



## The Spread of COVID-19 and Policy Responses

Ergys Islamaj, Young Eun Kim, and Duong Trung Le

Since early 2020, the COVID-19 pandemic has spread to most countries and territories around the world. For many countries, the second wave of infections is turning out to be more serious than the first. Notwithstanding the global spread of the virus, public policy responses have varied across countries and regions. This brief analyzes the spread of COVID-19 and the effectiveness of policy efforts to contain the disease across a large number of countries. The findings suggest that public health measures—especially testing—and economic support policies are associated with effective containment of the disease, and thus are supporting fundamental prerequisites for a resumption of normalcy, until vaccines are rolled out and community immunity is obtained.

This brief examines the evolution of COVID-19 and public policy responses across country groups around the world; presents an econometric analysis of the relationship between the spread of infections and the policy responses; and concludes with main policy implications.

### The Spread of COVID-19 around the World

COVID-19, which started in China at the end of 2019, spread quickly around the world in 2020 (map 1). The infection rate—defined as the number of newly confirmed cases per 1,000 people—has been increasing rapidly in many countries across all regions (figure 1, panel a). Driven by the United States, the infection rate in North America started to increase rapidly in April. Following a transient cool-down period from August to September, new infections have surged again since then. In many European countries, the second wave of infections started in September and is ongoing, with higher infection rates than the first wave in April. In Latin America and Caribbean, the infection rate rose noticeably during winter in the Southern Hemisphere between June and August before subsiding, and has declined gradually since. In South Asia, the infection rate, after increasing for several consecutive months, has been declining since October. The infection rate in Middle East and North Africa has been steadily increasing, although it is smaller. Many East Asia and Pacific countries have been less affected relative to countries in other regions. However, the number of new cases is still high in Indonesia and the Philippines and has been increasing since September in Malaysia and Myanmar. There was a mild surge of

cases in Sub-Saharan African countries during July, but this has been largely contained. In many developing countries, the actual infection rate is likely to be much higher than the reported rate considering weak disease surveillance and reporting capacity (NTI and Johns Hopkins University 2019).

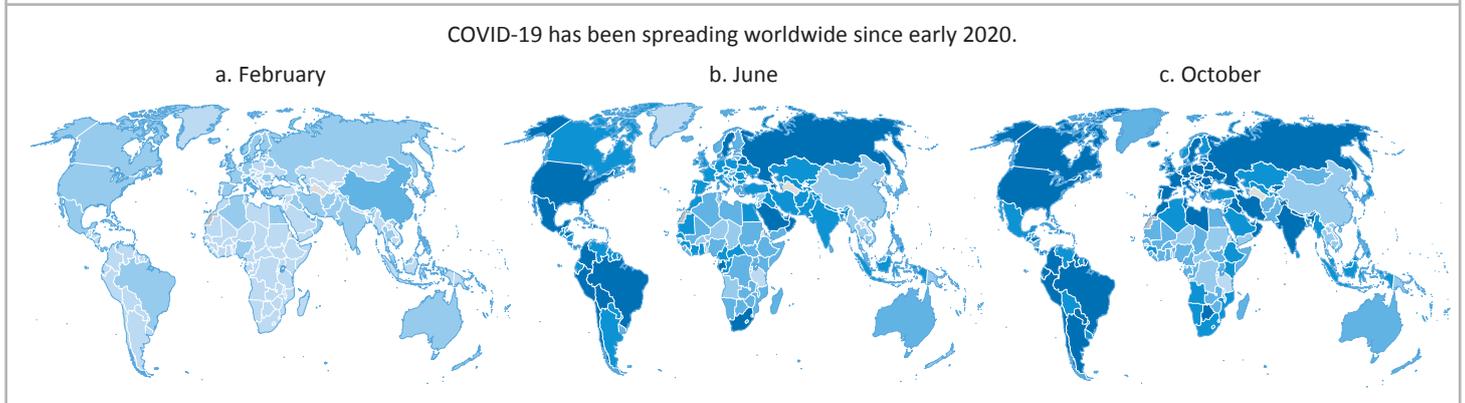
The case fatality rate—defined as the ratio of the number of deaths over cases—peaked in April as the spread of virus stretched health capacity in many countries (figure 1, panel b). It has since converged to below 3 percent. There are multiple potential reasons for the decline, including a demographic change in infected people toward the young, who are generally healthier and less likely to die; more comprehensive testing; and improved treatment strategies for COVID-19 (Lancet Infectious Diseases 2020). Average case fatality rate remains high in Latin America and the Caribbean, the Middle East and North Africa, and Sub-Saharan Africa, likely due to weaker health care capacity in the countries in these regions (figure 2).

### Unabated Spread of Infection

To better highlight the evolution of new infections across countries, this brief classifies countries into three groups:

- *Least affected:* The daily infection rate has been consistently below a constructed threshold.
- *Under control:* The daily infection rate had been higher than the threshold but has been successfully contained below the threshold as of November 2020.
- *Ongoing:* The daily infection rate has yet to be reduced below the threshold.

Map 1. Monthly Infection Rates of COVID-19 by Country



Source: Authors' calculations based on daily data from the European Centre for Disease Prevention and Control (CDC).

Note: The maps show the distribution by quintiles in the monthly number of cases per 1,000 people across the three months (low to high = light to dark blue).

**Affiliations:** Ergys Islamaj, East Asia and Pacific Chief Economist Office, World Bank; Young Eun Kim, East Asia and Pacific Chief Economist Research Center, World Bank; Duong Trung Le, East Asia and Pacific Chief Economist Office, World Bank.

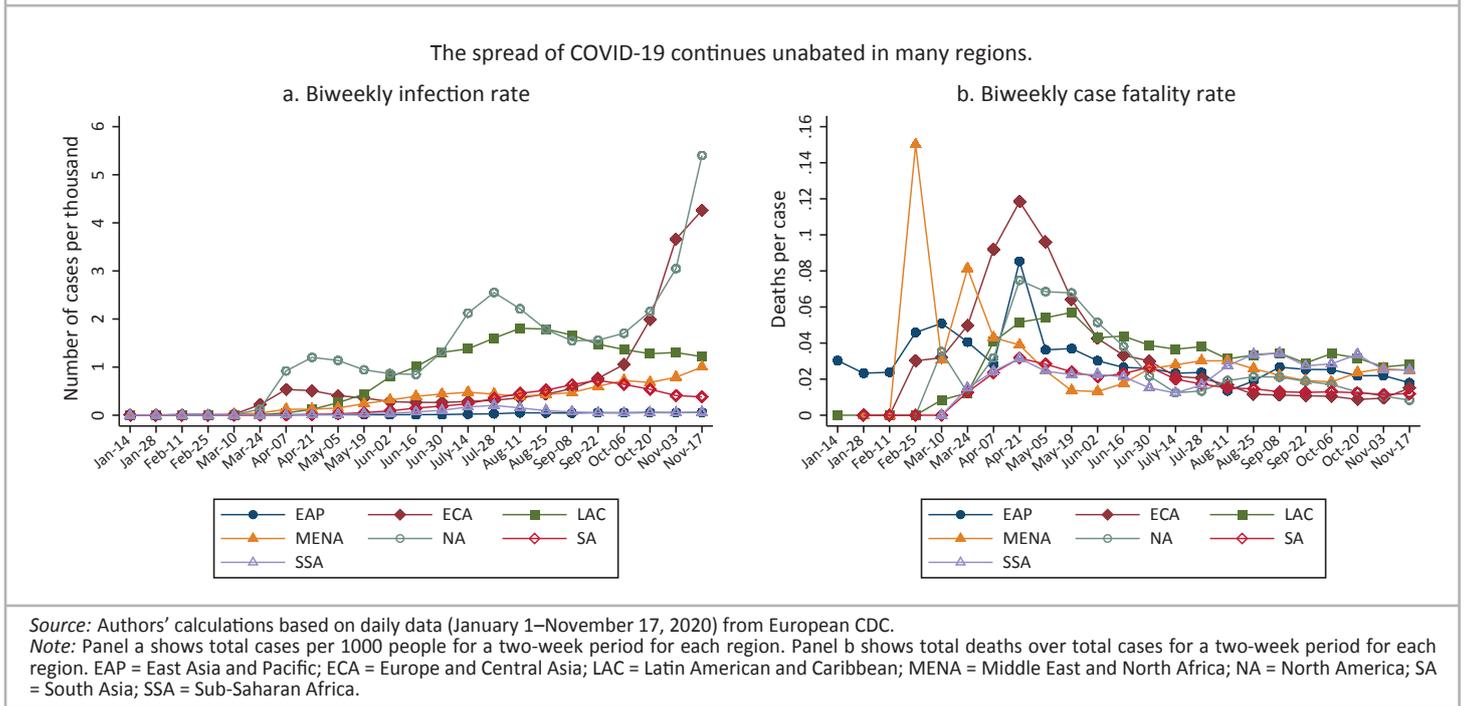
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Figure 1. Rates of COVID-19 Infections and Fatalities by Region



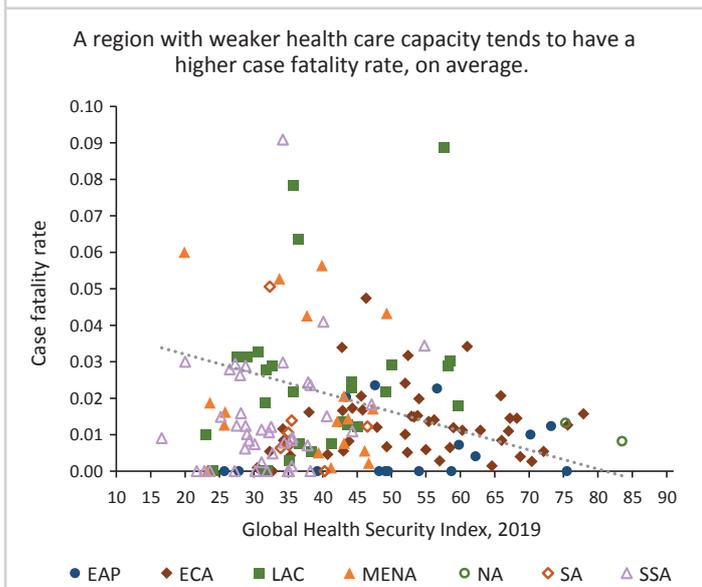
The threshold is constructed as the 10th percentile of country-specific highest daily infection rate for the period January 1 to November 17, 2020 (0.003 cases per thousand). To smooth daily infection rates, the 15-day moving average is used. A break-down of the countries in each group is presented in the appendix.

The median infection rate in countries in the *ongoing* group has been rising steadily since March, reaching 1.4 cases per thousand population biweekly in November, with no signs of deceleration

(figure 3). The rise in infections in this group of countries continues to drive the global rise in COVID-19 cases. In countries in the *under-control* group, the median infection rate increased from May to July to around 0.06 per thousand but has since declined. In countries in the *least-affected* group, the median infection rate has remained below 0.005 per thousand since early 2020.

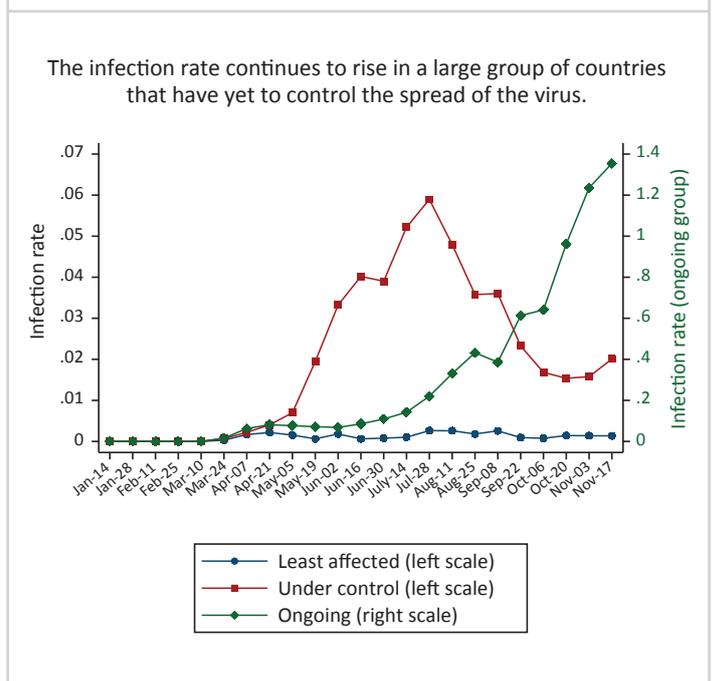
The countries in the *least-affected* group make up less than 10 percent of all countries with available data and are predominantly

Figure 2. Health Care Capacity Compared to COVID-19 Fatalities by Region



*Source:* Authors' calculations based on the country-specific overall Global Health Security Index from NTI and Johns Hopkins University 2019 and data on cases and deaths from European CDC.  
*Note:* The figure shows biweekly case fatality rate during November 4–17, 2020 versus the 2019 Global Health Security Index score for each country with available data (0 to 100 = weakest to strongest). EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin American and Caribbean; MENA = Middle East and North Africa; NA = North America; SA = South Asia; SSA = Sub-Saharan Africa.

Figure 3. Biweekly Number of New Cases per Thousand People



*Source:* Authors' calculations based on daily data (January 1–November 17, 2020) from European CDC.  
*Note:* The figure shows biweekly infection rates as a median of country-specific infection rates for each group. Infection rate is defined as the total number of new cases per 1,000 people. See the appendix for a break-down of countries by group.

**Table 1. Status of Infection Rates as of Mid-November 2020**

Widespread infection is ongoing in almost three-quarters of all countries.

| Region                       | N          | Not or mildly affected | Under control |                  |          | Ongoing    |                  |           | Decelerating trend <sup>a</sup> |
|------------------------------|------------|------------------------|---------------|------------------|----------|------------|------------------|-----------|---------------------------------|
|                              |            |                        | Total         | Wave(s) suffered |          | Total      | Wave(s) suffered |           |                                 |
|                              |            |                        |               | 1 wave           | 2+ waves |            | 1 wave           | 2+ waves  |                                 |
| East Asia and Pacific        | 20         | 7                      | 5             | 4                | 1        | 8          | 5                | 3         | 1                               |
| Europe and Central Asia      | 49         | 1                      | 0             | 0                | 0        | 48         | 14               | 34        | 17                              |
| Latin America and Caribbean  | 31         | 0                      | 3             | 2                | 1        | 28         | 21               | 7         | 19                              |
| Middle East and North Africa | 20         | 1                      | 2             | 2                | 0        | 17         | 11               | 6         | 9                               |
| North America                | 3          | 0                      | 0             | 0                | 0        | 3          | 0                | 3         | 1                               |
| South Asia                   | 7          | 0                      | 1             | 1                | 0        | 6          | 3                | 3         | 2                               |
| Sub-Saharan Africa           | 44         | 8                      | 25            | 23               | 2        | 11         | 7                | 4         | 7                               |
| <b>Total</b>                 | <b>174</b> | <b>17</b>              | <b>36</b>     | <b>32</b>        | <b>4</b> | <b>121</b> | <b>61</b>        | <b>60</b> | <b>56</b>                       |

*Source:* Authors' calculations based on daily data (January 1–November 17, 2020) from European CDC.  
*Note:* The number of waves were determined by the authors in reference to the country-specific infection-rate figures (See the appendix for the URL to access the figures).  
 a. "Decelerating trend" refers to countries where the daily infection rate has been decreasing recently.

in East Asia (such as Cambodia, Lao PDR, and Vietnam), Pacific, and Sub-Saharan Africa (such as Chad, Tanzania, and Togo) (table 1). The countries in the *under-control* group comprise around 20 percent of countries, more than half of which are in Sub-Saharan Africa. The remaining majority, more than 70 percent of the countries, are part of the *ongoing* group, where the number of new infections continues to rise or remains high. A significant proportion of countries in East Asia and Pacific (60 percent) and in Sub-Saharan African (75 percent) have either been minimally affected or have been able to control the transmission of infections. It is notable that the lower capacity to test and trace probable cases in low-income countries, such as those in Sub-Saharan Africa, may have resulted in an underestimate of actual infections. Also, previous experiences with other coronaviruses (such as SARS and MERS) may have made some of these countries better prepared to deal with the current pandemic.

Within the *ongoing* group, the trend of infections was decelerating in almost half of the countries as of mid-November 2020 (table 1). Brazil and India were experiencing a decline in the infection rate, while the rates were rising in the United States, Russia, and Mexico. By mid-November, two-thirds of Europe and Central Asia countries were struggling with an accelerating spread of the disease. Around 60 percent of Latin America and Caribbean countries (including Bolivia, Chile, and Peru) were experiencing a decreasing infection rate by November, after a sharp increase during the winter months in the Southern Hemisphere.

Most countries in Europe, Central Asia, and North America have encountered a second wave of infections (table 1). Only seven countries have gone through more than one wave and successfully contained it: Australia (East Asia and Pacific); Barbados (Latin America and Caribbean); Djibouti (Middle East and North Africa); Bhutan (South Asia); and Congo, Comoros, and Guinea (Sub-Saharan Africa).

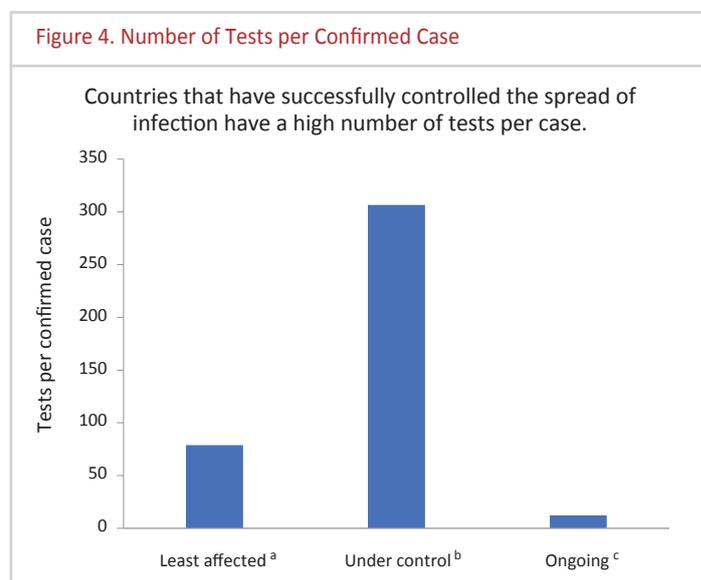
### Public Health and Economic Support Policies

Public policy responses to contain the spread of the disease have varied across countries and have included imposing mobility restrictions; testing for infections; and increasing spending to strengthen public health systems, support households, and help firms avoid bankruptcy.

### Enacting Mobility Restrictions

To control COVID-19, countries have imposed a variety of mobility restrictions, such as closing schools and workplaces, limiting domestic and international travel, and restricting public gatherings and events. The stringency of these measures reached the peak in April as the virus spread in most countries and gradually eased afterward. Existing literature shows a wide variation in the effectiveness of lockdown measures across countries and regions. For instance, Askitas, Tatsiramos, and Verheyden (2020), Bonardi

**Figure 4. Number of Tests per Confirmed Case**



*Source:* Authors' calculations based on daily data for infection cases from European CDC and tests from Hasell et al. (2020) for the period January 1–November 17, 2020.

*Note:* Bars show the total number of tests per confirmed case (total tests divided by total confirmed infection cases) by containment group over the period January 1–November 17, 2020. Comparison of the number of tests is affected by the way countries report data (<https://ourworldindata.org/coronavirus-testing#the-positive-rate-a-crucial-metric-for-understanding-the-pandemic>). EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin American and Caribbean; MENA = Middle East and North Africa; NA = North America; SA = South Asia; SSA = Sub-Saharan Africa.

a. For the least-affected group: EAP, 405 (average); SSA, 5; other regions, data not available.

b. For the under-control group: EAP, 975 (average); SSA, 10; other regions, data not available.

c. For the ongoing group: EAP, 15 (average); ECA, 17; LAC, 2; MENA, 4; NA, 16; SA, 14; SSA, 8.

et al. (2020), and Weber (2020) argue that the closure of borders or travel restrictions has had little effect. In contrast, studies on international air travel (Chinazzi et al. 2020; Keita 2020) find sizeable effects, particularly if measures were implemented early. Eckardt, Kappner, and Wolf (2020) find limited effectiveness of border controls during the first wave of COVID-19 in 18 Western European countries.

Challenges in implementing lockdown measures effectively, especially in economies facing capacity constraints, are likely to be compounded by unfavorable socioeconomic factors. For instance, many developing countries have a large share of firms in the informal sector, which usually lacks comprehensive social protection. Many governments also face limited fiscal space to provide financial support to low-income earners to sustain stay-at-home restrictions (Loayza et al. 2020). Lockdown measures such as closing schools can also lead to the loss of human capacity in the long term.

**Testing**

Governments across all regions have ramped up their testing effort since the outbreak of COVID-19. In practice, intensive testing policies do not necessarily mean that implementation is rigorous and effective. The number of tests per confirmed case (testing coverage afterward) has varied widely across regions. On average, the countries in the *ongoing* group have the lowest coverage, at around 12 tests per case; followed by 79 tests per case for the countries in the *least-affected* group. The highest coverage, at around 300 tests per confirmed case, on average, is reported by countries in the *under-control* group that have successfully dealt with the pandemic (figure 4). This trend is driven largely by East Asia and Pacific. Many countries in this region document the highest tests per case globally, including Thailand (313), Australia (340), Vietnam (983), and China (1,746). The average testing coverage in East Asia and Pacific region is 405 in the *least-affected* group and 975 tests per case in the *under-control* group, whereas it

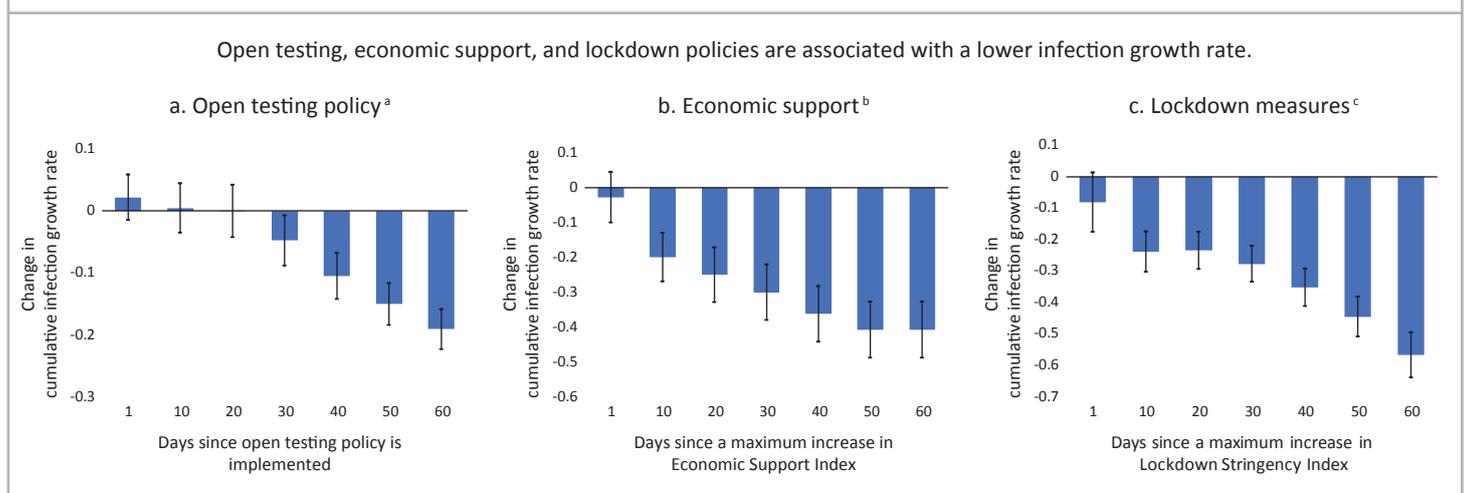
is much lower, at 15, in the *ongoing* group. In other regions, the testing coverage is below 20 on average across the *least-affected*, *under-control*, and *ongoing* groups.

The importance of intensive testing accompanied by rigorous contact tracing has been emphasized since the early stages of the pandemic (Rae and Friedman 2020; WEF 2020). Ranan-Eliya et al. (2020) use a sample of 174 countries and show that intensive testing has the greatest impact on controlling the spread of COVID-19 compared to various other interventions, including mask usage, school closures, and restrictions on gatherings, and is the common characteristic among countries that successfully have controlled the disease. Many developing countries have a weak capacity for early detection and testing of probable infection cases, as suggested by a low testing coverage or missing data (figure 4).

**Economic Support**

Many countries have supported households through various measures such as salary subsidies, relief from contractual obligations and debt, and conditional cash transfers. Such economic support is likely to induce people to stay at home and avoid having to look for jobs, which is especially important in developing countries, where many people working in the informal sector and their families depend on daily income to make ends meet (Loayza and Meza-Cuadra 2018). Based on the authors' estimations using data from Oxford COVID-19 Government Response Tracker 2020 (Hale et al. 2020), countries in North America and Europe have offered the highest average level of income support by subsidizing more than 50 percent of the lost salary for people employed in the formal sector since April. Countries in East Asia and Pacific and Latin America and Caribbean have introduced policies to subsidize earnings lost for both informal and formal employment on average since May, reflecting a high share of informal employment, exceeding a median of 60 percent at the regional level (World Bank 2020). Governments in countries of the *ongoing* group have subsidized, on average, less

Figure 5. How Public Health and Economic Support Affects COVID-19 Infection Rates



Source: Authors' estimations using data on policy responses from Oxford COVID-19 Government Response Tracker (Hale et al. 2020) and data on daily confirmed cases from Europe CDC for January 1–October 31, 2020.  
 Note: This figure presents the point-estimates from regressing cumulative growth rate in new cases on open testing policy (proxied indicator for public-health measure) (panel a) and availability of economic support (panel b). The model controls additionally for country-specific fixed effects, day-specific fixed effects, and the level of countries' mobility restriction (proxied by lockdown stringency index) (panel c). The Huber-White robust standard error estimation is used. Whiskers represent 95-percent confidence intervals of the estimates. The dependent variable is cumulative infection growth rate, standardized as a unit of deviation from the global mean.  
 a. The testing policy index is constructed as a binary indicator that equals 1 if testing is open and available to all, and 0 otherwise, based on data on testing policy from Oxford COVID-19 Government Response Tracker 2020.  
 b. The economic support index is a continuous average of two indicators: income support for lost earnings and debt relief or deferral on financial obligations, rescaled from [0-100] to [0-1] for representation on the figure. The index is from Oxford COVID-19 Government Response Tracker 2020.  
 c. The lockdown stringency index is constructed as an average of seven indicators with adjustment for whether they are targeted or general: closing of schools, workplaces, and public transport, restrictions on public events, gathering sizes, and domestic and international travel. The methods in Hale et al. 2020 were applied. The index ranges from 0 to 100 corresponding to the least to most intense.

than a half of lost earnings for both formal and informal employment since April. In the *least-affected* and *under-control* groups, the average income support has been extended largely to both formal and informal employment over May to September 2020 period and gradually reduced to only formal employment afterward (estimates available on request).

### Correlates of COVID-19 Infections

The association between the COVID-19 infection rate and the policy responses is assessed using daily data for 174 countries for the period January 1–October 31, 2020. A panel data regression is used with a country-fixed effects and time-fixed effects model. The results show that the introduction of both public-health and economic-support measures are positively correlated with a slower growth of COVID-19 infection cases with respect to the level that would have prevailed without the policy responses in a country (figure 5). These results suggest the benefits of an integrated policy approach to containment.

### Conclusion

This brief presents the patterns of COVID-19 infections and policy responses implemented by governments to contain the disease and support citizens over time by country groups. Wide variations are observed in the timeline and magnitude of the infection rate and the types and intensities of policies across countries and regions. Despite the diversity in infections and policies, countries that have successfully controlled the transmission of COVID-19 have imposed an intensive testing policy and implemented it effectively with high levels of testing coverage, on average. The econometric analysis suggests that public health policies such as testing, along with economic support, can help effectively contain the disease, thereby providing the fundamental prerequisite for a resumption of normalcy. Policy makers will need to strengthen the health care capacity especially for early detection and testing, as well as the capacity to reach out to the informally employed, especially in the services sector.

### Appendix: Countries by Containment Group as of November 17, 2020

#### Least affected countries (17)

*East Asia and Pacific (EAP):* Cambodia, Fiji, Lao PDR, Papua New Guinea, Thailand, Timor, Vietnam

*Europe and Central Asia (ECA):* Greenland

*Middle East and North Africa (MENA):* Yemen, Rep.

*Sub-Saharan Africa (SSA):* Burkina Faso, Burundi, Chad, Congo, Dem. Rep., Mali, Niger, Tanzania, Togo

#### Countries with infection under control (36)

*East Asia and Pacific (EAP):* Australia, Brunei, China, New Zealand, Singapore

*Latin America and the Caribbean (LAC):* Barbados, Haiti, Nicaragua

*Middle East and North Africa (MENA):* Djibouti; Egypt, Arab Rep.

*South Asia (SA):* Bhutan

*Sub-Saharan Africa (SSA):* Benin, Cameroon, Central African Republic, Comoros, Congo, Rep., Cote d'Ivoire, Gabon, Gambia, The, Guinea, Liberia, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Sudan, Sudan, Zambia, Zimbabwe

#### Countries with ongoing spread of infection (121)

*East Asia and Pacific (EAP):* Guam, Indonesia, Japan, Malaysia, Mongolia, Myanmar, Philippines, Korea, Rep.

*Europe and Central Asia (ECA):* Albania, Andorra, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faero Islands, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russia, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom, Uzbekistan

*Latin America and the Caribbean (LAC):* Argentina, Aruba, Bahamas, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad and Tobago, United States Virgin Islands, Uruguay, Venezuela

*Middle East and North Africa (MENA):* Algeria, Bahrain, Iran, Islamic Rep., Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Gaza

*North America (NA):* Bermuda, Canada, United States

*South Asia (SA):* Afghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka

*Sub-Saharan Africa (SSA):* Angola, Botswana, Cabo Verde, Ethiopia, Ghana, Kenya, Lesotho, Namibia, South Africa, Swaziland, Uganda

*Note:* The number of infection waves occurred in each country during the period of January 1–November 17, 2020 were determined by the authors in reference to the country-specific infection-rate figures. The figures can be accessed and downloaded from this URL:

[https://www.dropbox.com/sh/6d19eq31jv8mo9f/AACq49NUcVG9wU5v1h\\_MfONXa?dl=0](https://www.dropbox.com/sh/6d19eq31jv8mo9f/AACq49NUcVG9wU5v1h_MfONXa?dl=0)

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