.

An Updated Assessment of the Economic Impact of COVID-19¹

INTRODUCTION

On 31 December 2019, a series of pneumonia cases of unknown cause was detected in the People's Republic of China (PRC). On 30 January, the World Health Organization (WHO) declared the coronavirus outbreak a “public health emergency of international concern”—with 7,736 confirmed cases in the PRC and 83 confirmed cases in 18 economies outside the PRC (Figure 1). On 11 February, the disease caused by the coronavirus was officially named COVID-19. The next day, COVID-19 cases began to spike in the Republic of Korea (ROK). By 21 February, its presence in Italy signaled the rapid spread of the virus to Europe. By 9 March, Italy placed 60 million people under lockdown. And 2 days later, WHO declared COVID-19 a global pandemic. By 29 March, the US became the most infected country. On 4 April, the level of infection breached the million mark and several days after Spain overtook Italy. In 2 weeks' time, the level of infection breached 2 million, and 2 weeks later it breached 3 million. By 12 May, the virus had spread to 213 countries and territories worldwide, infecting more than 4 million people and causing more than 280,000 deaths.²

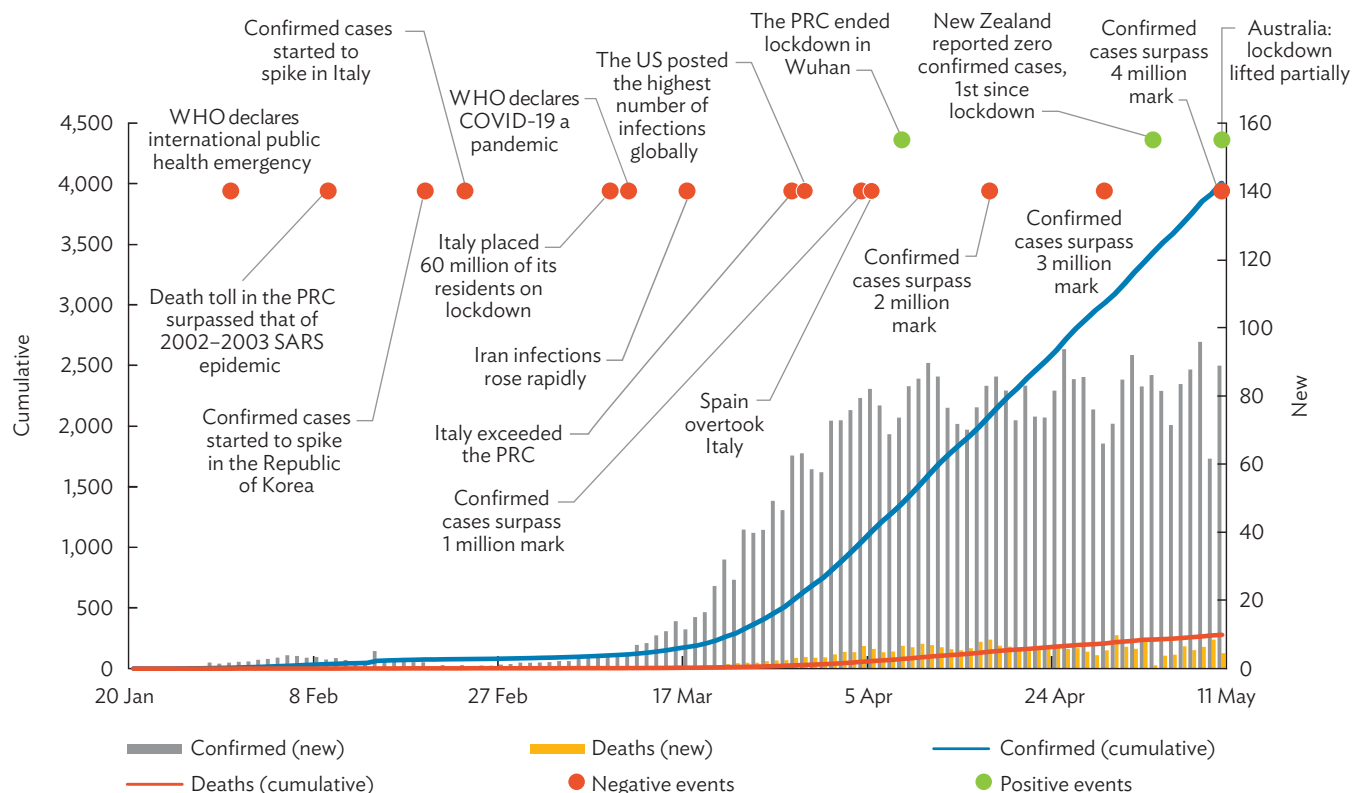
To suppress the spread of COVID-19, many countries partially or fully closed their borders and restricted the movement of people. The PRC was first to impose restrictions, placing Wuhan (11 million population) under lockdown, and restricting movement across Hubei Province (57 million population). Italy followed suit, imposing a quarantined “red zone” covering 11 towns and villages in the Lombardy and Veneto regions. The lockdown was later extended across the entire country (60 million population). The US imposed travel bans to and from Italy and the ROK. The ROK announced a level 4 “do not travel to” advisory for Daegu (where community infections in the ROK were first reported). As of 28 March, International Air Transport Association (IATA) data showed over 156 countries with some form of travel restriction—denying entry, restricting visas, or imposing mandatory quarantine, among others; and 104 countries were closed entirely.³

¹ This brief was prepared by Cyn-Young Park, James Villafuerte, Abdul Abiad, Badri Narayanan, Eduardo Banzon, Jindra Samson, Ammar Aftab, and Mara Claire Tayag. The authors acknowledge the contribution of Guy Sacerdoti, Paulo Rodelio Halili, Philip Amadeus Libre, Rosa Mia Lasam Arao, and Reizle Jade Platitas. The brief also benefited from comments received from numerous colleagues across Asian Development Bank (ADB). The brief was also supported by TA 8983: Universal Health Coverage for Inclusive Growth from the SDCC Health Sector Group.

² World Health Organization. WHO Coronavirus Disease (COVID-19) Dashboard. <https://covid19.who.int/> (accessed 12 May 2020).

³ International Air Transport Association (IATA). IATA – International Travel Document Notes: Coronavirus Update. <https://www.iatatravelcentre.com/international-travel-document-news/1580226297.htm> (accessed 28 March 2020).

Figure 1. Global COVID-19 Confirmed Cases and Deaths in 2020 ('000, as of 11 May)



PRC = People's Republic of China, SARS = severe acute respiratory syndrome, US = United States, WHO = World Health Organization.

Source: World Health Organization statistics downloaded using CEIC (accessed 12 May 2020).

These control measures—restrictions to transport, labor mobility, and workplace closures—acted as supply shocks to the economy. Initially, restrictions on transport and the movement of labor impaired the economy's production capacity, disrupting supplies. This spilled over to the demand side as people were locked down in their homes and workers were laid off and lost income. Air travel restrictions and border closures limited both the movement of people and the movement of goods across borders. In response, governments immediately ramped up spending on medical supplies such as masks, personal protective equipment, and viral medicines. They also announced several macroeconomic stimuli to support payroll and keep jobs, provided cash transfers and food supplies to the poor, and extended loans and tax assistance to businesses.

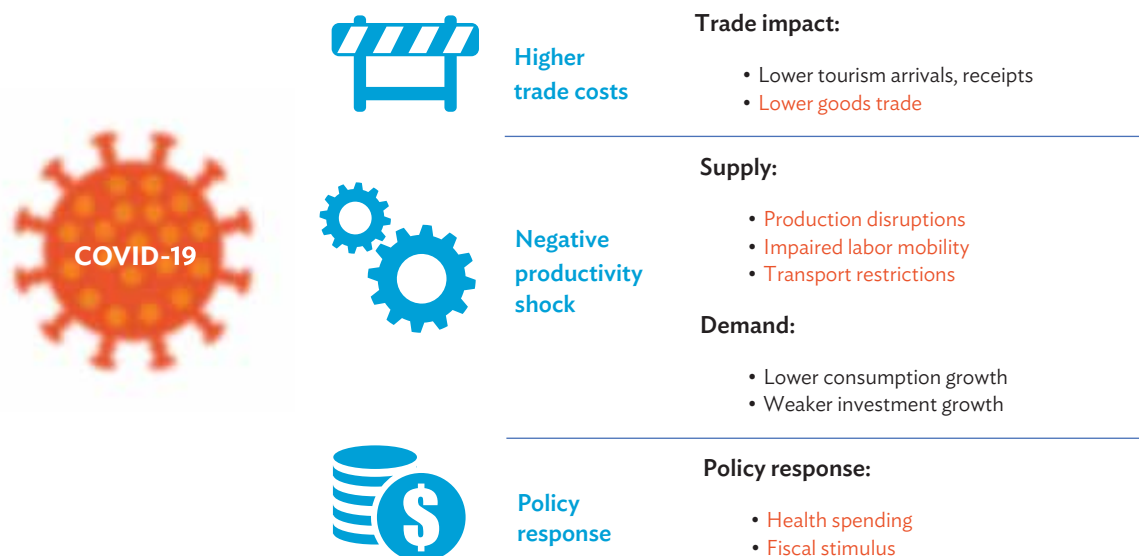
This policy brief explores the potential economic impacts of the COVID-19 outbreak using the Global Trade Analysis Project (GTAP) Model, a multiregion computable general equilibrium model. The analysis incorporates three known and measurable channels: (i) an increase in trade costs that affects the movement

of people and inbound tourism, along with industries linked to global supply chains; (ii) a negative supply-side productivity shock that cuts wages and corporate earnings, leading to reductions in consumption and investment; and (iii) fiscal stimulus through various macroeconomic policy instruments (Figure 2).

The first channel accounts for border control restrictions and air travel bans adopted by some countries immediately after the PRC announced the coronavirus outbreak in January 2020. In our modeling implementation, these border restrictions and travel bans increased the cost of trade in services, particularly aviation and outbound and inbound tourism. A study by ForwardKeys—a travel analytics company—noted that COVID-19-related travel restrictions reduced year-to-date arrivals (1 January–19 April 2020) by 39.8% in Americas, 42% in Africa and the Middle East, 50.2% in Central and Eastern Europe, 70.9% in North East Asia, 49.5% in Southeast Asia, and 40.9% in Oceania—affecting tourist arrivals and tourism receipts globally and in the region.⁴ Looking back over the first quarter (Q1) of 2020, airline seat capacity was 9.4% less than Q1 2019—or 482 million seats (Q1 2020) compared with 532 million

⁴ ForwardKeys. 2020. Consumers Still Plan to Travel as Bookings Continue to Dive. Travel Insights. 27 April. <https://forwardkeys.com/consumers-still-plan-to-travel-as-bookings-continue-to-dive/>.

Figure 2. How COVID-19 Affects the Economy



Notes: Red text refers to factors not included in the previous Asian Development Bank (ADB) estimation of COVID-19 impact using ADB Multiregional Input-Output Table (see Special Topic: The Impact of the Coronavirus Outbreak—An Update in ADB. 2020. *Asian Development Outlook 2020: What Drives Innovation in Asia*. Manila.). The Global Trade Analysis Project model includes all of these factors except the health spending channel. Also, it does not include the COVID-19 impact on migration and remittance; capital flows, debt and financial markets; and the environment. There are also no time lags, capacity constraints, or funding restrictions in the model. It also assumed that announced macroeconomic stabilization packages are implemented fully.

Source: Asian Development Bank.

seats (Q1 2019).⁵ Indirectly, flight restrictions and cancellations, along with border closures also affected the movement of freight: first, due to limited number and higher costs of cargo planes; second, because border closures required longer routes to move goods along the global supply chain; and third, severe reduction on passenger flights as these also transport some portion of freight. All these contributed to higher trade costs.

The second channel arises from government restrictions on mobility through community quarantine and lockdowns, and social distancing which impair the movement of people and factors of production—including labor, raw materials, and capital. These restrictions affect both the demand and supply sides of the economy.

In our model implementation, impaired mobility translates into lower consumer demand as people are unable to visit business establishments and purchase the usual volume of goods and services they consume. Even in countries where restrictions are more relaxed, rising infections and the higher perceived risk of contracting the virus also discourage patronage of crowd-related businesses such as restaurants, malls, recreational facilities, and music or sporting events, among others. Weak consumer sentiment and greater uncertainty also affect business sentiment and investment, compressing domestic demand even further.

On top of the demand impact, these mobility restrictions also disrupt the production of goods and services. For most countries—except for a few essential services such as medical facilities, grocery stores, logistics companies, banks, and selected government services—production in highly infected regions or entire countries are partially or completely shut down (including schools in many places). In turn, these supply disruptions lead to lower cash flow, falling rates of return, and labor displacements which further reduce disposable income, accentuating the demand compression. In our model implementation, we introduced a negative productivity shock which raised prices, cut domestic demand, and disrupted supply production.

A third channel examined is the potential impact of government policy responses through direct support to income and revenue through supplementary budgets, fiscal stimulus, tax cuts, or tax deferrals. In the model implementation, direct income and revenue support was implemented as subsidy or negative taxation to consumers and producers.

The analysis in this brief revolves around two scenarios: short and long containment scenarios. In the short containment scenario, the assumption is that it takes 3 months (from when the outbreak intensifies in each country) for economies to get their domestic outbreaks under control and to start normalizing economic

⁵ ForwardKeys. 2020. COVID19 Causes the Global Aviation Sector to Collapse. Travel Insights. 2 April. <https://forwardkeys.com/COVID19-causes-the-global-aviation-to-collapse/>.

activity; the long containment scenario assumes this process takes 6 months. The calibration of the shocks to trade costs, productivity, and government policy responses are explained in Table 1. For example, the size of the shock to consumption and investment growth in the PRC was calculated from the difference between the Q4 2019 and Q1 2020 year-on-year growth of retail sales and fixed asset investments. To illustrate, retail sales growth was 7.7% in Q4 2019 and –19.0% in Q1 2020 or a difference of 26.7 percentage points. Assuming that there are no shocks in Q2–Q4, this translate to 6.7 percentage point drop in PRC’s annual consumption growth. The fixed asset investment growth was 5.4% in Q4 2019 and –16.1% in Q1 2020, or a decline equivalent to 21.5 percentage points. Again, assuming that Q2–Q4 returns to normal (no shock), then the annual decline to investment growth is 5.4 percentage points.

GTAP MODEL AND DATABASE

To estimate the economic impact of COVID-19, a standard GTAP model (version 10) aggregated to 42 countries and regions and 52 subsectors was used. The GTAP model is a multiregional, comparative-static, CGE model of world trade and investment.⁶ The model provides a comprehensive representation of the economy as a complete system of interdependent components: industries, households, investors, governments, importers, and exporters—capturing the economic interactions of each country and/or region with detailed interindustry links. It also represents markets as perfectly competitive, industry technologies as linearly homogeneous, and traded goods as imperfectly substitutable. Flow-on effects to other countries are also captured in the model via bilateral trade relations from/to all countries and regions in

Table 1. Calibration of the Shock to Global Trade Analysis Project Model

Items	Short Containment Scenario	Long Containment Scenario
Higher trade costs bring down tourism receipts	Travel bans in place for 3 months 14% of tourists will travel immediately after lifting the travel ban, 47% travel after 1.5 months, 28% travel after 6 months, and 11% travel after 1 year or more	Travel bans in place for 6 months 14% of tourists will travel immediately after lifting the travel ban, 47% travel after 1.5 months, 28% travel after 6 months, and 11% travel after 1 year or more
Decrease in productivity cuts consumption growth by ^a	–6.7 percentage points (pp) in the PRC –8.1 pp in the United States (US) –7.1 pp in the European Union (EU) + United Kingdom (UK) –6.6 pp in Japan –6.5 pp in other outbreak-affected advanced economies –3.5 pp in other outbreak-affected ADB developing member countries (DMCs)	–10.1 pp in the PRC –12.2 pp in the US –10.7 pp in the EU+UK –9.9 pp in Japan –9.75 pp in other outbreak-affected advanced economies –5.3 pp in other outbreak-affected DMCs
Decrease in productivity cuts investment growth by ^a	–5.4 pp in the PRC –8.2 pp in the US –10.0 pp in the EU+UK –7.3 pp in Japan –9.2 pp in other outbreak-affected advanced economies –4.4 pp in other outbreak-affected DMCs	–8.1 pp in the PRC –12.3 pp in the US –15 pp in the EU+UK –10.95 pp in Japan –13.8 pp in other outbreak-affected advanced economies –6.6 pp in other outbreak-affected DMCs
Higher trade costs for industries linked to global supply chain	By 1% ^b	By 2%
Macroeconomic stimulus ^c	Half of the announced direct intervention to income and revenues enter as subsidy to consumers and producers	The full amount of the announced direct intervention to income and revenues enter as subsidy to consumers and producers

^a A negative productivity shock reduces consumption and investment growth through price increases. It also disrupts production as the economy produces less with the same inputs.

^b GTAP Model: Corong, E. et al. 2017. The Standard GTAP Model, Version 7. *Journal of Global Economic Analysis*. 2(1). pp. 1–119.

^c For Japan, only one-quarter of the announced direct intervention was included under the short containment scenario; one-half under the long containment scenario.

Note: In the short containment scenario, the assumption is that it takes 3 months (from when the outbreak intensifies in each country) for economies to get their domestic outbreaks under control and to start normalizing economic activity; and in the long containment scenario, this process takes 6 months. More explanation on the shocks is available online in Appendix 1: <https://aric.adb.org/covid-gtap-appendix>.

Source: Asian Development Bank.

⁶ GTAP Model: Corong, E. et al. 2017. The Standard GTAP Model, Version 7. *Journal of Global Economic Analysis*. 2(1). pp. 1–119.

the world. For this exercise, the GTAP database 10a was used and calibrated using 2018 data from ADB and the International Monetary Fund (IMF).⁷

For this study, we also retained other standard features of the model—such as the behavior of individuals, firms, and governments, along with their responses to changing resource and market conditions. Consumers maximize welfare, subject to their budget limitations, with a relatively sophisticated representation of consumer demand, allowing for regional differences in the price and income elasticities of demand. Firms maximize profits using the limited resources available in the economy. Five primary factors of production (land, natural resources, physical capital, and skilled and unskilled labor) are combined with intermediate inputs, including imports, to produce final output.⁸

RESULTS

Earlier, ADB released two sets of estimates on the potential economic impact of the COVID-19 outbreak. The first was released on 6 March 2020 and suggested a global impact ranging from \$77 billion to \$347 billion (0.1% to 0.4% of global gross domestic product [GDP]).⁹ From this estimate, two-thirds of the global impact was in the PRC, where the outbreak had been concentrated.

Since then, the outbreak has become a global pandemic. Containment policies, travel bans, and community lockdowns have proliferated. Google data analytics estimated the direct impact of these restrictions on mobility trends over time and by geography across different categories of places—such as retail and recreation, groceries and pharmacies, parks, transit stations, workplaces, and residential areas.¹⁰ In Figures 3a–3d, the mobility trends around transit stations as well as retail and recreation areas are most affected—with observed traffic contracting by over 50% on average across all ADB developing member countries (DMCs) where data are available. Traffic around workplaces, groceries, and pharmacies has also been moderately affected, contracting by 25% to 33%. There is wide variation among DMCs, however, with sharper declines in mobility in South Asia, followed by Southeast Asia, and Central Asia. What is notable is that the impact of restrictions on East Asia (no data for the PRC), with its high level of infections early in the year, appears less severe. Even more notable is that mobility restrictions are generally lower in advanced economies despite the relatively more serious degree of the outbreak there.

ADB's second set of updated estimates were released on 3 April 2020, published in the *Asian Development Outlook 2020: What Drives Innovation in Asia?* (ADO 2020). The global impact

estimate was higher, ranging from over \$2.0 trillion to \$4.1 trillion (2.3% to 4.8% of global GDP); with most of the impact accruing to economies outside the region.¹¹ Developing Asia would bear 22%–36% of the loss, depending on the scenario used. In particular, for the PRC, the estimated impact is close to 5% of its GDP.

This brief updates the ADB estimates for the economic impact of COVID-19 using the GTAP CGE model. Based on this analysis, **the impact of COVID-19 is now estimated at \$5.8 trillion to \$8.8 trillion (6.4% to 9.7% of global GDP), excluding the impact of policy measures.** ADB's new estimate is more than double the World Bank's 16 April 2020 estimate of a 2%–4% decline in global GDP, and higher than the IMF's April 2020 World Economic Outlook estimate of 6.3% decline in global GDP. Broadly, the ADB's GTAP estimates are more than double the ADO 2020 estimates (Table 2). Similar to ADO 2020 and the IMF, a large proportion of the updated global impact accrues to advanced economies, with high infection levels particularly in the US, the European Union (EU), and the United Kingdom (UK).

Table 2. GDP Impact (Excluding Policy Measures)—Deviation from the Non-COVID-19 Baseline (%)

	Short Containment		Long Containment	
	ADO 2020	GTAP	ADO 2020	GTAP
Global	–2.3	–6.4	–4.8	–9.7
Asia, ex-PRC ^a	–1.0	–4.6	–2.2	–7.2
PRC	–4.6	–7.5	–5.1	–11.2
ROW	–2.0	–6.5	–6.1	–9.8

^a Projections for Asia do not include those for the PRC, which are presented separately in this table.

ADO = Asian Development Outlook, GDP = gross domestic product, GTAP = Global Trade Analysis Project, PRC = People's Republic of China, ROW = rest of the world.

Sources: ADB. 2020. *Asian Development Outlook 2020: What Drives Innovation in Asia?* Manila; and ADB estimates.

The higher GTAP estimates stem in large part from differences in the assumptions used in the ADO and GTAP analyses. First, when the ADO was released on 3 April 2020, the COVID-19 outbreak had just breached 1 million infections with Italy still the highest in infections and deaths. In contrast, when we ran the GTAP analysis, the outbreak had already exceeded 4 million infections, with the US the highest in infections and deaths. Second, while the ADO 2020 analysis had 39 outbreak-affected economies,

⁷ Aguiar, A. et al. 2019. The GTAP Data Base: Version 10. *Journal of Global Economic Analysis*. 4(1). pp. 1–27.

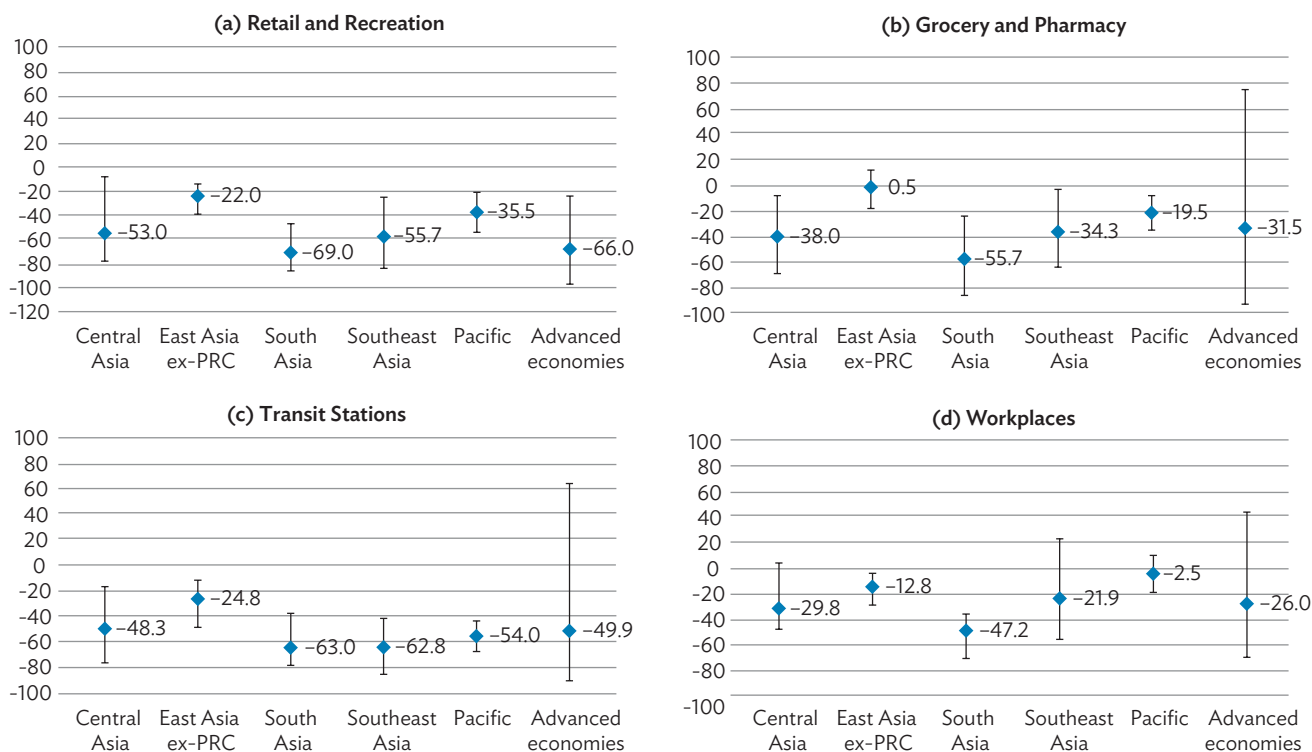
⁸ Hertel, T. W., ed. 1997. *Global Trade Analysis: Modeling and Applications*. Massachusetts: Cambridge University Press.

⁹ Abiad, A. et al. 2020. The Economic Impact of COVID-19 on Developing Asia. *ADB Briefs*. No. 128. Manila: ADB.

¹⁰ Google. COVID-19 Community Mobility Reports. <https://www.google.com/COVID19/mobility/> (accessed 5 April 2020).

¹¹ See Special Topic: The Impact of the Coronavirus Outbreak—An Update in ADB. 2020. *Asian Development Outlook 2020: What Drives Innovation in Asia*. Manila.

Figure 3. COVID-19 Community Mobility Trends—Developing Asia and Advanced Economies
(% change from baseline, as of 5 April 2020)



PRC = People's Republic of China.

Notes:

- (i) Data show how visits and length of stay at different places change compared with a baseline. The baseline is the median value for the corresponding day of the week during the 5-week period 3 January–6 February 2020. The changes were calculated from the aggregated and anonymized data used to show popular times for places in Google Maps.
- (ii) The diamond markers refer to the mean across economies within a subregion or country grouping. The upper (lower) bound refers to the maximum (minimum) across economies within a subregion or country grouping.
- (iii) Retail and recreation: Mobility trends for places like restaurants, cafes, shopping centers, theme parks, museums, libraries, and movie theaters.
- (iv) Grocery and pharmacy: Mobility trends for places like grocery markets, food warehouses, farmers markets, specialty food shops, drug stores, and pharmacies.
- (v) Transit stations: Mobility trends for places like public transport hubs, such as subway, bus, and train stations.
- (vi) Workplaces: Mobility trends for places of work.
- (vii) Developing Asia (Central Asia, East Asia, South Asia, Southeast Asia, and the Pacific) refers to ADB's developing member economies. Central Asia includes Kazakhstan, the Kyrgyz Republic, and Tajikistan. East Asia includes Hong Kong, China; Mongolia; the Republic of Korea; and Taipei, China (no data for the People's Republic of China). South Asia includes Afghanistan, Bangladesh, India, Nepal, Pakistan, and Sri Lanka. Southeast Asia includes Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam. The Pacific includes Fiji and Papua New Guinea.
- (viii) Advanced economies include Australia, Canada, the European Union's 27 members, Japan, New Zealand, and the United States.

Source: Google. COVID-19 Community Mobility Reports. <https://www.google.com/covid19/mobility/> (accessed 5 April 2020).

GTAP analysis covered 96 outbreak-affected countries and territories, with 1,000+ infections each. Third, while the ADO analysis incorporates four main channels (tourism, consumption, investment, and trade and production linkages), GTAP covers 3 others—increase in trade costs, production disruptions, and government policy responses. Finally, the GTAP analysis was also based on partial Q1 2020 data and April 2020 Consensus Economics Forecast—which showed a larger decline in tourism receipts and consumption and investment growth in the major economies, leading to larger aggregate demand shocks.

Aside from these numerical differences, however, there are also modeling differences between the Multiregional Input-Output Table (MRIOT) approach used in ADO 2020 estimates and the GTAP approach used here. First, the MRIOT uses fixed shares, while GTAP is based on consumer and producer behavioral equations and substitution elasticities—which generate stronger demand and supply-side interactions. Second, the GTAP analysis uses a productivity shock to bring down domestic demand, which also affects the supply or level of production in an economy. Third, GTAP includes price effects not included in the MRIOT analysis.

GDP impact: Under the short containment scenario, where the outbreak lasts for 3 months, global GDP will be **\$5.8 trillion (6.4%** of global GDP) lower compared with a world without COVID-19 (Table 3).¹² Compared to a world without COVID-19, GDP would be smaller by **\$1.7 trillion (6.2%)** in Asia and by **\$1.1 trillion (7.5%)** in the PRC—with Asia accounting for about 30% of the overall decline in global output.

Under the long containment scenario, where the outbreak lasts for 6 months, global output will be **\$8.8 trillion (9.7%** of global GDP) lower compared with a world without COVID-19. Likewise, GDP will be lower by **\$2.5 trillion (9.3%)** in Asia and by **\$1.6 trillion (11.2%)** in the PRC—with Asia accounting for 30% of the overall decline in global output—compared with a world without COVID-19.

The US dollar estimates of the COVID-19 impact are based on 2018 GDP levels and prices. If we re-scale the estimates using 2020 GDP levels and prices, the global impact in US dollars will increase by \$290 billion to \$441 billion (Box 1). The impact on Asia and other regions will likewise increase.

Subregional impact: Under the two scenarios, output in East Asia excluding the PRC will be down by **\$164 billion to \$257 billion (6.0% to 9.3% of the subregion's GDP)** and between **\$163 billion and \$253 billion (4.6% to 7.2%)** in Southeast Asia. The effects in these regions reflect their larger trade and tourism shares relative to GDP. GDP in South Asia will also be lower by **\$142 billion to \$218 billion (3.9% to 6.0%)**, mainly reflecting the tight restrictions in place in countries like Bangladesh, India, and Pakistan. Central

Asia will also have lower GDP, declining by 3.4% to 5.5%. In the Pacific, however, where data are scarce, there will likely be large variations between economies—some affected more due to their large tourism- and remittance-related shares of GDP.

G3 impact: Output in the US, Japan, and the EU plus the UK (G3) will fall by **\$3.5 trillion to \$5.3 trillion (7.3% to 11.0%)**. Output in the US will be lower by **\$1.5 trillion to \$2.2 trillion (7.1% to 10.7%)**. Output in Japan will be lower by **\$324 billion to \$491 billion (5.9% to 8.9%)**. GDP in the EU and the UK will be lower by an aggregate of **\$1.7 trillion to \$2.6 trillion (7.7% to 11.7%)**. In total, the output decline in the G3 is more than **60%** of the total output decline globally in the two scenarios.

Impact on various sectors in the economy: From the start, the pandemic affected some sectors more than others. Aviation and tourism were hit hard early by travel and border restrictions. Recreational activities, hospitality, and retail trade were also quickly shut down as government restrictions targeted crowd-oriented businesses. Transportation—the enabler of many economic activities—was also heavily curtailed (particularly taxi and bus operations). School closures disrupted education generally, although e-learning was ramped up where available to allow students to continue some courses digitally. Agriculture was also affected, particularly in getting produce to markets, customers, and consumers. The impact on employment was severe. Unskilled workers normally working on a casual or “per piece” basis were hardest hit. Women were also heavily affected—as they dominate recreation, hospitality, and retail trade sectors. As construction and other sectors shut down, foreign migrant workers felt the brunt of

Table 3. GDP Impact (Excluding Policy Measures)—Deviation from the Non-COVID-19 Baseline

	GDP (\$ million)		GDP (%)	
	Short Containment	Long Containment	Short Containment	Long Containment
Global	-5,796,893	-8,789,852	-6.4	-9.7
Asia	-1,667,824	-2,529,112	-6.2	-9.3
Australia and New Zealand	-91,156	-139,456	-4.6	-7.0
Central Asia	-21,070	-33,978	-3.4	-5.5
East Asia ex-PRC	-164,085	-256,741	-6.0	-9.3
PRC	-1,083,078	-1,623,381	-7.5	-11.2
Southeast Asia	-163,223	-252,899	-4.6	-7.2
South Asia	-141,938	-217,646	-3.9	-6.0
Pacific	-3,275	-5,010	-4.6	-7.0
G3	-3,528,842	-5,327,954	-7.3	-11.0
United States	-1,485,318	-2,226,466	-7.1	-10.7
Japan	-324,483	-491,035	-5.9	-8.9
European Union + United Kingdom	-1,719,041	-2,610,453	-7.7	-11.7

G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; PRC = People's Republic of China.

Note: Definition of regional and subregional groupings is online in Appendix 2: <https://aric.adb.org/covid-gtap-appendix>.

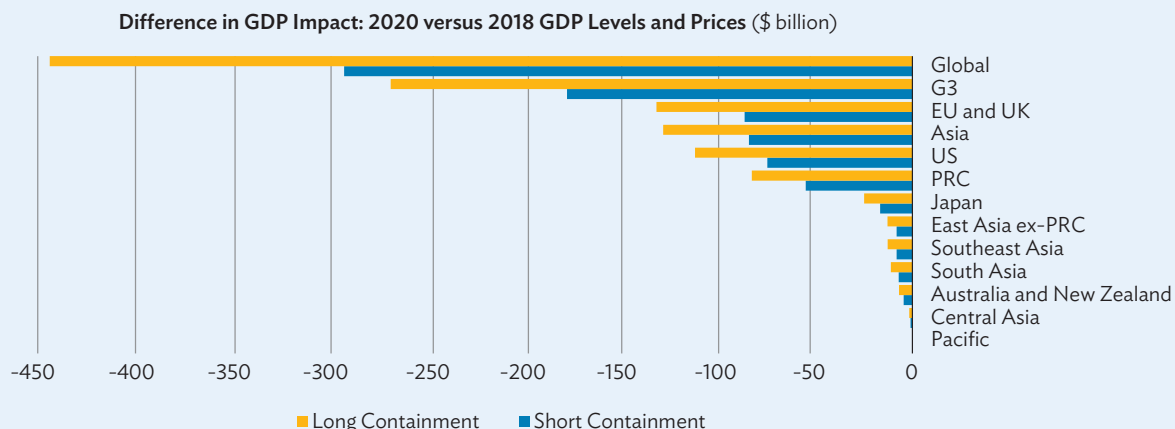
Source: Asian Development Bank estimates.

¹² **Caveat:** Similar to the MRIOT analysis in the ADO, the GTAP model uses the 2018 baseline data. Hence, the estimated level impacts in US dollars are underestimated. However, the impact as percentage of GDP is more accurate.

Box 1. Rebasings the COVID-19 Impact to 2020 GDP Levels and Prices

As stated in this brief, the updated estimates of the COVID-19 impact on GDP are expressed in 2018 GDP levels and prices, and will be underestimated. Based on the International Monetary Fund projections, GDP globally may have grown by around 5% without COVID-19 from 2018 to 2020. We used this global GDP growth to run a dynamic recursive Global Trade Analysis Project (GTAP) model and simulate and scale up all economies in the world to generate a 2020 GDP level without COVID-19.^a

Based on our analysis, the estimated COVID-19 impact on global output, in 2020 GDP levels and prices, will range from \$6.1 trillion to \$9.2 trillion. This is \$290 billion–\$441 billion higher than the estimated impact expressed in 2018 GDP levels and prices. For Asia, the impact in 2020 levels and prices ranges from \$1.7 trillion to \$2.7 trillion, or \$84 to \$127 billion higher. For the G3, the impact in 2020 levels and prices is \$176 billion to \$266 billion higher at \$3.7 trillion to \$5.6 trillion.



^a A simple dynamic variant of the GTAP model was used, where a time variable is added to the static GTAP model version. This adds investment to capital used in production, with all variables in the model adjusting to the new GDP target.

EU = European Union; G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; NZL = New Zealand; PRC = People's Republic of China; UK = United Kingdom; US = United States.

Source: Asian Development Bank estimates.

government policies on repatriation. Finally, many in the informal sector also lost their means of livelihood, as social distancing and community quarantines targeted the clearing of pavement dwellers.

Effects on trade: Even prior to the COVID-19 outbreak, trade growth was slowing amid the 2019 re-escalation of the US-PRC trade conflict, the broad slowdown in global growth, and weak global business confidence (Figure 4). While a US-PRC Phase 1 trade deal was agreed upon earlier in the year, there remains significant uncertainty as to what extent the agreement will hold given its ambitious import targets. To add to these trade challenges, additional hurdles emerged as the COVID-19 outbreak spread globally. For instance, travel restrictions and strict border controls or closures have raised international trade costs and prevented the supply and consumption of tradable services. There were also temporary bans on the exports of medical supplies and food, as production disruptions contributed to shortages of parts and components affecting industries strongly linked to global supply chains.

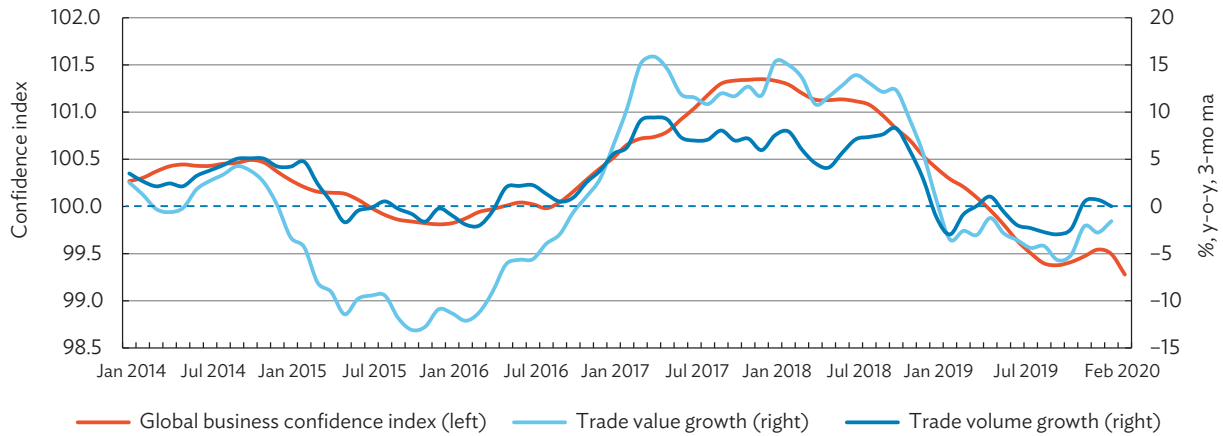
In total, border closures, travel restrictions, and lockdowns will cut global trade by **\$1.7 trillion to \$2.6 trillion (1.9% to 2.9% of GDP)** under the two scenarios (Table 4). The trade impact appears to be on the low side given that output is falling by **\$5.8 trillion to \$8.8 trillion**, which suggests a trade to output elasticity of only

30% on average. This seems to suggest that the 1% increase in trade costs in the short containment or 2% in the long containment could actually be an underestimation of the true increase in actual trade costs. We have done a sensitivity analysis which suggests that if we bump up the increase in trade costs to 5% in the short containment, the trade impact could increase by **\$1.3 trillion**.

Domestic versus international spillover effects: In general, the trade channel is the mechanism by which the domestic impact of the pandemic spills over and is transmitted to other countries or regions. In this analysis, the impact on total trade is roughly 30% of the impact on global GDP. It can be inferred that the spillover effects from the COVID-19 pandemic are relatively small compared with the domestic impact. Especially under the short containment scenario, where countries still rely on inventories, the spillover impact will be smaller than under the long containment scenario. However, there remain spillover effects not taken into consideration, such as the plunge in commodity prices. This channel could introduce larger spillover effects—both positive and negative.

Impact on employment and wage income: A critical impact of the COVID-19 outbreak is on labor. In the PRC, an estimated 5 million people lost their jobs in the first 2 months of 2020. The urban

Figure 4. Global Business Confidence Index and Asia's Trade Growth



y-o-y = year-on-year, mo = month, ma = moving average.

Notes: Trade volume growth rates were computed using volume indexes. For each period and trade flow type (i.e., imports and exports), available data include indexes for Japan and the People's Republic of China, and an aggregate index for selected Asian economies, which include Hong Kong, China; India; Indonesia; Malaysia; Pakistan; the Philippines; the Republic of Korea; Singapore; Taipei, China; Thailand; and Viet Nam. To come up with an index for Asia, trade values were used as weights for the computations. On the other hand, trade value levels and growth rates were computed by aggregating import and export values of the same Asian economies. Global business confidence index represents Organisation for Economic Co-operation and Development (OECD) economies.

Sources: ADB. 2019. *Asian Economic Integration Monitor 2019/2020*. Manila; Updated using data from CEIC; CPB Netherlands Bureau for Economic Policy Analysis. World Trade Monitor. <https://www.cpb.nl/en/data>; and OECD Database. <https://data.oecd.org/> (all accessed 30 April 2020).

Table 4. Trade Impact—Deviation from the Non-COVID-19 Baseline

	Trade (\$ million)		Trade (% of GDP)	
	Short Containment	Long Containment	Short Containment	Long Containment
Global	-1,712,459	-2,622,851	-1.9	-2.9
Asia	-755,469	-1,155,085	-2.8	-4.3
Australia and New Zealand	-39,151	-59,132	-2.0	-3.0
Central Asia	-3,769	-4,962	-0.6	-0.8
East Asia ex-PRC	-65,664	-108,504	-2.4	-3.9
PRC	-316,506	-489,817	-2.2	-3.4
Southeast Asia	-229,495	-344,434	-6.5	-9.7
South Asia	-100,677	-147,987	-2.8	-4.1
Pacific	-207	-250	-0.3	-0.3
G3	-675,728	-1,069,137	-1.4	-2.2
United States	-69,661	-41,674	-0.3	-0.2
Japan	-173,837	-271,130	-3.2	-4.9
European Union + United Kingdom	-432,230	-756,333	-1.9	-3.4

G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; PRC = People's Republic of China.

Note: Trade refers to the sum of exports and imports. Definition of regional and subregional groupings is online in Appendix 2: <https://aric.adb.org/covid-gtap-appendix>.

Source: Asian Development Bank estimates.

unemployment rate hit a record 6.2% in February 2020, up from 5.3% in January 2020 and 5.2% in December 2019.¹³ It is interesting that the labor impact does not arise from the health effect of

the virus, but from government measures imposed to flatten the infection curve. Mobility, travel, and border restrictions were largely behind the jump in job losses.

¹³ CNBC News. 2020. Roughly 5 Million Workers in China Lost Their Jobs in the First 2 Months. 16 March.

For instance, air travel restrictions pulverized the airline industry—which employs some 66 million people globally. Staff from many airlines—such as Cathay Pacific, Jetstar, Qantas, Tiger Air, and Virgin Australia, to name a few—were either asked to take unpaid leave or were simply let go. Cruise ship operations worldwide also stopped, with engineers, chefs, waiters, entertainers, and cleaning staff—mostly overseas workers—asked to return home temporarily. And with mobility restrictions affecting recreation and hospitality industries, casual employees in restaurants, salons, bars, and gyms also lost their jobs.

Thus, on 18 March 2020, the International Labour Organization (ILO) suggested a possible increase in global unemployment of somewhere between 5 million to 25 million, with most of the rise occurring in high-income countries.¹⁴ Two weeks later, on 2 April, ADB also warned that 68 million jobs could be lost in Asia due to COVID-19—with the PRC absorbing 52.8 million.¹⁵ Further, on 7 April, the ILO said job cutbacks over the following 3 months would more likely be equivalent to almost 200 million full-time workers.¹⁶

Globally, the GTAP analysis suggests that the equivalent of **158 million to 242 million jobs** will be lost in the two scenarios (**6.0% to 9.2% of total employment**) (Table 5). The job losses under the short containment scenario is more than 7 times the drop in employment during the 2008–2009 global financial crisis—which reduced employment by about 22 million people measured as full-time job equivalent (ILO report).¹⁷ For Asia, the drop in employment

will reach **109 million to 167 million jobs—or almost 70% of total employment losses globally**. For the G3 economies, the combined drop in employment ranges from **29 million to 44 million—or 18% of employment losses globally**. These large employment cuts suggest that COVID-19 will have significant impact on poverty (Box 2).

Impact on wage incomes: Wage incomes will also fall globally, especially in the US, the EU, and the UK. Globally, labor income will drop between **\$1.2 trillion to \$1.8 trillion** (see Table 5). For Asia, the decline in wage income will range from **\$359 billion to \$550 billion—or about 30% of the global drop in wage income under the two scenarios**. For G3, the combined fall in labor income ranges from **\$735 billion to \$1.1 trillion—or about 61% of the global total**.

POLICY RESPONSE

Immediately after COVID-19 spread outside the PRC, governments worldwide rushed to increase spending on health and public order. N95 masks, personal protective equipment, ventilators, and a few viral medicines became sought-after medical commodities. Governments also mobilized public sector workers to implement social distancing, community quarantine or lockdowns, and border controls. Governments likewise announced a variety of macroeconomic stabilization and stimulus policies. They ranged from payroll support to keep jobs, cash transfers and distribution

Table 5. Impact on Employment and Wage Income—Deviation from the Non-COVID-19 Baseline

	Employment (million)		Wage Income (\$ million)	
	Short Containment	Long Containment	Short Containment	Long Containment
Global	-158.1	-242.1	-1,201,231	-1,832,371
Asia	-109.1	-166.7	-358,709	-549,900
Australia and New Zealand	-0.3	-0.5	-11,189	-17,042
Central Asia	-1.9	-3.0	-3,419	-5,396
East Asia ex-PRC	-2.2	-3.6	-37,751	-59,730
PRC	-62.9	-95.2	-253,503	-385,970
Southeast Asia	-11.6	-18.4	-25,047	-38,986
South Asia	-30.0	-45.9	-27,606	-42,445
Pacific	-0.1	-0.2	-193	-331
G3	-29.1	-44.1	-735,301	-1,118,925
United States	-9.0	-13.5	-402,675	-611,233
Japan	-3.6	-5.5	-60,556	-92,157
European Union + United Kingdom	-16.5	-25.1	-272,070	-415,534

G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; PRC = People's Republic of China.

Note: Definition of regional and subregional groupings is online in Appendix 2: <https://aric.adb.org/covid-gtap-appendix>.

Source: Asian Development Bank estimates.

¹⁴ International Labour Organization. 2020. COVID-19 and the World of Work: Impact and Policy Responses. *ILO Monitor 1st Edition*. 18 March.

¹⁵ The 68 million jobs lost due to the impact of COVID-19 was computed using ADB. COVID-19 Economic Impact Assessment Template. <https://data.adb.org/dataset/covid-19-economic-impact-assessment-template>.

¹⁶ ILO. 2020. COVID-19 and the World of Work: Updated Estimates and Analysis. *ILO Monitor 2nd Edition*. 7 April.

¹⁷ According to the ILO, COVID-19 related full or partial lockdowns are affecting roughly 2.7 billion people, or 80% of the global workforce. More so, ILO's new global estimates indicate that working hours will decline by 6.7% in Q2 of 2020—equivalent to 195 million people in full-time job equivalent.

Box 2. Impact of COVID-19 on Poverty Levels in Asia

Grouped distribution data on household consumption expenditures for 34 Asian Development Bank (ADB) developing member countries (DMCs) was used to model the possible impact of the COVID-19 pandemic on poverty incidence. As is widely acknowledged, the pandemic is adversely affecting livelihoods through shocks on both the demand side (for example, as consumers avoid travel and leisure activities) and the supply side (for example, on account of the lockdown policies), cutting into economic activity, earnings, and consumption. We adopted the simple assumption that per capita consumption fell by similar amounts for all households. In real life, of course, the situation is far more complex. For example, households with members working in the tourism, restaurants, and non-food retail sectors would likely be hit particularly hard, as would those with informal, short-term employment contracts. There are also geographical variations depending on levels of infection and the severity of lockdown policies within a city or region. The varying effects of COVID-19 by industry, type of employment, and location cannot be captured by the data used here.

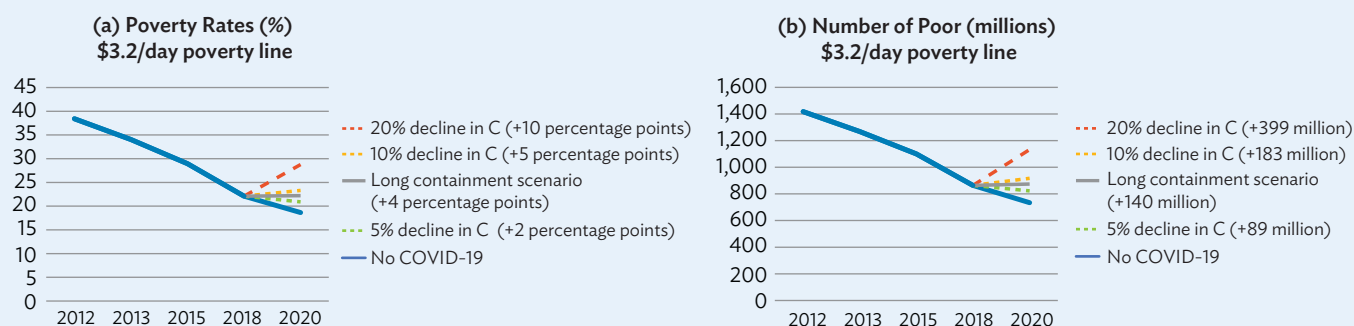
With these caveats, the two figures summarize the results for the 34 DMCs with respect to the \$3.2/day poverty line typical in lower-middle-income economies (expressed in 2011 purchasing power parity).^a It also shows the poverty impact of the consumption

decline associated with the Global Trade Analysis Project (GTAP) simulation in the long containment scenario.

The figures illustrate the direction of poverty rates and number of poor relative to a baseline 2020 scenario without COVID-19. The baseline shows the region would have seen a continued steady reduction in poverty rates and number of poor in line with 2012–2018 data—for example, there would be an estimated 734 million (or about 19%) living in poverty as defined by the \$3.2/day poverty line in 2020. By comparison, a 5% reduction in annual per capita consumption expenditure would add 89 million poor people, while a 10% and 20% decline in annual per capita consumption expenditure would imply 183 million and a staggering 399 million people, respectively, falling back into poverty. Using the extreme poverty line (\$1.9/day), results show an additional 34 million, 78 million, and 185 million extreme poor for the 5%, 10%, 20% decline in annual per capita consumption expenditure scenarios, respectively. For the GTAP long containment scenario, the number of poor will increase by about 56 million for the \$1.9/day and 140 million for the \$3.2/day.

These are just simple projections. Should households be better able to adapt to changing local conditions, and/or benefit from private sector or government relief programs, the poverty impact of the pandemic could be lower.

Poverty Estimates in Developing Asia for the \$3.2/day Poverty Line: With and Without COVID-19



C = average household per capita consumption expenditure.

Notes: Developing Asia refers to the average of 34 DMCs. For 2018, India's estimates were based extrapolations using World Bank's model-based mean per capita expenditure in 2015, GDP per capita growth rates between 2015 and 2018, and distribution based on the 2011–2012 household consumption survey.

Sources: World Bank's PovcalNet Database for 2012–2018 (except for India for 2018) and Asian Development Bank estimates for all for 2020 and India for 2018.

^a To measure the impact of COVID-19 on poverty, we assumed three scenarios where the average household per capita consumption expenditure dropped by 5%, 10%, or 20%.

Source: Bulan, J., R. Hasan, A. Martinez, and I. Sebastian. 2020. "COVID-19 and Poverty: Some Scenarios." Unpublished note prepared for Economic Research and Regional Cooperation Department, Asian Development Bank.

of supplies to the poor, and extension of loans and tax assistance to businesses. These helped counteract some of the adverse economic impacts of the COVID-19 pandemic. In what follows, we analyze the economic effects of these policy responses.

Cost of health spending: For government spending on health, the brief uses upper and lower bound estimates based on (i) population infection rate of between 2% and 6%; (ii) case severity where 80% of infected individuals experience mild symptoms, 18% will require

Table 6. Cost of Health Spending—Lower and Upper Bounds

	\$ million		% of GDP	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Global	238,889	386,676	0.3	0.5
Asia	82,049	115,176	0.3	0.5
Australia and New Zealand	2,610	4,860	0.2	0.3
Central Asia	5,270	6,470	0.8	0.9
East Asia ex-PRC	3,490	6,220	0.2	0.3
PRC	35,400	54,100	0.3	0.4
Southeast Asia	12,000	16,000	0.4	0.5
South Asia	23,100	27,300	0.7	0.9
Pacific	179	226	0.5	0.7
G3	92,640	174,600	0.2	0.4
United States	46,200	88,500	0.2	0.4
Japan	8,340	15,200	0.2	0.3
European Union + United Kingdom	38,100	70,900	0.2	0.4

G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; PRC = People's Republic of China.

Note: Definition of regional and subregional groupings is online in Appendix 2: <https://aric.adb.org/covid-gtap-appendix>.

Source: Asian Development Bank estimates.

hospitalization, and 2% will require critical care including the use of ventilators; and (iii) 12% of the population being tested with confirmed cases isolated and their contacts traced. Overall, health expenditures could range from \$234 billion to \$387 billion or from 0.3% to 0.5% of global GDP (Table 6). For Asia, health interventions will cost between **\$82 billion to \$115 billion**; and for G3 economies, from **\$92 billion to \$175 billion**. While these costs are modest, the importance of government investment in the health sector is substantial. Health sector investments, particularly in testing for ongoing infections, tracing of contacts, and treatment of cases will enable improved containment of the virus spread and help reduce the need for restrictions in economic activities.¹⁸ Essentially, well-targeted investments in the sector can also provide critical information needed to open the economy without triggering a second wave of infections, helping ensure impacts are closer to the short containment scenario than the long containment scenario.

Effects of fiscal stimulus: Another important government policy response is the use of macroeconomic stabilization policies. To date, an array of fiscal and monetary stimulus policies have been taken to (i) give cash handouts to keep jobs or provide essential goods and services; (ii) support businesses via tax cuts, provision of credit, or equity infusions; and (iii) provide market liquidity support through various market instruments, such as reverse repurchases and buying treasury bonds or mortgage-backed securities.

To better understand the different policy responses to COVID-19, ADB has published a COVID-19 Policy Database that categorizes policies by differences in operational details and/or financial statement effects.¹⁹ In defining a policy's operational path, the database identifies three key channels: (i) providing liquidity; (ii) encouraging credit creation by the financial sector; or (iii) direct funding to households, businesses, and/or state/local/regional governments. In terms of financial impact, the database distinguishes between (i) who, if anyone, bears what kind of financial risk of the measure; and (ii) whether the measure increases debt or income (for example, net worth or equity, *ceteris paribus*) for the target recipient. Based on these two types of taxonomy, the database identifies five types of stabilization or stimulus policies: (i) support for the normal functioning of money market and short-term finance; (ii) encouraging private credit creation; (iii) direct lending to the nonfinancial sector (businesses, households, and local governments); (iv) equity claims on the private sector; and (v) direct support to income and/or revenue.

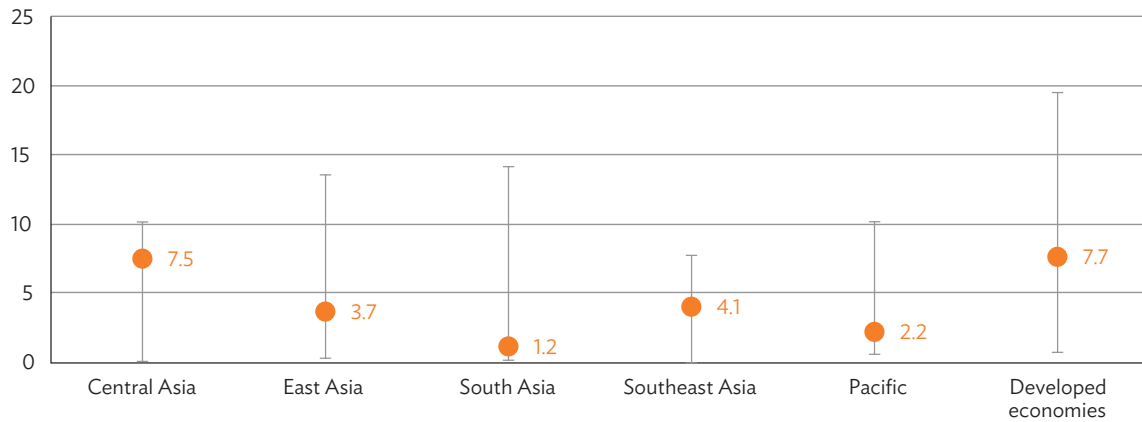
For this analysis, we only cover direct income and/or revenue support of households, businesses, and the public sector. On average, direct support to income and revenue accounts for 42.8% of the stabilization packages of ADB DMCs and 33.8% for advanced economies. For the 68 ADB members and the EU, this measure amounts to \$4.7 trillion (6.6% of their cumulative GDP).²⁰ By country, Japan has the largest direct support as a percentage of

¹⁸ AlRuthia, Y. et al. 2019. *Estimation of Direct Medical Costs of Middle East Respiratory Syndrome Coronavirus Infection: A Single-Center Retrospective Chart Review Study*. Dove Medical Press Limited. <https://www.dovepress.com/estimation-of-direct-medical-costs-of-middle-east-respiratory-syndrome-peer-reviewed-article-IDR>.

¹⁹ Felipe, J. et al. 2020. ADB COVID-19 Policy Database (Version 1, 20 April 2020). Manila: ADB.

²⁰ The other interventions were not included as they have a more indirect effect on the real economy through the financial sector (which is not included in the GTAP model).

Figure 5. Direct Support to Income or Revenue in Response to COVID-19—ADB Member Economies (% of GDP)



ADB = Asian Development Bank, GDP = gross domestic product.

Note: The circular markers refer to the weighted average across economies within a subregion or grouping. The upper (lower) bound refers to the maximum (minimum) value within a subregion or grouping.

Source: Felipe, J. et al. 2020. ADB COVID-19 Policy Database (Version 1, 20 April 2020). Manila: ADB.

Table 7. Macro Stimulus Effects—Deviation from the Non-COVID-19 Baseline

	GDP (\$ million)		GDP (%)	
	Short Containment	Long Containment	Short Containment	Long Containment
Global	1,701,133	3,402,089	1.9	3.7
Asia	339,258	674,839	1.3	2.5
Australia and New Zealand	10,164	20,334	0.5	1.0
Central Asia	9,634	19,138	1.0	2.0
East Asia ex-PRC	18,509	36,770	0.7	1.3
PRC	249,306	496,563	1.7	3.4
Southeast Asia	43,641	86,608	1.2	2.5
South Asia	7,654	14,724	0.2	0.4
Pacific	351	702	0.5	1.0
G3	1,282,579	2,569,894	2.6	5.3
United States	519,746	1,043,054	2.5	5.0
Japan	197,101	395,789	3.6	7.2
European Union + United Kingdom	565,732	1,131,051	2.5	5.1

G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; PRC = People's Republic of China.

Note: Definition of regional and subregional groupings is online in Appendix 2: <https://aric.adb.org/covid-gtap-appendix>.

Source: Asian Development Bank estimates.

GDP, followed by Germany and several small economies such as Bhutan, Mongolia, Kazakhstan, and the Cook Islands. By subregion, developed economies have the largest direct support, averaging 7.7% of GDP, followed by Central Asia (mainly Kazakhstan) (7.5%), Southeast Asia (4.1%), East Asia (3.7%), the Pacific (2.2%), and South Asia (1.2%) (Figure 5).

Potentially, these macroeconomic stabilization packages could raise global GDP by **\$1.7 trillion to \$3.4 trillion (1.9% to 3.7% of global GDP)** (Table 7). For Asia, macroeconomic stimulus could also add **\$339 billion to \$675 billion (1.3% to 2.5% of the region's GDP)**. For the G3 economies, they could raise output by **\$1.3 trillion to \$2.6 trillion (2.6% to 5.3% of their aggregate GDP)**.²¹

²¹ This study assumes that only half of the announced stabilization packages are spent in the short containment scenario, and full amount is spent in the long containment scenario. However, the study does not pass judgment on the validity of the announced stabilization packages.

Table 8. GDP Impact of COVID-19 with Macroeconomic Policy Responses—
Deviation from the Non-COVID-19 Baseline

	GDP (\$ million)		GDP (%)	
	Short Containment	Long Containment	Short Containment	Long Containment
Global	-4,095,760	-5,387,763	-4.5	-5.9
Asia	-1,328,566	-1,854,273	-4.9	-6.8
Australia and New Zealand	-80,992	-119,122	-4.1	-6.0
Central Asia	-11,436	-14,840	-1.8	-2.4
East Asia ex-PRC	-145,576	-219,971	-5.3	-8.0
PRC	-833,772	-1,126,819	-5.8	-7.8
Southeast Asia	-119,582	-166,290	-3.4	-4.7
South Asia	-134,284	-202,922	-3.7	-5.6
Pacific	-2,924	-4,308	-4.1	-6.0
G3	-2,246,264	-2,758,060	-4.6	-5.7
United States	-965,572	-1,183,412	-4.6	-5.7
Japan	-127,383	-95,245	-2.3	-1.7
European Union + United Kingdom	-1,115,880	-1,479,403	-5.0	-6.7

G3 = United States, Japan, and European Union plus United Kingdom; GDP = gross domestic product; PRC = People's Republic of China.

Note: Definition of regional and subregional groupings is online in Appendix 2: <https://aric.adb.org/covid-gtap-appendix>.

Source: Asian Development Bank estimates.

GDP impact after incorporating government responses:

Government macroeconomic policy responses are designed to reduce the net effect of COVID-19 on output. Hence, with policy interventions under the short containment scenario, global output will fall by **\$4.1 trillion (4.5% of global GDP)**, with Asia's output falling by **\$1.3 trillion (4.9%)** (Table 8). With policy interventions under the long containment scenario, global output will fall by **\$5.4 trillion (5.9%)**, with output in Asia falling by **\$1.9 trillion (6.8%)**. In the G3, output will fall by **\$2.2 trillion to \$2.8 trillion (4.6% to 5.7%)**.

CONCLUSION AND POLICY IMPLICATIONS

The ADO 2020's COVID-19 impact assessment of **\$2.0 trillion to \$4.1 trillion (2.3% to 4.8% of global GDP)** is now upgraded to **\$5.8 trillion to \$8.8 trillion (6.4% to 9.7% of global GDP)**. However, if the impact of policy responses from governments are factored in—including direct interventions on income and revenues—the COVID-19 impact under the short containment scenario is reduced by **\$1.7 trillion to \$4.1 trillion (30% of the gross impact)**. Under the long containment scenario, it will be reduced by **\$3.4 trillion to \$5.4 trillion (40%)**.²²

The COVID-19 impact under the long containment scenario is large. Thus, policy makers should aim for quick containment at all cost. Without policy response, output losses could reach \$8.8 trillion, job losses 242 million, and forgone labor income

\$1.8 trillion. These will be difficult to recoup. Furthermore, we cannot discount the possibility of a financial crisis, if the pandemic could not be contained in time to prevent large defaults and bankruptcies. This would further exacerbate the crisis and possibly cause permanent economic scarring—through forcing the closure of businesses, pushing people out of the labor force, and other associated widespread scarring effects such as a sharp fall in household health and education spending, delayed human capital development, and discouraged entrepreneurship.

As discussed, policy interventions can significantly offset the impact of COVID-19—reducing it by 30% under the short containment scenario and by 40% under the long containment scenario. However, with the current size of macroeconomic stimulus for some countries in the region still small relative to the impact of the COVID-19 outbreak, doubling the size of macroeconomic stabilization packages could help shorten the containment period.

Aside from increasing the value of the packages, it is also important to incorporate interventions that help restructure the economy toward higher productivity growth. These interventions could incorporate investments in hard and soft infrastructure that could help the economy open up without risking a second wave of re-infections. For example, higher use of information and communication technology (ICT) in (i) work arrangements, (ii) delivery of health services, (iii) delivery of education and

²² Economy-level comparison of the GDP impact of COVID-19 between ADO 2020 and GTAP analyses is online in Appendix 3: <https://aric.adb.org/covid-gtap-appendix>. The detailed information on the differences between the two methodologies is online in Appendix 4 in the same link.

training, (iv) payment systems, and (v) international trade and global supply chains would comply with social distancing policies and also minimize disruptions to economic activities. On the soft investments, ICT could also be used to prepare workers in the post-COVID-19 world through online education, training and re-skilling, and establishment of electronic labor exchanges to help re-employ displaced workers. Facilitating online business opportunities through e-commerce and other small-scale online services will also help. Strengthening occupational health and safety is also important to allow economies to reopen safely. Overall, these initiatives will increase the impact of direct interventions by contributing to productivity enhancements, further increasing the fiscal multiplier effect. The result from sensitivity analysis suggests that if the \$4.7 trillion support to income and revenues were spent on items that enhance economic productivity, the impact in the long containment scenario could be as large as \$5.6 trillion, equivalent to a fiscal multiplier of 1.2.

Increasing health budgets is beneficial. While health expenditures save lives, protect frontline workers, and contain the virus spread, they have little economic impact. Yet, their impact on human lives is critical. More importantly, increasing health budgets will prepare the sector for the disease burden COVID-19 leaves behind. While it is too early to estimate the disability-adjusted life years (DALYs), time lost due to premature death and the time spent disabled by disease could have significant economic impact. In addition, what COVID-19 underscored is that our health systems—even those from advanced countries that we thought better prepared—were ill-equipped to deal with the surge of a pandemic. We must invest now to ensure we are better prepared next time.

There are other mitigation measures that can help minimize the economic impact of the pandemic. First, while lockdowns and community quarantine are helpful, they negatively affect the economy. It is important to review them in a timely manner to optimize the reopening of essential transport, markets, and supply chain systems—when it is safe to do so. Keeping freight and goods moving should be differentiated from personal mobility. While individuals will still accompany freight and goods, the technology exists and precautions are available to manage this relatively miniscule risk. Preparations should be adopted to ensure markets remain open alongside strict adherence to social distancing, use of masks, and other hygienic and sanitation practices. The growth and deepening of e-commerce systems, payment structures, and logistics for the delivery of food, goods, and some services can keep consumption disruptions to a minimum. They can be strengthened to promote more inclusive production and trade.

Tourism, which has been decimated by transport restrictions and lockdowns, will require financial support through insurance bailouts, tax incentives, and other business support schemes to keep the sector afloat. Post-crisis planning must begin now to create a robust response structure that will allow the industry to open safely once air traffic and lockdown restrictions are gradually lifted. Rebuilding consumer confidence must be backed by safety assurances on the ground that contribute to a balanced,

positive experience for both visitor and host. Effective advertising to attract tourists through mainstream and social media will be needed to mitigate any COVID-19 stigma, while measures must be taken to assure the local population that hosting visitors is safe. For many destinations, encouraging domestic tourism should be a priority.

Managing ongoing and evolving trade and supply chain disruptions is an essential priority, particularly for food supplies and complex value chains such as electronics and automobiles. Trade rules and markets must be predictable. Also, forging stronger regional trade cooperation to ensure sufficient supply of essential medical commodities such as face masks, personnel protective equipment, anti-viral medications, and eventually vaccines should be established.

Strong income and employment protection are critical to avoid possible long-term economic scarring. A key driver behind the drop in consumption comes from marketplace disruptions and the huge employment losses, both globally and across the region. Therefore, governments should aim to establish safe zones where producers and consumers can reconnect and interact safely, particularly for essential agricultural and food products. To ensure consumption does not fall sharply, governments should support temporary cash transfers, unemployment subsidies, and the distribution of essential commodities—particularly food. Help should also be targeted to those most affected, including women, older workers, the unskilled and informal-sector workers, and those in urban areas where community lockdowns remain in place. Direct income support can be properly implemented by ensuring that transfer is done efficiently—maybe tapping digital payment systems, if applicable; meaningful amounts are set; and measures are in place to prevent corruption.

Caveat to the GTAP analysis: In assessing the analysis presented, it is important to keep in mind the natural omissions and simplifications that could affect the model results. First, a few important channels of COVID-19 effects on the economy have not been accounted for. These include (i) the impact on migration and remittances; (ii) the impact of death and disability on the labor force; (iii) the impact on capital flows, debt, and the financial markets; and (iv) the impact on the environment and climate change. Migration and remittance channels are important for several Southeast and South Asian economies and the small island economies in the Pacific. Also, for some economies with only few COVID-19 cases, such as the Pacific, the calculated impacts are modest, with a potential for substantial increases if COVID-19 caseloads intensify. Similarly, as COVID-19 deaths rise and long-lasting health effects persist through long recovery periods or physical disabilities, the productivity of recovered patients will be affected. Another important impact of COVID-19 is the crowding out of other essential and elective health services, with some health facilities being closed and nurses being laid off. The financial channel is critically affected by both the depth and longevity of lockdowns. On the positive side, however, there are clear gains from limited travel and mobility in terms of both environmental quality and global warming.

Similarly, our GTAP analysis makes simple assumptions to make results more tractable. Yet, they could also lead to some overestimation of annualized impacts. For example, in the GTAP static simulation, one moves from one equilibrium to another without a time-lag or constraints on capacities or institutions. For example, in the policy response simulations, the disbursements of half of the announced funds to targeted groups with no delay

is allowed. While there are funding constraints in the real world, the modeling implementation assumes that direct income and revenue support is fully funded in a short-time horizon through increases in tax collections arising from higher GDP growth and higher savings arising from lower consumption. These simplifications could lead to overestimated outcomes on the effectiveness of policy responses.

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