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Working Paper

An analysis of the worldwide response to the COVID-19 pandemic: What and how much?

ADB Economics Working Paper Series, No. 626

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Felipe, Jesus et al. (2020) : An analysis of the worldwide response to the COVID-19 pandemic: What and how much?, ADB Economics Working Paper Series, No. 626, Asian Development Bank (ADB), Manila,
<https://doi.org/10.22617/WPS200353-2>

This Version is available at:

<https://hdl.handle.net/10419/246703>

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AN ANALYSIS OF THE WORLDWIDE RESPONSE TO THE COVID-19 PANDEMIC

WHAT AND HOW MUCH?

*Jesus Felipe, Scott Fullwiler, Donna Faye Bajaro, Al-Habbyel Yusoph, Simon Alec Askin,
and Martin Alexander Cruz*

NO. 626

December 2020

**ADB ECONOMICS
WORKING PAPER SERIES**

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Jesus Felipe, Scott Fullwiler, Donna Faye Bajaro, Al-Habbyel Yusoph, Simon Alec Askin, and Martin Alexander Cruz

No. 626 | December 2020

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www.adb.org

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ISSN 2313-5867 (print), 2313-5875 (electronic)
Publication Stock No. WPS200353-2
DOI: <http://dx.doi.org/10.22617/WPS200353-2>

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ABSTRACT

We use the information compiled as of 15 June 2020 by the Asian Development Bank (ADB) in the ADB COVID-19 Policy Database to analyze the measures taken by its 68 members, plus the European Central Bank, and the European Union, to combat the coronavirus disease (COVID-19) pandemic. Measures associated with monetary policy amount to \$14.9 trillion (\$1.4 trillion by ADB's developing members), while the measures associated with fiscal policy amount to \$7.1 trillion (\$1.5 trillion by ADB's developing members). We discuss the specifics of five countries—identifying similarities and differences. Analysis shows that some countries implemented actions which do not translate easily into monetary amounts for reporting. We show that the total package per capita is directly related to gross domestic product per capita with a high elasticity of 1.61; and so is the package on government support to income and revenue (a subset of the total package), with an elasticity of 1.49. We develop a series of models to understand why rich economies spend significantly more per capita. Results indicate that the package per capita is positively related to the COVID-19 deaths per 100,000 population as of 15 June 2020, population of at least 65 years old as percent of total population, and wage and salaried workers as percent of total employment; and inversely related to self-employed as percent of total employment, and vulnerable employment as percent of total employment. We use this information to compare actual to expected packages.

Keywords: ADB COVID-19 Policy Database, COVID-19

JEL codes: A10, C82

I. INTRODUCTION

The coronavirus disease (COVID-19) pandemic that shocked the world economy in 2020 has already infected over 18 million people worldwide, caused over 700 thousand deaths (as of mid-August 2020), and affected the lives of countless others.

This paper uses the COVID-19 Policy Database of the Asian Development Bank (ADB) to study the measures that its 68 members, as well as the European Central Bank (ECB), and the European Union (EU), have implemented to combat the effects of the COVID-19 pandemic. Database work commenced in March 2020, and has been released five times, in 2-week intervals from 20 April to 15 June.

The specific objectives of this paper are to: (i) take stock of how packages have changed since April 2020; (ii) understand the measures that ADB members have implemented; (iii) analyze whether the measures were adequate to deal with the shock phase; and (iv) understand differences in the size of the packages, when measured in per capita terms or as percentage of gross domestic product (GDP).

The paper is structured as follows. Section II explains the taxonomy used to classify the different measures as well as the estimated country and aggregate packages. Section III summarizes and discusses the measures taken by ADB members as well as the packages (amounts) deployed to combat COVID-19. Section IV discusses the extent to which the measures taken were adequate to deal with the shock phase. Section V presents a statistical analysis to understand the determinants of the size of the packages. Section VI concludes.

II. THE ADB COVID-19 POLICY DATABASE

The ADB COVID-19 Policy Database collects information on the key economic measures that authorities are taking to combat the COVID-19 pandemic.¹ The primary information comes from both national sources and data collected by international organizations. The database covers the 68 members of ADB, the ECB, the EU, and 9 other economies in Africa, Latin America, and Europe.² They represent 92.0% of global GDP and 80.0% of the world's population.

To understand the different policy actions in response to COVID-19, the policy database categorizes these actions according to their differences in operational details and/or financial statement effects. Operational details define the path a given measure takes to affect the financial system, spending, production, and so forth. For the COVID-19 policy responses, these fall into the following categories:

¹ Felipe and Fullwiler (2020) provide a detailed guide on the ADB COVID-19 Policy Database. The database can be accessed at <https://covid19policy.adb.org/>.

² Other economies included are: Arab Republic of Egypt, Argentina, Brazil, Islamic Republic of Iran, Mexico, Nigeria, the Russian Federation, Saudi Arabia, and South Africa. These economies are not discussed in the analysis. We focus on ADB members.

- Provide liquidity to financial and nonfinancial businesses and/or state, local, or regional governments
- Encourage credit creation by the financial sector
- Directly fund households, businesses, and/or state, local, or regional governments

Financial statement effects of a given measure answer one of the following questions:

- Who, if anyone, bears the financial burden of the measure and what kind?
- Does the measure create more debt or more income (e.g., net worth or equity, other things being equal) for the recipients?

These are shown in Table 1.

Table 1: Categorization of Measures According to Operational Details and Financial Position Effects

Operational Details	Financial Positions
Provide liquidity	Measure 01 <ul style="list-style-type: none"> • Loans from the central bank or government to the private sector and state, regional, or local sector • Government or central bank purchases of short-term assets from the private sector • Regulatory or other changes that do not directly alter private sector financial statements
Encourage credit creation by the financial sector	Measure 02 <ul style="list-style-type: none"> • Increases in liabilities of the private sector and state, regional, or local sector to the government or central bank through loans to the financial sector (to enable further lending to the financial and nonfinancial sectors) or secondary market purchases of securities issued by the financial sector, businesses, or state, regional, or local governments • Interest rate changes, loan guarantees, forbearances, and regulatory changes to encourage private credit creation
Directly fund	Measure 03 <ul style="list-style-type: none"> • Increases in recipients' liabilities through long-term direct loans from the government or central bank Measure 04 <ul style="list-style-type: none"> • Increases in ownership claims of the government or central bank through equity investments in the business and/or financial sectors Measure 05 <ul style="list-style-type: none"> • Increases in income or reductions in costs or obligations through government transfer payments, loan cancellation, tax cuts, forbearances, and so forth

Source: Felipe, Jesus, and Scott Fullwiler. 2020. "The ADB Covid-19 Database: A Guide." *Asian Development Review* 37 (2): 1–20.

The left column repeats the three bulleted categories for operational details. The respective potential financial statement outcomes of a given measure are to the right of the corresponding operational detail categories. In order to provide liquidity, for instance, governments or central banks can (i) lend (expanding the borrowers' liabilities in order to obtain central bank liabilities) via existing or expanded standing facilities; (ii) purchase financial assets (exchanging the sellers' financial assets for central bank liabilities); or (iii) undertake actions which do not directly alter private sector financial statements in the sense that there are no accompanying transactions (though they may encourage or enable financial institutions' subsequent actions and thereby lead to changes in their financial statements indirectly, of course), such as relaxing regulations (e.g., lowering required minimum

liquidity ratios), expanding the range of acceptable collateral for secured loans from the central bank, and so on. A brief discussion of each measure follows.

For Measure 01 (liquidity, refinance, and money markets support) there are three subcategories. Measure 01A refers to short-term lending actions and purchase of short-term financial assets. Measure 01B includes adjustments in collateral requirements for borrowing from the central bank or government, payments system policies, reserve requirements, and other liquidity regulations (such as the liquidity coverage ratio, and so forth). Measure 01C includes foreign exchange operations or domestic lending in foreign currency (including domestic foreign currency swap markets) to support domestic liquidity in foreign currency.

Measure 02 (support for private credit creation) also has three subcategories. Measure 02A is for financial sector lending and funding which include secondary market purchases of mortgage-backed securities, corporate bonds, collateralized loan obligations, or bond exchange-traded funds, and loans to the financial sector. Measure 02B includes interest rate reductions and regulatory adjustments to (usually) relax capital requirements, bank oversight, and lending standards. Measure 02C is for loan guarantees.

For Measure 03, Measure 03A covers direct, long-term (greater than 1 year) lending actions and Measure 03B is for forbearances.

Measure 04—equity investments by the government or central bank—currently has no submeasures.

Measure 05 has two subcategories for direct income support: those directly related to healthcare and public health (Measure 05A) and all other direct income support (Measure 05B).

These measures and subcategories do not easily fit standard conceptions of monetary and fiscal policies. Measures 01–03 relate mostly to loans, financial regulations, interest rate changes, and so forth, which are most often associated with monetary policy. Measure 05 directly impacts the government sector’s budget position, which is commonly associated with fiscal policy.³ However, many governments also lend to businesses, households, and/or governments below the national level; provide loan guarantees; and invest in equity of private businesses. Because the approach here separates the actions by effects on financial statements and differences in operations, if the government provides a loan guarantee, for instance, this is a contingent liability that does not affect the government’s financial statements (i.e., it does not affect the government’s budget position) unless the borrower of the guaranteed loan defaults. In our measures, the loan guarantee fits Measure 02C, while a default on a loan with a guarantee subtracts from Measure 02C and adds the same amount to Measure 05B. Consequently, while Measure 05 is the nearest of our measures to a typical definition of “fiscal policy,” the value of Measure 05 will not necessarily equal what a nation may announce as a “fiscal package.”⁴

³ Both governments and central banks engage in financial regulation, of course, which mostly appears in Measure 01B and Measure 02B.

⁴ A good example of this is the United States (US) Coronavirus Aid, Relief, and Economic Security (CARES) Act, which has a total value of \$2.2 trillion but includes a total of nearly \$1 trillion in guarantees (Measure 02C) to banks in the Paycheck Protection Program and to the Federal Reserve, as well as smaller allocations for loans to private businesses (Measures 01A and 03A).

The database contains five additional measures. Three of them are also consistent with Table 1 but effectively double count from an accounting perspective: (i) Measure 06: Redirecting or reallocating previously budgeted spending; (ii) Measure 07: Central bank financing government in the primary or secondary markets; and (iii) Measure 08: International assistance (borrower or recipient). Measure 06 is double counting because it is previously budgeted spending (already allocated/budgeted) that is redirected or reallocated and has been previously accounted for in government budget position projections and therefore, in theory, should not affect subsequent projections to the budget position. Measure 07 is double counting because bank purchases of government securities or direct loans to the government double count government deficits (except to the degree that the purchases or loans become greater than COVID-19-related deficits), which are already counted in Measures 01–05 (mostly Measure 05, though government may be engaged in Measures 01–04). Measure 07 contains two subcategories: (i) direct lending or government reserve drawdown (Measure 07A); and (ii) secondary market purchase of government bonds (Measure 07B). Finally, international assistance (Measure 08) is double counting because it is receiving funds, not spending, lending, or investing them. It contains two subcategories: (i) swaps and clearing arrangements used as borrower (Measure 08A); and (ii) received international assistance funded by ADB or other institutions (Measure 08B).

Measure 09 is international assistance (lender or donor). This is the mirror image of Measure 08, from the point of view of the donor economy.⁵ It contains two subcategories: (i) swaps and clearing arrangements provided as lender; and (ii) international assistance given. It is not double counting from the perspective of the individual nation. Finally, Measure 10 is for those cases in which a nation's actions or announced measures fit somewhere within Measures 01–05 but press releases and other primary sources do not yet provide sufficient information to determine the exact measure.

III. SIZE AND COMPOSITION OF THE PACKAGES

As of 15 June, the total package of the 68 members of ADB (plus that of the ECB and EU) amounted to \$22.5 trillion, up from \$16.6 trillion in April, that is, an increase of 36.0%. Five out of the 68 ADB members have not dedicated any specific monetary amount to combat COVID-19. These are Kiribati, Nepal, Niue, Tajikistan, and Turkmenistan. Forty-seven members have packages of at most \$100 billion; 59 members have packages of at most \$800 billion; and 4 member economies have packages of at least \$1.7 trillion. The United States (US) has the highest package, \$6.04 trillion. The People's Republic of China (PRC) is the only ADB developing member in the top five. Of the \$6.0 trillion increase in the total package, \$5.3 trillion correspond to ADB's developing members and other ADB members, while the ECB and EU contributed the remaining \$0.7 trillion.

It is important to note that significant portions of these packages are *intentions*, and that only in due time will we know the true amounts of the packages versus what was initially authorized. Of the total combined package of the 68 members, ADB's developing members contributed \$3.0 trillion (an increase of 59.5% over the April figure). The total package of ADB's other members amounts to \$14.0 trillion, and those of the ECB and the EU add another \$5.5 trillion.

⁵ We exclude Measure 09 of all the lender or donor economies to compute the total package. However, this measure is included in the calculation of the individual country packages.

Table 2 shows the total package as of 20 April and 15 June, divided into ADB's developing members and other ADB members, and the former further split by region. Data as of 15 June show that East Asia contributed 75.4% of the total package of ADB's developing members, followed by South Asia, 12.3% of the total. These two regions were also the biggest sources of change between April and June, 52.4% and 378.8%, respectively.

Table 2: Packages, 20 April and 15 June 2020 Versions
(\$ million)

	20 April	15 June	% Change
ADB's developing members^a	1,844,932	2,943,389	59.5
Central and West Asia	31,552	35,000	10.9
East Asia	1,456,521	2,219,950	52.4
Pacific	2,213	2,465	11.4
South Asia	75,823	363,029	378.8
Southeast Asia	278,824	322,945	15.8
Other ADB members^b	9,846,388	14,028,736	42.5
ECB and EU	4,858,804	5,528,482	13.8
Total	16,550,124	22,500,607	36.0

COVID-19 = coronavirus disease, ECB = European Central Bank, EU = European Union.

Notes:

^a **Central and West Asia:** Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Pakistan, Uzbekistan; **East Asia:** Hong Kong, China; Mongolia; People's Republic of China; Republic of Korea; Taipei, China; **Pacific:** Cook Islands, Federated States of Micronesia, Fiji, Marshall Islands, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu; **South Asia:** Bangladesh, Bhutan, India, Maldives, Sri Lanka; **Southeast Asia:** Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam. Five countries have not dedicated specific amounts to combat COVID-19 and are thus excluded from this table. These are: Kiribati, Nepal, Niue, Tajikistan, and Turkmenistan.

^b **Other ADB Members:** Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

Source: Authors' calculations based on data from the ADB COVID-19 Policy Database. <https://covid19policy.adb.org/>.

A. How Large Are the Country Packages?

Table 3 shows the countries with the largest packages in absolute value. Four countries account for over half of the global package. These are the US (\$6.0 trillion), Japan (\$3.1 trillion), Germany (\$2.0 trillion), and the PRC (\$1.8 trillion). Of the top 10 countries, only two, the PRC and India, are developing countries. The largest increases between April and June are those of India (449.0%), Japan (165.8%), and Canada (105.7%).

Table 3: Top 10 Countries with the Largest Packages, 20 April and 15 June 2020 Versions
(\$ million)

Rank	Countries	20 April	15 June	% Change
1	United States	4,446,634	6,038,994	35.8
2	Japan	1,163,476	3,091,993	165.8
3	Germany	1,837,389	2,008,827	9.3
4	People's Republic of China	1,148,817	1,795,386	56.3
5	United Kingdom	768,972	756,068	-1.7
6	Canada	296,130	609,148	105.7
7	Italy	504,408	568,302	12.7
8	France	509,469	547,511	7.5
9	India	63,933	350,982	449.0
10	Australia	199,632	260,511	30.5

Note: Rank is based on 15 June packages.

Source: Authors' calculations based on data from the ADB COVID-19 Policy Database. <https://covid19policy.adb.org/>.

Table 4 shows the top five packages as percentage of GDP and package per capita, for both ADB's developing members and other ADB members. Among ADB's developing members, Hong Kong, China and Malaysia lead in terms of percentage of GDP, 50.6% and 20.4%, respectively. Meanwhile, Japan and Finland lead the other ADB members, 59.5% and 53.4%, respectively. In terms of package per capita, Hong Kong, China, provides the highest amount, \$25,567, followed by Singapore, \$12,200. Among the other ADB members, Luxembourg and Finland provide the largest packages, \$29,409 and \$25,614, respectively.

Table 4: Top Five Economies with the Largest Package as Percent of Gross Domestic Product and per Capita

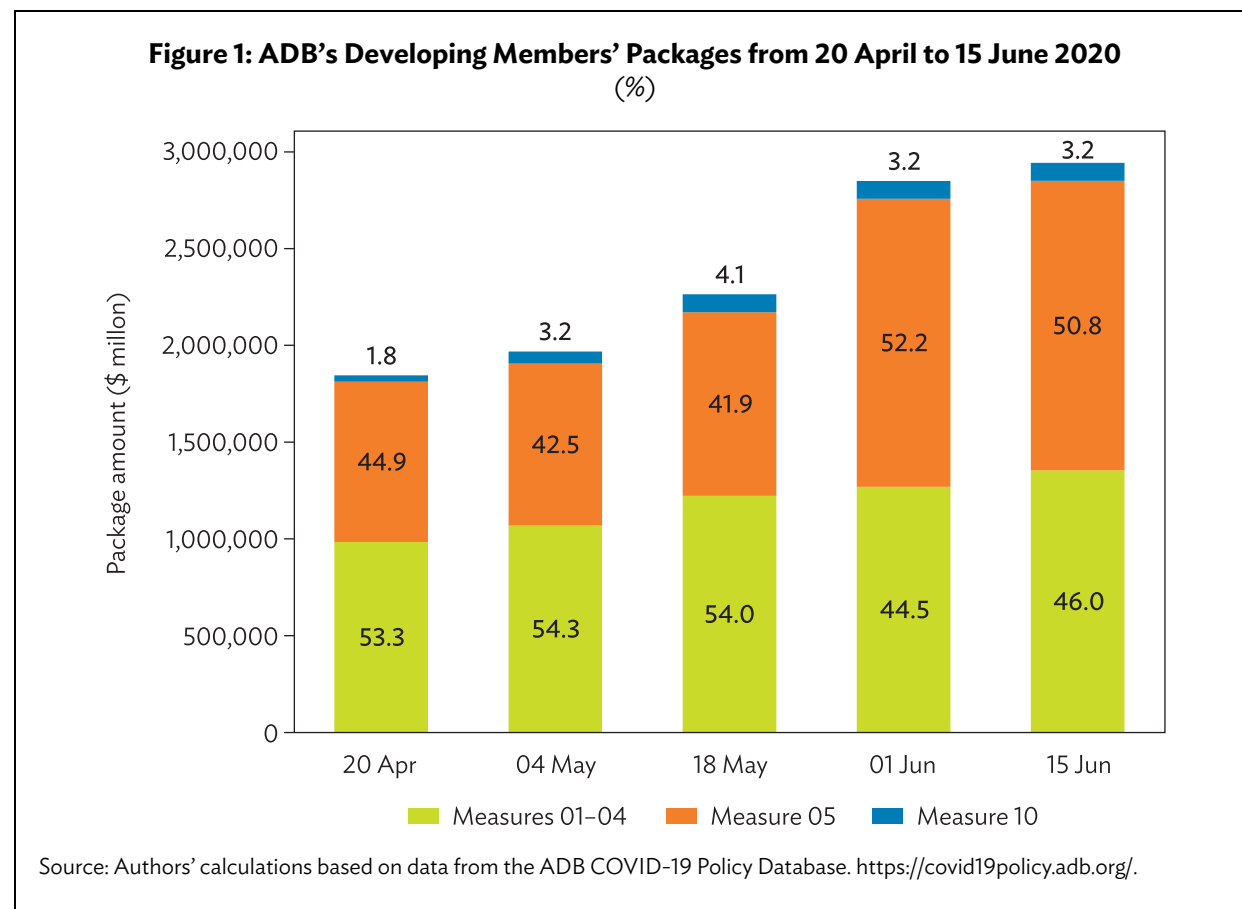
% of GDP					
ADB's Developing Members			Other ADB Members		
1	Hong Kong, China	50.6	1	Japan	59.5
2	Malaysia	20.4	2	Finland	53.4
3	Singapore	19.6	3	Germany	52.8
4	Marshall Islands	16.8	4	Canada	37.0
5	Bhutan	16.6	5	Italy	29.0
Per Capita (\$)					
ADB's Developing Members			Other ADB Members		
1	Hong Kong, China	25,567	1	Luxembourg	29,409
2	Singapore	12,200	2	Finland	25,614
3	Republic of Korea	3,885	3	Japan	24,437
4	Malaysia	2,296	4	Germany	24,224
5	Cook Islands	1,912	5	Switzerland	23,879

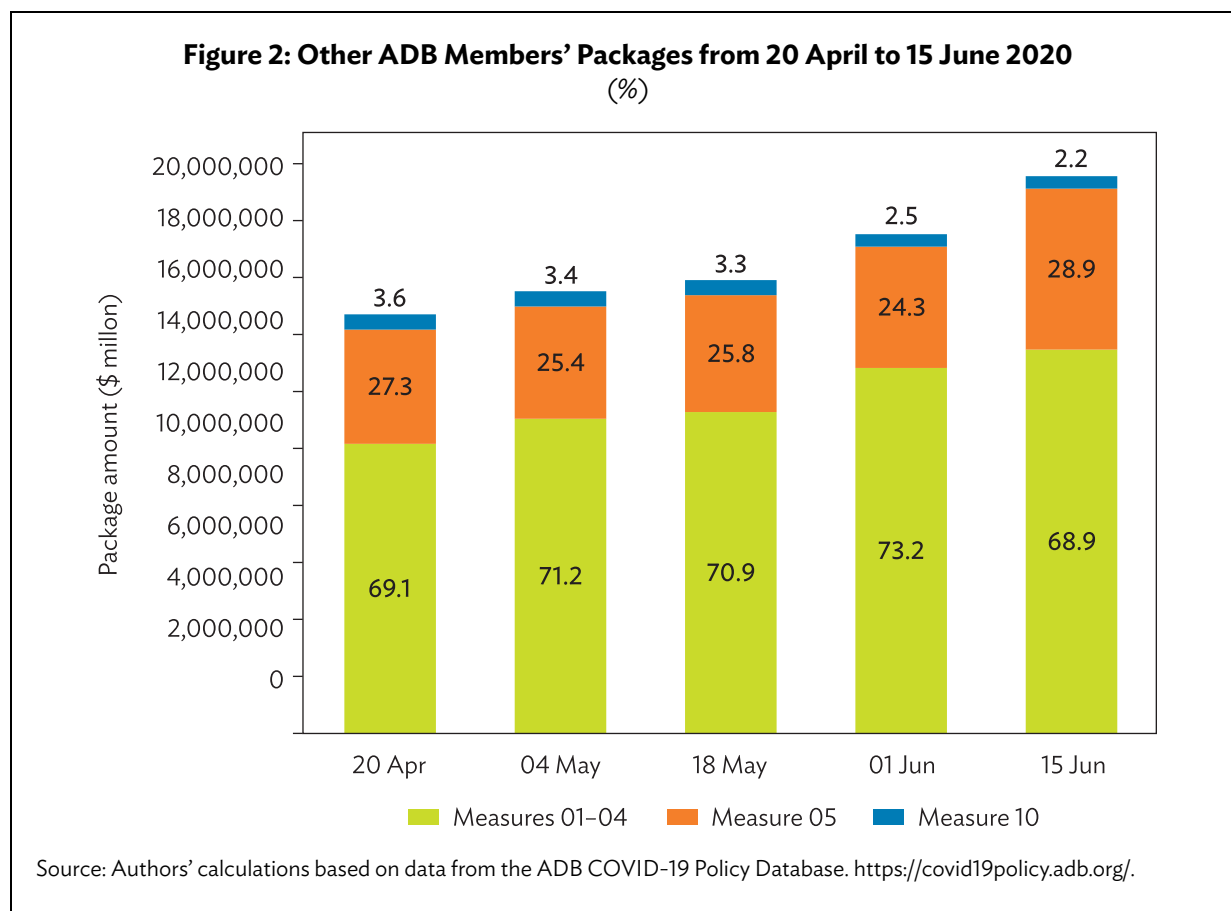
GDP = gross domestic product.

Source: Authors' calculations based on data from the ADB COVID-19 Policy Database. <https://covid19policy.adb.org/> and ADB Asian Development Outlook database for Cook Islands' GDP and population.

B. What Measures Have Economies Implemented?

This section provides details on the composition of the packages by type of measure. Figures 1–2 show the breakdown of the packages into the sum of Measures 01–04 and Measure 05. The overall composition of the packages between the two aggregates has remained fairly constant over time for both ADB’s developing members and the other ADB members. As of 15 June, the former devote more to Measure 05 (50.8% of the total) than to the sum of Measures 01–04 (46.0% of the total); while the reverse is true for the other ADB members, with Measures 01–04 consistently accounting for the majority of the total package, about 71.0% of the total across the five dates.





As of 15 June, Measures 01-04, add up to \$1.4 trillion for the developing members and to \$13.5 trillion for the other members (a total of \$14.9 trillion), representing 5.7% and 28.0% of their cumulative GDPs, respectively. On the other hand, Measure 05 now stands at \$1.5 trillion for the developing members and \$5.7 trillion for other members (a total of \$7.1 trillion), equivalent to 6.3% and 11.7% of their total GDPs, respectively.⁶

Table 5 provides further detail by type of measure (columns) for respective regions and countries (rows). Credit creation and direct income support make up for much of the total package of all 68 ADB members (including ECB and EU), 47.6% and 31.8%, respectively. These shares vary between developing members and other members: in the former, the share of credit creation is 11.9%, and that of direct income support is 50.8%; in the latter, the share of credit creation is 53.0% and that of direct income support is 28.9%.

⁶ As of 20 May, the International Monetary Fund's estimate of the global fiscal support amounts to \$9 trillion (Battersby, Lam, and Ture 2020). While this includes direct budget support (our Measure 05), it also includes public sector loans and equity injections, guarantees, and other actions (such as noncommercial activity of public corporations) that have different impacts on the financial positions of the government and nongovernment sectors compared to direct income support. Interestingly, as of 29 June, the Center for Strategic and International Studies estimated the total fiscal package of the G20 countries at \$7.6 trillion, representing 11.2% of their aggregated GDP (Segal and Dylan 2020).

Table 5: Share of Each Measure in Total Packages, 15 June 2020 Version
(%)

	Functioning Money Markets	Credit Creation	Lending to the Nonfinancial Sector	Equity Claims (private sector)	Direct Income Support	No Breakdown
All ADB members	11.8	47.6	5.2	1.3	31.8	2.4
ADB's developing members	25.8	11.9	7.7	0.5	50.8	3.2
Central and West Asia	13.2	3.9	2.5	–	76.8	3.6
East Asia	26.1	10.7	6.8	0.5	52.5	3.4
South Asia	41.0	17.4	–	–	41.1	0.5
Southeast Asia	8.1	15.6	23.1	1.2	47.8	4.3
Pacific	–	1.1	9.5	–	35.9	53.5
Other ADB members	9.7	53.0	4.8	1.4	28.9	2.2
United States	8.6	55.9	9.8	–	25.7	–
Japan	19.6	3.2	–	3.7	73.5	–

Note: The percentages shown for each aggregate (i.e., rows for all members, developing members and regions, and other members) are computed by summing up the measures (numerator) and total packages (denominator) of all countries belonging in the aggregation. For the United States and Japan, Measure 09 is excluded in their total packages.

Source: Authors' calculations based on data from the ADB COVID-19 Policy Database. <https://covid19policy.adb.org/>.

Developing members allocate the largest share of their packages to direct income support. In Central and West Asia, the share is 76.8%. The second largest measure varies across the regions. In Central and West Asia, East Asia, and South Asia, the next largest measure is functioning money markets, while in Southeast Asia and the Pacific, it is lending to the nonfinancial sector.

The smallest shares in both developing members and other members are lending to the nonfinancial sector and equity claims on the private sector: combined, they only make up for 8.2% of the developing members' total package, and 6.2% of the other members'. Southeast Asia is the only region that allocated a noticeably larger share to lending to the nonfinancial sector—23.1% of the total package. The share of equity claims on the private sector is very small in both developing members and other members.

We now make some remarks on each measure:

01. Functioning money markets. This measure aims to provide short-term liquidity to ensure the normal functioning of money markets. Actions include short-term lending to the private sector, regulatory adjustments to liquidity requirements, and foreign exchange operations.

Among ADB's developing members, India and Hong Kong, China have allocated significant shares of the total package to this measure, 41.5% and 68.1%, respectively. India's actions included increased short-term repurchase agreements (0.1% of GDP); variable term repurchase agreements (0.5% of GDP);

and special refinance facilities for rural banks, housing finance companies, and small enterprises (0.2% of GDP). Hong Kong, China's actions relied more heavily on relaxing liquidity requirements with an estimated total of \$128.8 billion in lending capacity released through the reduction in regulatory reserves.⁷ These two members plus the PRC account for most of the size difference for Measure 01's relative size in the packages of ADB developing members relative to the other ADB members.

Among the other ADB members, Switzerland has the highest allocation to this measure, 51.1% of its total package, although the vast majority of its actions for Measure 01 were in foreign exchange operations totaling more than \$100 billion in order to keep the Swiss franc from appreciating. At the other end of the spectrum, Canada's actions in Measure 01, which total \$187 billion and are 31.0% of the total package as of 27 July, include no foreign exchange operations due to Canada's freely floating exchange rate. Instead, it includes Bank of Canada purchases of banker's acceptances, short-term debt of the provinces, and commercial paper; multiple repurchase agreement facilities at the Bank of Canada; and short-term loans from government agencies to small business, nonprofit organizations, and farms.

02. Credit creation. This measure aims to encourage the financial sector to increase provision of credit to the nonfinancial private sector and to subnational governments. Actions under this measure include loans to the financial sector, secondary market purchases, provision of loan guarantees, interest rate reductions, and other regulatory adjustments. Among the developing members, Thailand and Bangladesh allocated 31.5% and 52.1% of their total packages to this measure, respectively. The Bank of Thailand offered \$15.6 billion in loans to financial institutions to finance the latter's lending to small and medium-sized enterprises (SMEs). Bangladesh will subsidize interest payments of up to \$5.9 billion in working capital loans by scheduled banks to businesses.

Among the other ADB members, the ECB, Italy, and Belgium have the highest allocations to this measure. Both Italy and Belgium implemented state guarantee programs for bank loans, as well as reinsurance schemes, accounting for nearly 84.0% of their total packages. The ECB's entire package is in Measure 02; to date it has offered "Targeted Longer-Term Refinancing Operations" to financial institutions at negative interest rates, estimating that this could enable the equivalent of €3 trillion in private credit creation. Another program, the ECB's Pandemic Emergency Purchase Programme, was authorized for another €1.35 trillion in security purchases. The US has the highest monetary value for this measure, which is \$3.2 trillion as of 27 July. It includes several of the Federal Reserve's new standing facilities including the Paycheck Protection Program Lending Facility, the Secondary Market Credit Facility, the Main Street New Loan Facility, and the reestablished Term Asset-Backed Securities Loan Facility, as well as its increased purchases of mortgage-backed securities.⁸ It also includes nearly \$1.1 trillion in guarantees provided by the government to banks and to the Federal Reserve.

03. Lending to the nonfinancial sector. This measure consists of long-term loans to the nonfinancial private sector as well as forbearances. The Republic of Korea (ROK) leads ADB's developing members in absolute amount at \$101.9 billion, comprising 50.8% of its total package. Some of the specific

⁷ This is an example of how some countries have reported monetary values on regulatory items in Measures 01B and 02B. For Measure 01B, the estimation appears to be similar to a money multiplier view of how much relaxed reserve requirements might increase excess reserves available for deposit creation. For Measure 02B, the calculations are linked to how much additional balance sheet space becomes available when capital requirements are relaxed. The vast majority of countries relaxed regulatory measures related to both Measures 01B and 02B, but only a small minority reported estimates for potential credit creation that might result.

⁸ The \$3.2 trillion figure uses the authorized amounts for the Secondary Market Credit Facility (included with the Primary Market Credit Facility, since the Federal Reserve uses the same Special Purpose Vehicle (SPV) to lend to both facilities and then reports at the level of this vehicle rather than the individual facilities), the Main Street New Loan Facility, and the Term Asset Backed Securities Lending Facility, which total \$1.45 trillion.

measures it has implemented include expanded lending and new bond purchasing facilities. Among the other ADB members, the US and the EU allocate the largest absolute amounts, accounting for 8.3% and 46.5% of their total packages, respectively. For the US, the Federal Reserve established the Municipal Liquidity Facility that will offer up to \$500 billion in lending to states and municipalities to manage cash flow stresses caused by the COVID-19 pandemic, while the US government offered loans to businesses critical to national security and also for emergency disaster relief. The EU established the Pandemic Crisis Support credit lines, with access granted for up to 2.0% of the respective country's GDP as of end-2019.

04. Equity claims on the private sector. At just over 1.0% of all ADB members' total package, this measure is the smallest of Measures 01–05, especially for ADB's developing members. Germany has allocated \$123.9 billion to directly acquire equity of affected companies (e.g., Lufthansa). Japan, on the other hand, increased the purchases of exchange-traded funds and Japan-Real Estate Investment Trusts up to \$111.8 billion (2.2% of GDP) and \$1.7 billion (0.03% of GDP), respectively. Interestingly, the US has not yet allocated anything to this measure, in contrast with its Troubled Asset Relief Program that purchased private equity positions in large financial institutions during the 2008–2009 global financial crisis.

05. Direct support to income. This measure reflects both health and nonhealth government expenditure designed to increase income and improve the financial positions (net worth) of the private sector. This also includes transfer payments, tax cuts, and other forms of government subsidies.

Among ADB developing members, the PRC and India allocated the largest amounts to this measure, \$1.1 trillion (60.5% of total package) and \$148 billion (42.2% of total package), respectively. Major spending for the PRC includes local government infrastructure projects, COVID-19 control and prevention, tax relief and waived social security contribution, interest concessions, and price reductions. India's actions include support for businesses and poor households, investments in health institutions, and programs for the agriculture sector.

Japan and the US allocated the largest amounts to this measure, \$2.3 trillion (73.5% of the total package) and \$1.7 trillion (25.6% of the total package), respectively. Japan launched the Emergency Economic Package Against COVID-19, which now represents over 43.4% of its GDP. Some of the measures it has implemented include health-related initiatives, support to businesses and households, and transfers to the local governments. Meanwhile, the US has enacted four major laws to implement its fiscal packages: Coronavirus Preparedness and Response Supplemental Appropriations Act; Families First Coronavirus Response Act; Coronavirus Aid, Relief, and Economic Security (CARES) Act; and Paycheck Protection Program and Healthcare Enhancement Act (PPPHCEA).

Relatedly, the multiple US acts are good examples of how Measure 05 can differ from the headline monetary values of government legislation. The CARES Act has a total value of \$2.2 trillion but includes nearly \$1 trillion in guarantees (Measure 02C) to banks (in the PPPHCEA) and to the Federal Reserve, as well as smaller allocations for loans to private businesses (Measures 01A and 03A). Similarly, the PPPHCEA is nearly \$500 billion but includes \$321 billion for loan guarantees and another \$50 billion in emergency disaster relief loans to small businesses. The four legislative acts combine for \$2.9 trillion, but as above, the portion of this that applies to Measure 05 is \$1.7 trillion.

09. International assistance. This measure includes the provision of currency swaps and loans among central banks, as well as donations and grants. The US Federal Reserve is by far the largest provider of central bank currency swaps given its contractual agreements with 14 other central banks. Central bank currency swap lines were also provided by the central banks of the EU, India, Japan, the ROK, and

Singapore. The Federal Reserve and ECB also provided lines of credit secured by government securities in the respective currencies in some instances, in lieu of loans secured by the borrowing nations' currencies. Meanwhile, other ADB members, along with the PRC and the ROK, also engaged in direct international assistance, either through direct transfers to intended beneficiaries or increased contributions to multilateral organizations.

C. How Are the Measures Being Funded?

As countries implement their packages, they have also sought ways to finance them. These are: (i) central bank financing, (ii) international assistance as the borrower or recipient, and (iii) reallocation of previously budgeted government spending.

First, any lending or purchasing actions of the central banks in Measure 01–04 in the domestic currency are inherently *self-funded*, since these actions simply involve a central bank crediting the account of the bank that is the counterparty, or, if the counterparty is not a bank, then it credits the account of the counterparty's bank, who then credits the counterparty's account.

For government deficit positions, central banks are the major funding sources in Singapore, the United Kingdom, and the US, where this source is equivalent to about 10.4%, 9.4%, and 8.2% of their respective GDPs. Most of this comes from secondary market purchases of government bonds. Direct lending to governments is much more uncommon, only used by the US and a few Southeast Asian countries.⁹ In the case of the Philippines, this was accomplished through a \$5.9 billion repurchase agreement from the central bank to the government, while the Indonesian central bank opted to purchase sharia sovereign bonds through a government auction in the primary market.

As in the previous section's discussion of Measure 09, the international assistance comes mostly from the network of central bank bilateral swap agreements and via temporary repo facilities (the latter provided independently by the US Federal Reserve and the ECB to central banks in emerging market economies against the risk-free collateral in the lender's currency). Among ADB's developing members, those securing swap lines and/or liquidity facilities from multiple central banks are Indonesia, the ROK, Singapore, and Sri Lanka.

Other forms of international assistance come from ADB and other multilateral organizations such as the World Bank, the International Monetary Fund, and the Asian Infrastructure Investment Bank, but these make up for a small percentage overall. Nevertheless, international assistance remains an important source of funds for small economies such as those in the Pacific, where it amounts to about 1.7% of the region's total GDP, compared to 0.03% for the rest of ADB's developing members. Meanwhile, in absolute amounts, India received the most assistance, \$4.0 billion, followed by the Philippines, \$3.6 billion.

Lastly, reallocating previously budgeted government spending was the least used of these financing measures. Among all ADB members, only Indonesia and the European Union have used this measure.

⁹ The US case here is unique, involving the government's backstop of Federal Reserve lending programs, as authorized in the CARES Act. As of 27 July, \$114 billion has been moved from the Treasury's account on the Federal Reserve's balance sheet into 'special' accounts that are effectively equity investments in the Federal Reserve's SPVs. Of this amount, \$96 billion is invested directly in nonmarketable domestic series US government debt. In other words, \$96 billion of the government's current \$114 billion equity position in the Federal Reserve's SPVs is invested directly in newly issued, nonmarketable US government securities. To be more precise, \$1.5 billion of the \$114 billion is allocated to the Federal Reserve's Money Market Liquidity Facility, which is not among the Federal Reserve's SPVs.

IV. COMPARING COUNTRIES—A SHORT CASE STUDY OF PACKAGES AND WHAT IS OR IS NOT REPORTED

This section provides analyses of qualitative and quantitative differences in packages of the Philippines, Indonesia, Thailand, Malaysia, and the ROK. Table 6 shows the estimated or authorized monetary values as a percent of GDP for the five countries for Measures 01–05 and 10 that the respective countries reported. Cells in the rows for Measures 02 and 03 parenthetically highlight similarities or differences across countries. Cells for Malaysia and the ROK for Measure 10 note that Malaysia's entry was not clear enough to say which combination of measures within Measures 01–05 the actions most likely fit, whereas for the ROK it appears the actions fit Measures 02, 03, and 04 but with no clear delineation of how much for each. The final two rows list the respective packages as a percent of GDP and in US dollar per capita.

Table 6: Comparison of Measures 01 to 05 and 10 for the Philippines, Indonesia, Thailand, Malaysia, and the Republic of Korea, 15 June 2020 Version
(% of GDP)

Measure	Philippines	Indonesia	Thailand	Malaysia	Republic of Korea ^a
1 Liquidity	1.2	1.4	(Actions, but no amounts provided)	1.3	1.1
2 Private credit creation	0.6 (Guarantees)	0.9 (Guarantees)	5.0 (Guarantees; finance bank lending to SMEs)	3.3 (Guarantees)	(Guarantees, but no amounts provided)
3 Direct lending	0.1	0	2.7 (Corporate bonds)	7.1 (Forbearances)	6.5 (SME loans, corporate bonds)
4 Equity investment	0	0	0	0.1	0.6
5 Direct income support	2.8	3.5	8.3	6.2	2.1
10 No breakdown	0.8	0	0	2.1 (Unclear)	2.1 (Measures 02, 03, 04)
Total package (% of GDP)	5.5	5.8	16.0	20.4	12.3
Package per capita (\$)	188	229	1,211	2,296	3,730 ^a

GDP = gross domestic product, SMEs = small and medium-sized enterprises.

^a The Republic of Korea's package inclusive of Measure 09 (bilateral swaps extended to Bank Indonesia [\$7.6 billion] and international aid [\$400 million]) is \$3,885 per capita.

Source: Authors' calculations based on data from the ADB COVID-19 Policy Database. <https://covid19policy.adb.org/>.

Regarding Measures 01, 02, and 03, it is important to note that all five countries did the following: (i) relaxed liquidity (01B) and capital requirements (02B); (ii) relaxed regulatory oversight to enable banks to restructure customers' loans (02B, 03B); and (iii) reduced central bank interest rate targets. These are important actions that unfortunately do not translate easily into monetary amounts for reporting. A relatively small minority of countries did report monetary amounts for one or more of these, including, coincidentally, a majority of this sample (Philippines, Indonesia, and Malaysia).¹⁰ On the other hand, Thailand and the ROK reported actions but no accompanying monetary amounts for Measures 01B and 02C, respectively.

The packages for the Philippines and Indonesia are substantially smaller as a percent of GDP and in per capita terms than the other three countries. Both have comparatively small amounts for Measures 02 and 03, and similar values for Measures 01 and 05. Looking a bit deeper, Indonesia's Measure 01B includes almost 0.5% of GDP for reduced liquidity requirements that provide "additional liquidity" available (about 0.1% of GDP) and fewer "demand deposit obligations" (about 0.4% of GDP); the former refers to traditional bank reserve requirements, while the latter refers to more recent macroprudential liquidity regulations. Further, Bank Indonesia also raised a separate liquidity requirement for banks—the "liquidity buffer ratio"—that could only be fulfilled via government bond purchases in the primary market, for which no monetary amounts were reported. The Philippines' Bangko Sentral ng Pilipinas (BSP) reported the entire amount for its Measure 01 entry also as an increase in liquidity available due to reduced requirements in Measure 01B; on the other hand, BSP was also doing increased open market operation in March (the most severe period of liquidity difficulties) that were later reversed of nearly equal amount to that in Measure 01B. By the same token, Indonesia's entry for Measure 02 does not include an amount for an additional round of loan guarantees announced on 19 May. Taken altogether, this deeper look appears to net to an amount roughly around the original amounts in the bottom two rows of Table 6 from the ADB database, with perhaps a modest reduction in Measure 01 and a similar increase in Measure 02 for Indonesia.

For Thailand and Malaysia, at first sight the two packages seem quite different with nearly \$1,100 per capita of separation, but a deeper look suggests their sizes are probably more similar. Recall that Thailand reported actions but not monetary amounts for Measure 01; if we assume these actions amounted to 1.0% of GDP—slightly smaller than the next smallest entry for Measure 01 in the Table (1.1% of GDP for the ROK)—then Thailand's package is nearly \$1,300 per capita. Malaysia's Bank Negara Malaysia (BNM), like the BSP, and Bank Indonesia, incorporates monetary amounts for Measure 01B that equal 86.0% of the total. Further, Malaysia's entry for Measure 03 (7.1% of GDP) is mostly due to its inclusion of a monetary estimate in Measure 03B (forbearances) for the impact of a 6-month moratorium and restructuring for SMEs. Thailand likewise reports a "loan payment holiday of 6 months for SMEs and suspension of principal" for Measure 03 but does not report a monetary value like most countries. Overall, to compare "likes to likes," raising Thailand's package to account for not reporting monetary values for Measure 01, and reducing Malaysia's entries for Measures 01 and 03, the two countries' packages become less than \$200 per capita apart (Malaysia's is still larger), rather than nearly \$1,100 apart.¹¹

¹⁰ See also footnote 7 for more information.

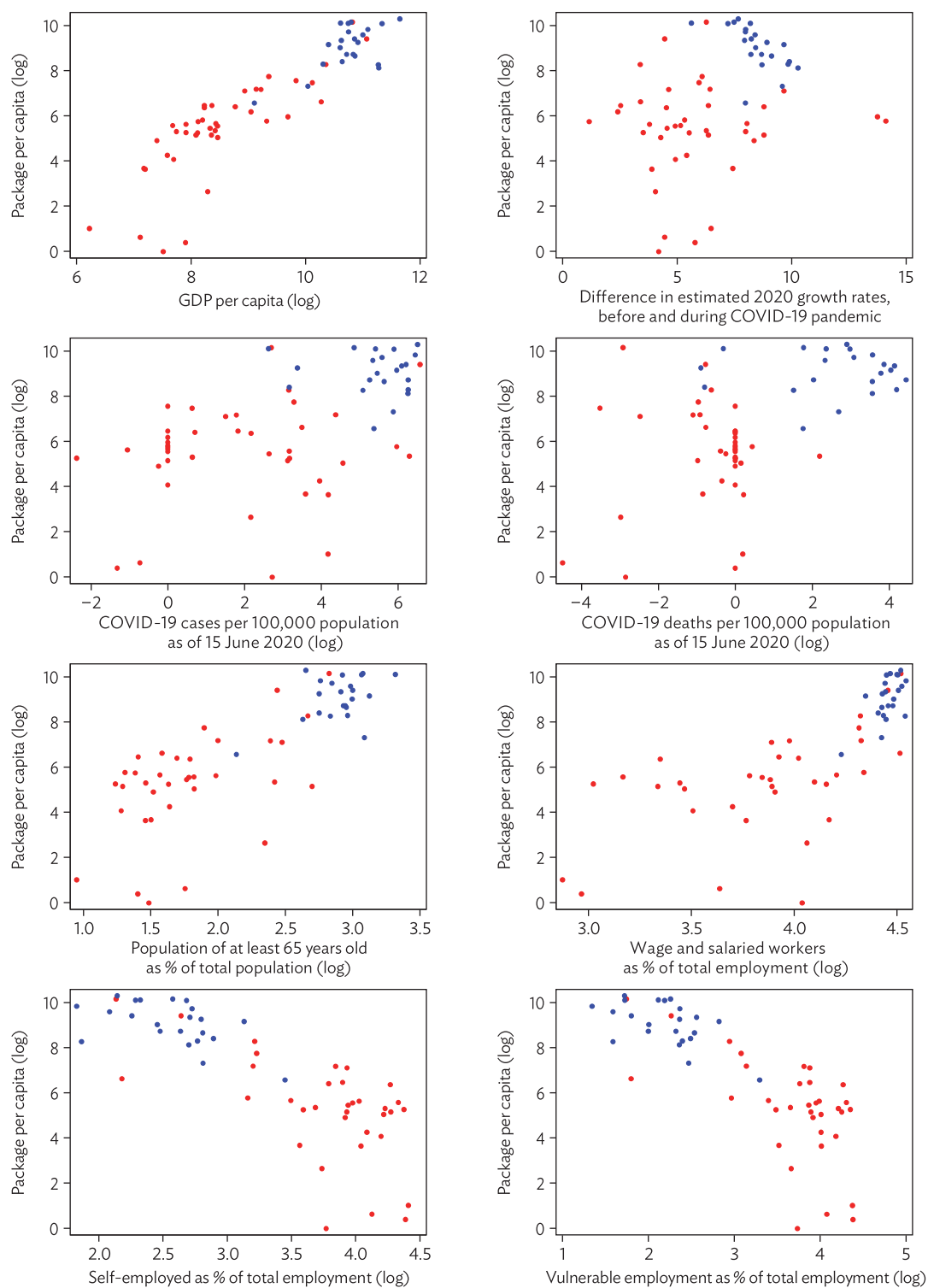
¹¹ If Malaysia's package is actually closer in size in per capita terms to Thailand's, this is consistent with the results in Table 9 that suggest Malaysia's reported package is significantly larger than the models predict. The same does not hold for Thailand, for which the regressions also predict much lower values; as a potential explanation for this, the entries for Measure 05 for Thailand in the ADB database report a deliberate attempt by Thailand's government to pass a fiscal package of 10.0% of GDP, which is a clear anomaly in the database, especially for ADB member economies. The database reports a value less than 10.0% of GDP for Thailand's Measure 05 because some parts do not fit the database's definition of "income support" and instead appear in Measures 02 and 03.

The ROK's package is by far the largest in Table 6 in per capita terms. Two things stand out—the smaller entry for Measure 05 and the lack of a monetary amount for Measure 02. Regarding the latter, the ADB database notes that there are loan guarantees, but their value is a portion of an entry in Measure 05. The database also reports loan guarantees within the collection of actions in the entry for Measure 10. Of course, this does not increase the size of the ROK's total package, and the loan guarantees inside part of Measure 05 mean the ROK is devoting even less to direct income support than the already small amount shown in the cell (2.1% of GDP). Overall, and given that the ROK's entry for Measure 10 is most likely not adding to Measure 05, the ROK's response to COVID-19 puts the most emphasis of the five countries on loan guarantees, lending to and refinancing the private sector, corporate bond purchases, and (to a lesser extent) increasing equity claims of the government and central bank on the private sector and the least emphasis on direct income support to the private sector.

To conclude, more in-depth consideration and comparison of packages across these five countries show interesting differences and similarities. The packages of the Philippines and Indonesia look similar in Table 6, and a deeper look confirms this. The packages of Thailand and Malaysia, on the other hand, are far more similar than they appear in Table 6, at least as a percent of GDP and on a per capita basis. As the highest per capita income country of the five, the ROK's package is perhaps expectedly much larger than the others, but reverses the larger share of direct income support within the total package compared to Thailand and Malaysia. Finally, the analysis here suggests that there may be no “correct” way to report actions that do not have obvious monetary values such as liquidity requirements, capital requirements, and forbearances. However, it is done, the database's taxonomy recognizes inherently that governments and central banks nevertheless take onto their own financial statements the costs and/or the financial and macroeconomic risks of loosened financial regulations and requirements that creditors and others provide deferred payments and restructuring options.

V. WHAT DETERMINES THE SIZE OF A PACKAGE? IS A PACKAGE “ADEQUATE”?

In this section, we undertake a preliminary statistical analysis to understand why packages differ in size. We use six proxies of the size: (i) total amount of package per capita, (ii) sum of Measures 01–04 per capita, (iii) Measure 05 per capita, (iv) total amount of package as a share of 2019 GDP, (v) sum of Measures 01–04 as a share of 2019 GDP, and (vi) Measure 05 as a share of 2019 GDP. Figure 3 and Appendix Figures A.1–A.5 graph these six variables against a number of possible correlates (description is provided in Table 7).

Figure 3: Package per Capita and Correlates, 15 June 2020 Version

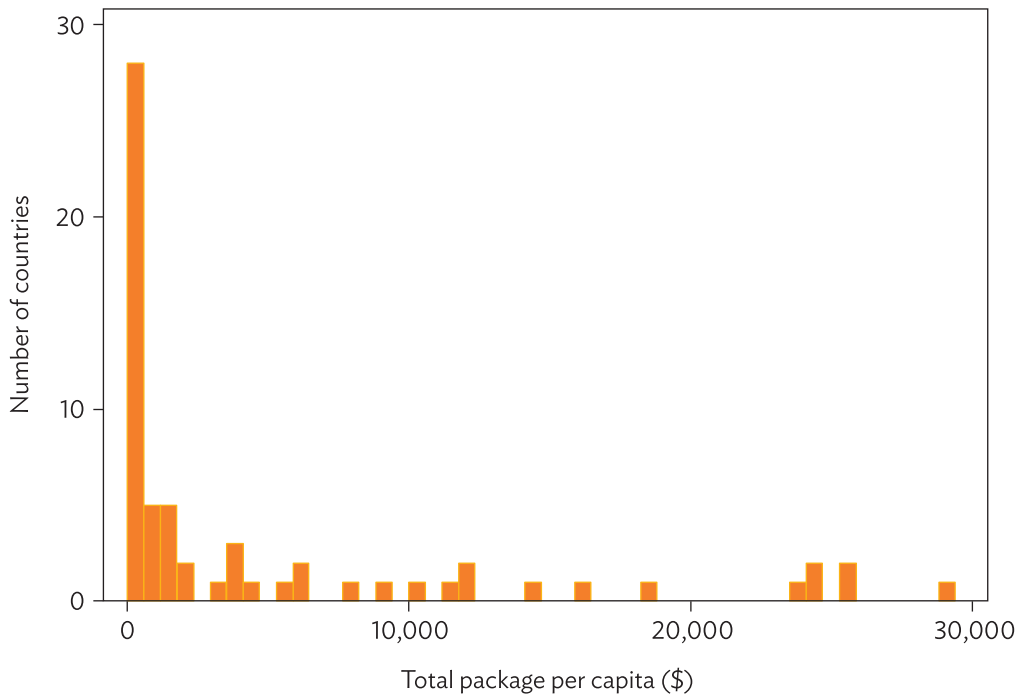
COVID-19 = coronavirus disease, GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

Source: Authors' calculations. See data sources in Table 7.

Table 7 provides descriptive statistics of the variables (dependent and correlates) used in the analysis using 15 June data. Eighteen economies have package per capita above the mean. The largest package per capita is that of Luxembourg (\$29,409), while the smallest is that of Uzbekistan. Twenty-seven ADB members have a package per capita that is at most \$500; and 50 ADB members have a package per capita that is at most \$10,000. Additionally, six ADB members have a package per capita of at least \$23,000. Hong Kong, China is the only ADB developing member in the top six. Figure 4 graphs the distribution of the total package per capita.

Figure 4: Number of Countries by Total Package per Capita, 15 June 2020 Version



Source: Authors' calculations. See data sources in Table 7.

The largest package as percent of GDP is that of Japan, while the smallest is that of the Lao People's Democratic Republic (Lao PDR). The highest amounts per capita and as percent of GDP of Measure 05 are also those of Japan. Thirty-two ADB members have packages that are at most 10.0% of their GDP; 48 ADB members have package that are at most 20.0% of their GDP. Finally, four ADB members have packages that are at least 50.0% of their GDP. The highest amounts per capita and as percent of GDP of Measures 01–04 are those of Finland. Hong Kong, China ranks second and is the only ADB developing member in the top 10.

Table 7: Descriptive Statistics, 15 June 2020 Version

	Data Sources	Mean	Std Dev	Min	Max
Total package per capita (\$) ^a	ADB COVID-19 Policy Database, World Bank, ADB ADO Database, National Statistics	5,136	8,016	0.98	29,409
Total package as % of GDP ^a	ADB, IMF, ADB ADO Database	13.9	13.6	0.06	59.5
Measure 05 per capita (\$) ^a	ADB COVID-19 Policy Database, World Bank, ADB ADO Database, National Statistics	2,004	3,542	0	17,833
Measure 05 as % of GDP ^a	ADB, IMF, ADB ADO Database	6.4	6.8	0	43.4
Sum of Measures 01–04 per capita (\$) ^a	ADB COVID-19 Policy Database, World Bank, ADB ADO Database, National Statistics	2,852	5,137	0	20,064
Sum of Measures 01–04 as % of GDP ^a	ADB, IMF, ADB ADO Database	6.5	9.7	0	41.8
Correlates					
GDP per capita (\$) ^a	IMF, World Bank, ADB ADO Database, National Statistics GDP in 2019, population in 2018	22,778	26,023	504	114,283
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic (percentage points)	IMF	6.6	2.6	1.16	14.1
COVID-19 cases per 100,000 population as of 15 June 2020 ^a	European Centre for Disease Prevention and Control, Center for Systems Science and Engineering at Johns Hopkins University, Worldometer, World Bank, and National Statistics Cases and deaths in 2020, population in 2018	136	200	0	713
COVID-19 deaths per 100,000 population as of 15 June 2020 ^a		9	19	0	85
Population of at least 65 years old as % of total population in 2018	World Bank	10.8	6.8	2.58	27.6
Wage and salaried workers as % of total employment in 2019	World Bank	64.2	23.8	17.67	93.8
Self-employed as % of total employment in 2019	World Bank	35.8	23.8	6.22	82.3
Vulnerable employment as % of total employment in 2019	World Bank	32.8	24.5	3.84	80.1
Total stock of debt liabilities issued by the central government as % of GDP in 2018	IMF	50.8	36.6	2.6	198.4

ADO = Asian Development Outlook, COVID-19 = coronavirus disease, GDP = gross domestic product, IMF = International Monetary Fund.

^a Data calculated based on the listed sources.

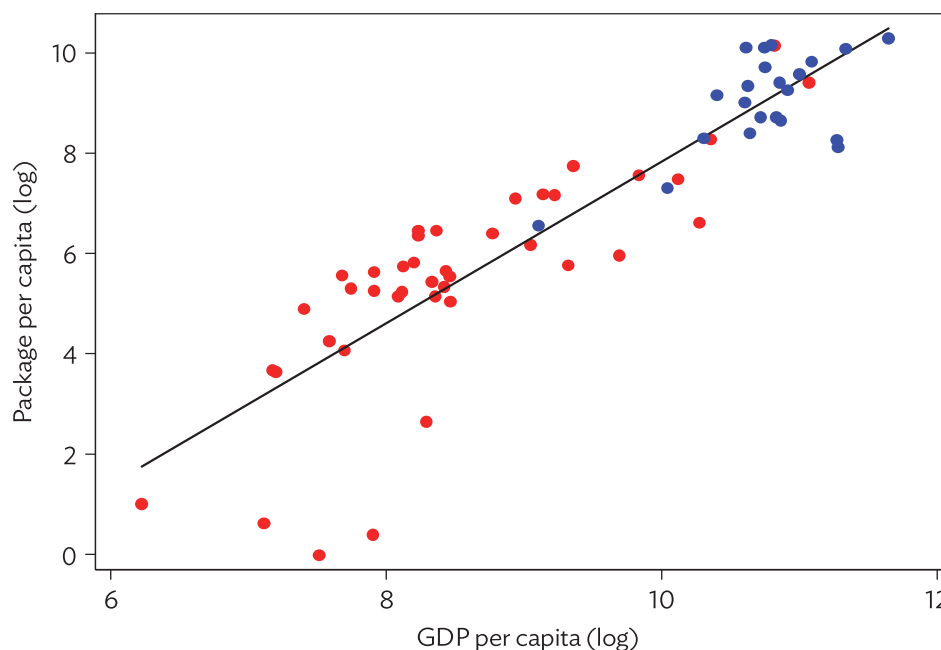
Source: Authors' compilation and calculation.

The difference in estimated 2020 growth rates before and during the COVID-19 pandemic indicates how growth estimates have been affected by the pandemic. The largest difference is that of Maldives, while the smallest is that of the Federated States of Micronesia. Thirteen ADB developing members (Cook Islands, Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Samoa, Solomon Islands, Tonga, Turkmenistan, Tuvalu, and Vanuatu) have no confirmed COVID-19 cases as of 15 June. Aside from that, eight ADB developing members (Bhutan, Cambodia, Fiji, Lao PDR, Mongolia, Papua New Guinea, Timor-Leste, and Viet Nam) have not registered any COVID-19 deaths. Japan has the highest percentage of people at least 65 years old, while Afghanistan's share is the lowest. The highest percent of salaried workers in total employment is in the US, while the highest percentage of vulnerable employment in total employment is in the Lao PDR.

Tables 8 and Appendix Tables A.1–A.5 show log-log ordinary least squares regressions of the six regressands against these correlates.¹² These regressions do not contain regional fixed effects (dummies for the five ADB regions) because these were insignificant in many cases. Nevertheless, we report under each table the results of the fixed-effects tests. Likewise, we only show the regressions that produced some meaningful and statistically significant results. Most of the right-hand-side variables are highly correlated and, consequently, results are very poor when they are together in a regression. We also realized that the key explanatory variable (whether the left-hand-side variable is package per capita or package as percent of GDP, for the three measures of the package) is income per capita. Table 8, with package per capita as regressand, indicates that the elasticity of the package per capita with respect to income per capita is 1.61 (column 1). This variable alone explains 79.0% of the variation in the log of the package per capita. Naturally, this regression is equivalent to regressing the total package on GDP (positive coefficient) and population (negative coefficient). This indicates that the intended total packages increase much more than proportionally. It is clear that rich countries are dedicating significantly more resources to combat COVID-19 than the developing economies. Figure 5 plots the corresponding regression line. Only a few countries exhibit a substantial deviation from the line. We conclude that income per capita alone is a very good predictor of the package per capita. The question is why packages increase so fast with income per capita.

A similar result is obtained when the package refers to Measure 05 (Table A2). Indeed, the elasticity is still a very high 1.49. Results when the dependent variable is the total package as percent of GDP are also statistically significant but the elasticities in this case are much lower, 0.61 (Table A1) and 0.53 (Table A3). The corresponding elasticities for the sum of Measures 01–04, Table A4 per capita and Table A5 as percent of GDP, are larger than the previous ones, 2.05 and 0.67, respectively. We also note the rather high elasticities of population of at least 65 years old as percent of total population (log) in Tables 8, A2, A4, and A5. These six tables indicate that the best results in terms of regression fit are those with the total package per capita (Table 8) and for this reason we focus on this regressand.

¹² Though the ADB database provides information since mid-April every 2 weeks, these data cannot be pooled as the right-hand-side variables do not change. We have run the regressions for each version and results are qualitatively very similar.

Figure 5: Package per Capita and Gross Domestic Product per Capita: Regression Line

GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

Source: Authors' calculations. See data sources in Table 7.

Column 2 in Table 8 indicates that the package per capita increases with the difference between the estimated before and during COVID-19 pandemic growth rates for 2020, that is, the larger the difference, the larger the package per capita. Likewise, column 3 shows that there is also a positive relationship between the package per capita and the total number of COVID-19 cases per 100,000 population as of 15 June (elasticity of 0.53). Rich countries have been significantly more affected by the pandemic in terms of the decline in expected growth rate and number of cases.¹³

Columns 4–6 show regressions of the package per capita against the COVID-19 deaths per 100,000 population as of 15 June (log) (a subset of the number of cases), and wage and salaried workers as percent of total employment (log), self-employed as percent of total employment (log), and vulnerable employment as percent of total employment (log). The package per capita increases with the number of deaths and with the percentage of wage and salaried workers in total employment (log); and decreases with the percentage of self-employed in total employment (log) and with the percentage of vulnerable employment in total employment (log), both higher in poorer economies.

Columns 7–9 show regression of the package per capita against population at least 65 years old as percent of total population (log), wage and salaried workers as percent of total employment (log), self-employed as percent of total employment (log), and vulnerable employment as percent of

¹³ As time passes by, there are indications that the number of cases and deaths have not been counted correctly and that in reality, the number is probably significantly higher.

total employment (log). The package per capita increases with the percentage of people at least 65 as percent of total population (log) and with the percentage of wage and salaried workers in total employment (log); and decreases with the percentage of self-employed in total employment (log) and with the percentage of vulnerable employment in total employment (log).

Finally, we add that the package per capita is not statistically related to the stock of central government debt as percent of GDP.

Table 8: Package per Capita (log) and Correlates, 15 June 2020 Version

Package per capita (log) on:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP per capita (log)	1.61***								
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic		0.35***							
COVID-19 cases per 100,000 population as of 15 June 2020 (log)			0.53***						
COVID-19 deaths per 100,000 population as of 15 June 2020 (log)				0.41***	0.28*	0.26*			
Population of at least 65 years old as % of total population (log)							2.16***	1.77***	1.69***
Wage and salaried workers as % of total employment (log)				3.58***			2.01***		
Self-employed as % of total employment (log)					-2.36***			-1.58***	
Vulnerable employment as % of total employment (log)						-2.00***			-1.36***
R ²	0.7941	0.1204	0.2813	0.6379	0.6735	0.6801	0.6839	0.7172	0.7204
No. of observations	63	62	63	56	56	56	56	56	56

COVID-19 = coronavirus disease, GDP = gross domestic product, OLS = ordinary least squares.

Notes: (i) We tested for the presence of heteroskedasticity using the Breusch-Pagan test and rejected the null hypothesis (no heteroskedasticity) in models (1) and (4)-(9). Estimation method: OLS with robust standard errors; (ii) Model 1: All regional fixed effects (FE) are insignificant. Model 2: East Asia is the only insignificant regional FE. Model 3: East Asia and the Pacific are insignificant regional FE. Models 4-5: Central and West Asia is the only significant regional FE. Model 6: All regional fixed effects are insignificant. Model 7: Central and West Asia is the only significant regional FE. Models 8-9: East Asia is the only significant regional FE. *** means significant at 1%, ** at 5%, and * at 10%.

Source: Authors' calculations. See data sources in Table 7.

Based on these results, Table 9 shows the actual and expected package per capita, the latter given by regression in columns (1), (4)–(6), and (7)–(9) in Table 8. This information can be used to discuss the normative question: is the package per capita adequate to address the pandemic? This is a difficult question with no easy answer, as it depends on the government’s objectives, both with respect to the pandemic and with respect to other economic objectives (e.g., fear of running a fiscal deficit), and how it perceives the situation. With this caveat in mind, we answer this question by comparing the actual package per capita to the expected package per capita given the regressors. Since we have a total of nine models, often results are not crystal clear and so conclusions require some judgment.¹⁴

Take, for example, the case of Australia. Its actual package per capita is right in line with its income per capita, but it is much larger than what it should be given the number of deaths, population of at least 65 years old as percent of total population, wage and salaried workers as percent of total employment, self-employed as percent of total employment, and vulnerable employment as percent of total employment. These are also the cases of Germany and Switzerland. Belgium’s package, on the other hand, appears to be small according to all models. These are also the cases of Norway and Portugal, among others.

If we look at ADB’s developing members, we see large countries like India or Indonesia with seemingly small packages per capita, \$259 and \$229, respectively, but larger than what they should be given the control variables we have. The PRC’s package (\$1,289) is larger than those of these two and well over the predicted values by the regressions. This is also the case of Malaysia and Thailand, with actual packages of \$2,296 and \$1,211, respectively. The package of the Philippines, on the other hand, is small in absolute value (\$188) and several of the models indicate that the package ought to be larger. A package of about \$300 per capita would imply a total package 59.0% larger, about \$32 billion as opposed to \$20 billion. Pakistan’s package, \$38 per capita, also seems to be small according to our analysis. A package of \$100 per capita would imply an increase in the country’s total package from \$8 billion to about \$21 billion.

¹⁴ It is important to emphasize that what the regressions show is how well do the independent variables predict the per capita (or percent of GDP) size of a given country’s package. It could very well be that no countries are doing enough to really sustain private sector financial positions. These regressions can’t tell us that—all they can tell us is what is predicted for a country given what other countries are doing. The regressions say something about the state of policy ‘knowledge’ and the ‘diffusion’ of that knowledge. That is, what we are seeing in Table 9 is how much policy response is ‘allowed’ by current doctrines in use by policy makers and others in positions of influence in the midst of the largest global economic crisis in 90 years, relative to what a given individual country is actually doing. So, for instance, assuming the database has correctly captured the monetary value of the package (another assumption—although it may be reasonable to think that across over 60 economies, perhaps this evens out, then clearly Norway is doing much less than current doctrines suggest, the ROK’s package is about the ‘right size’ according to current views; and Denmark and Thailand are clearly doing well beyond this amount (interesting to see how that turns out).

Table 9: Actual and Expected Packages per Capita
(\$)

	Actual Package Per Capita	Expected Package Per Capita						
		(1)	(4)	(5)	(6)	(7)	(8)	(9)
Australia	10,424	11,047	1,517	1,740	2,408	5,093	4,574	5,438
Austria	6,080	9,641	6,022	8,403	10,662	8,592	10,636	12,402
Belgium	6,121	8,069	14,716	11,401	10,442	8,001	8,132	7,851
Canada	16,437	8,472	8,037	6,305	6,684	6,435	6,056	6,351
Denmark	14,488	12,646	7,933	23,188	26,185	10,257	21,356	23,300
Finland	25,614	9,113	5,149	6,201	5,918	11,156	11,555	10,908
France	8,173	6,709	12,401	14,560	16,570	9,697	12,140	13,459
Germany	24,224	8,437	7,476	14,491	20,018	11,717	17,867	22,108
Ireland	3,339	19,891	9,904	7,648	7,672	4,059	4,290	4,440
Italy	9,404	4,817	8,443	3,166	3,442	9,708	5,220	5,468
Japan	24,437	6,796	2,482	6,261	4,587	19,984	26,293	19,862
Luxembourg	29,409	35,842	9,788	23,601	23,038	4,925	10,752	10,971
Netherlands	5,724	10,188	9,206	5,906	5,398	7,871	6,418	6,063
New Zealand	4,427	7,110	1,469	1,424	1,913	4,890	3,925	4,566
Norway	3,848	19,598	6,050	30,857	21,100	7,669	23,111	18,008
Portugal	1,479	2,703	6,445	4,592	4,911	10,510	8,106	8,324
Spain	3,997	4,132	12,279	7,817	8,443	8,169	6,985	7,471
Sweden	12,154	10,054	13,960	23,704	25,424	10,226	16,636	17,835
Switzerland	23,879	21,819	7,903	6,749	9,295	7,724	7,419	9,239
Turkey	703	600	2,190	787	743	907	551	540
United Kingdom	11,371	6,938	12,451	8,782	5,942	7,452	6,960	5,438
United States	18,458	14,623	14,048	60,139	58,599	6,547	21,476	22,137
Afghanistan	2.7	6	9	52	57	5	15	17
Armenia	208	199	1,633	509	406	1,287	626	536
Azerbaijan	153	212	74	81	117	100	94	120
Bangladesh	70	51	140	96	103	107	83	88
Bhutan	571	146	46	69	68	74	82	80
Brunei Darussalam	742	3,937	2,182	7,737	7,730	485	1,533	1,627
Cambodia	133	38	337	158	136	125	88	81
Cook Islands	1,912	1,937	NA	NA	NA	NA	NA	NA
Federated States of Micronesia	311	123	NA	NA	NA	NA	NA	NA
Fiji	596	349	509	214	185	230	147	135
Georgia	171	179	215	116	111	1,555	694	621
Hong Kong, China	25,567	9,473	920	4,692	4,920	7,185	14,866	14,371
India	259	60	20	53	57	54	78	80
Indonesia	229	171	281	140	141	204	132	132
Kazakhstan	1,302	630	1,037	662	506	817	637	529

continued on next page

Table 9 *continued*

	Actual Package Per Capita	Expected Package Per Capita						
		(1)	(4)	(5)	(6)	(7)	(8)	(9)
Kyrgyz Republic	39	27	614	287	242	204	149	136
Lao PDR	1.5	86	12	52	54	15	34	36
Malaysia	2,296	895	986	614	564	643	510	483
Maldives	315	850	1,891	1,073	1,017	188	201	208
Marshall Islands	633	146	NA	NA	NA	NA	NA	NA
Mongolia	631	181	361	165	147	102	74	71
Myanmar	1.8	24	21	27	31	121	96	98
Nauru	478	544	NA	NA	NA	NA	NA	NA
Pakistan	38	28	222	126	118	83	65	65
Palau	386	1,545	NA	NA	NA	NA	NA	NA
Papua New Guinea	191	88	14	54	57	12	26	28
People's Republic of China	1,289	724	277	138	126	946	462	410
Philippines	188	121	825	343	323	263	180	177
Republic of Korea	3,885	4,503	1,156	702	807	3,439	2,047	2,140
Samoa	282	203	987	429	383	253	187	179
Singapore	12,200	14,199	1,761	2,600	3,008	2,745	3,368	3,651
Solomon Islands	58	62	81	82	80	33	37	38
Sri Lanka	14	161	175	105	105	1,025	508	469
Taipei, China	1,759	3,063	NA	NA	NA	NA	NA	NA
Thailand	1,211	456	116	76	77	957	467	433
Timor-Leste	200	67	65	76	75	44	49	49
Tonga	253	211	270	138	126	195	128	121
Tuvalu	336	139	NA	NA	NA	NA	NA	NA
Uzbekistan	1.0	46	169	101	93	151	105	98
Vanuatu	171	115	44	68	70	24	34	35
Viet Nam	276	88	217	123	118	266	169	162

Lao PDR = Lao People's Democratic Republic, NA = not available.

Notes: (i) Gold/Green indicates that the expected package per capita is higher/lower than the actual package per capita. Clear fill means that the expected package per capita is close to the actual package per capita; (ii) 5 out of the 68 ADB members do not have data on actual package per capita. These are Kiribati, Nepal, Niue, Tajikistan, and Turkmenistan.

Source: Author's calculations based on regression models (1), (4)-(6), and (7)-(9) in Table 8. See data sources in Table 7.

VI. CONCLUSIONS

This paper has used the ADB COVID-19 Policy Database to analyze the packages implemented by ADB's 68 members, plus the ECB, and the EU, to combat the COVID-19 pandemic. It has (i) provided a detailed account of the measures taken and the amounts announced between 20 April and 15 June; (ii) discussed the specifics of five Asian countries by comparing their packages qualitatively and quantitatively; and (iii) provided a statistical analysis to understand what determines the size of a package, which allowed comparison between actual and estimated packages, given the correlates.

The data we used categorized the measures taken by their effects on financial statements and differences in operations. We captured measures and amounts that may have not been included in other databases and analyses which follow the typical fiscal and monetary policy definitions. As of 15 June 2020, the total package announced amounted to \$22.5 trillion, an increase of 36.0% from April. This is broken down into \$3.0 for ADB's developing members, \$14 trillion for ADB's other members, and \$5.5 trillion for the ECB and the EU. Credit creation and direct income support make up for much of the total package of all 68 ADB members (including ECB and EU), 47.6% and 31.8%, respectively. Developing members allotted the highest to direct income support, 50.8%, while other members' priority was credit creation, 53.0%.

The packages of the Philippines, Indonesia, Thailand, Malaysia, and the ROK reveal interesting similarities and differences. The packages of the Philippines and Indonesia are similar in terms of percent of GDP and in per capita, substantially lower than those of the three other countries. The packages of Thailand and Malaysia, after adjusting for actions with no monetary amounts, are far more similar than they initially appear, at least as a percent of GDP and on a per capita basis. The package of the ROK is the largest, as expected, but has a lower share of direct income support within the total package than those of Thailand and Malaysia.

The statistical analysis shows that the key explanatory variable of the package per capita is income per capita. This variable alone can explain why rich countries dedicated significantly more resources to combat COVID-19 than developing economies. Other variables related to infection severity, population age, and employment are also good predictors. Package per capita is positively related to the COVID-19 deaths per 100,000 population, population of at least 65 years old as percent of total population, and wage and salaried workers as percent of total employment; and inversely related to self-employed as percent of total employment, and vulnerable employment as percent of total employment.

Our study used information on the measures announced up until 15 June, a period which can still be considered in the shock phase of the pandemic response. However, the global health crisis and economic downturn is not yet over. It is likely that countries will announce more measures to counter medium- and long-term effects brought about by the pandemic. Moreover, many countries covered in our analysis have actual packages lower than expected packages and may have yet to catch up. A new set of explanatory variables may emerge to explain these future packages.

APPENDIX

**Table A.1: Total Package as Percent of Gross Domestic Product and Correlates,
15 June 2020 Version**

Total Package as % of GDP (log) on:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP per capita (log)	0.61***								
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic		0.11							
COVID-19 cases per 100,000 population as of 15 June 2020 (log)			0.20***						
COVID-19 deaths per 100,000 population as of 15 June 2020 (log)				0.21*	0.18	0.18			
Population of at least 65 years old as % of total population (log)							1.02***	0.99***	0.98***
Wage and salaried workers as % of total employment (log)				1.33**			0.63		
Self-employed as % of total employment (log)					-0.79***			-0.39	
Vulnerable employment as % of total employment (log)						-0.66***			-0.33
R ²	0.3590	0.0368	0.1201	0.3500	0.3372	0.3370	0.3677	0.3677	0.3673
No. of observations	63	62	63	56	56	56	56	56	56

COVID-19 = coronavirus disease, GDP = gross domestic product, OLS = ordinary least squares.

Notes: (i) We tested for the presence of heteroskedasticity using the Breusch-Pagan test and rejected the null hypothesis (no heteroskedasticity) in models (1), and (3)-(9). Estimation method: OLS with robust standard errors; (ii) Model 1: All regional fixed effects (FE) are insignificant. Model 2: East Asia is the only insignificant regional FE. Model 3: Central and West Asia is the only significant regional FE. Model 4: All regional FE are insignificant. Models 5-9: East Asia is the only significant regional FE. *** means significant at 1%, ** at 5%, and * at 10%.

Source: Authors' calculations. See data sources in Table 7.

Table A.2: Measure 05 per Capita and Correlates, 15 June 2020 Version

Measure 05 per capita (log) on:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP per capita (log)	1.49***								
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic		0.37***							
COVID-19 cases per 100,000 population as of 15 June 2020 (log)			0.43***						
COVID-19 deaths per 100,000 population as of 15 June 2020 (log)				0.39**	0.29	0.27			
Population of at least 65 years old as % of total population (log)							2.42***	2.16**	2.12**
Wage and salaried workers as % of total employment (log)				3.14***			1.25		
Self-employed as % of total employment (log)					-2.03***			-1.00	
Vulnerable employment as % of total employment (log)						-1.72***			-0.86
R ²	0.6435	0.1334	0.1781	0.4911	0.5082	0.5133	0.5722	0.5854	0.5866
No. of observations	63	62	63	56	56	56	56	56	56

COVID-19 = coronavirus disease, GDP = gross domestic product, OLS = ordinary least squares.

Notes: (i) We tested for the presence of heteroskedasticity using the Breusch-Pagan test and rejected the null hypothesis (no heteroskedasticity) in models (7)–(9). Estimation method: OLS with robust standard errors; (ii) Model 1: All regional fixed effects (FE) are insignificant. Model 2: East Asia is the only insignificant regional FE. Model 3: East Asia and the Pacific are insignificant regional FE. Model 4: Southeast Asia and Central and West Asia are the only significant regional FE. Models 5–7: Central and West Asia is the only significant regional FE. Models 8–9: All regional FE are insignificant. *** means significant at 1%, ** at 5%, and * at 10%.

Source: Authors' calculations. See data sources in Table 7.

Table A.3: Measure 05 as Percent of Gross Domestic Product and Correlates, 15 June 2020 Version

Measure 05 as % of GDP (log) on:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP per capita (log)	0.53***								
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic		0.09							
COVID-19 cases per 100,000 population as of 15 June 2020 (log)			0.10						
COVID-19 deaths per 100,000 population as of 15 June 2020 (log)				0.13	0.10	0.09			
Population of at least 65 years old as % of total population (log)							0.70*	0.60	0.60
Wage and salaried workers as % of total employment (log)				1.21**			0.71		
Self-employed as % of total employment (log)					-0.78***			-0.51	
Vulnerable employment as % of total employment (log)						-0.65***			-0.42
R ²	0.2580	0.0225	0.0319	0.2250	0.2311	0.2295	0.2389	0.2467	0.2452
No. of observations	63	62	63	56	56	56	56	56	56

COVID-19 = coronavirus disease, GDP = gross domestic product, OLS = ordinary least squares.

Notes: (i) We tested for the presence of heteroskedasticity using the Breusch-Pagan test and rejected the null hypothesis (no heteroskedasticity) in all models. Estimation method: OLS with robust standard errors; (ii) Model 1: Pacific is the only significant regional fixed effects (FE). Model 2: East Asia and the Pacific are the only insignificant regional FE. Model 3: Central and West Asia is the only significant regional FE. Models 4-9: All regional FE are insignificant. *** means significant at 1%, ** at 5%, and * at 10%.

Source: Authors' calculations. See data sources in Table 7.

Table A.4: Sum of Measures 01 to 04 per Capita and Correlates, 15 June 2020 Version

Sum of Measures 01–04 per capita (log) on:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GPD per capita (log)	2.05***								
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic		0.42*							
COVID-19 cases per 100,000 population as of 15 June 2020 (log)			0.96***						
COVID-19 deaths per 100,000 population as of 15 June 2020 (log)				0.42***	0.23*	0.19			
Population of at least 65 years old as % of total population (log)							3.30***	2.61***	2.48***
Wage and salaried workers as % of total employment (log)				4.53***			1.75*		
Self-employed as % of total employment (log)					–3.17***			–1.76***	
Vulnerable employment as % of total employment (log)						–2.72***			–1.57***
R ²	0.6489	0.0926	0.4572	0.5708	0.6509	0.6678	0.7013	0.7429	0.7498
No. of observations	63	62	63	56	56	56	56	56	56

COVID-19 = coronavirus disease, GDP = gross domestic product, OLS = ordinary least squares.

Notes: (i) We tested for the presence of heteroskedasticity using the Breusch-Pagan test and rejected the null hypothesis (no heteroskedasticity) in models (2) and (5)–(9). Estimation method: OLS with robust standard errors; (ii) Model 1: East Asia is the only insignificant regional fixed effects (FE). Model 2: All regional FE are significant. Models 3–5: East Asia is the only insignificant regional FE. Model 6: Southeast Asia and East Asia are the only insignificant regional FE. Model 7: South Asia and Central and West Asia are the only significant regional FE. Models 8–9: East Asia is the only significant regional FE. *** means significant at 1%, ** at 5%, and * at 10%.

Source: Authors' calculations. See data sources in Table 7.

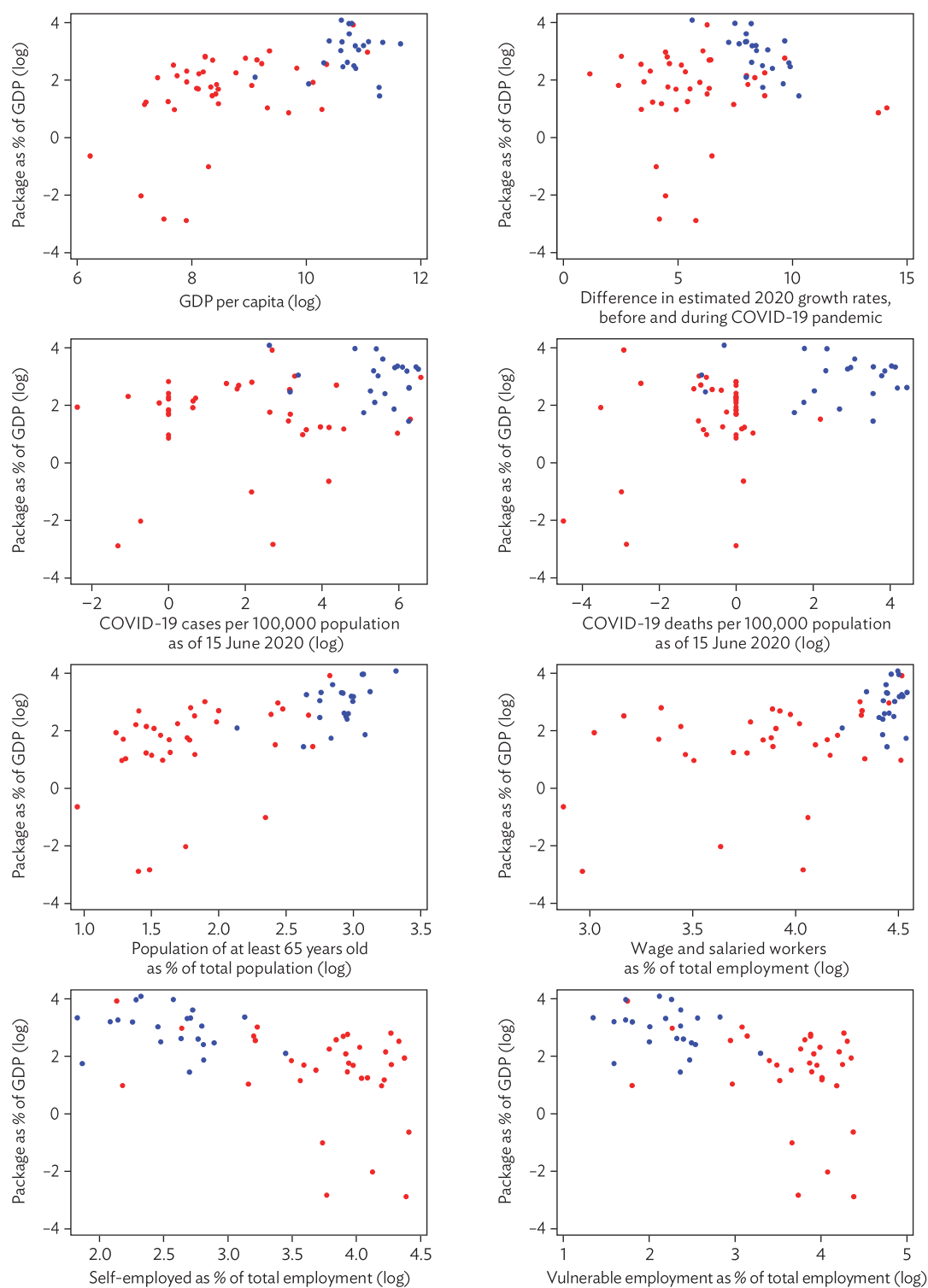
**Table A.5: Sum of Measures 01 to 04 as Percent of Gross Domestic Product and Correlates,
15 June 2020 Version**

Sum of Measures 01–04 as % of GDP (log) on:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GPD per capita (log)	0.67***								
Difference in estimated 2020 growth rates, before and during COVID-19 pandemic		0.13**							
COVID-19 cases per 100,000 population as of 15 June 2020 (log)			0.30***						
COVID-19 deaths per 100,000 population as of 15 June 2020 (log)				0.13	0.07	0.05			
Population of at least 65 years old as % of total population (log)							1.18***	0.94***	0.90***
Wage and salaried workers as % of total employment (log)				1.59***			0.57		
Self-employed as % of total employment (log)					–1.12***			–0.59**	
Vulnerable employment as % of total employment (log)						–0.96***			–0.52**
R ²	0.4684	0.0588	0.2944	0.3970	0.4569	0.4688	0.5033	0.5312	0.5354
No. of observations	63	62	63	56	56	56	56	56	56

COVID-19 = coronavirus disease, GDP = gross domestic product, OLS = ordinary least squares.

Notes: (i) We tested the presence of heteroskedasticity using the Breusch-Pagan test and could not reject the null hypothesis (no heteroskedasticity). Estimation method: OLS with robust standard errors; (ii) Model 1: The Pacific is the only significant regional fixed effects (FE). Models 2–3: East Asia is the only insignificant regional FE. Model 4: Central and West Asia and the Pacific are the only significant regional FE. Models 5–7: All regional FE are insignificant. Models 8–9: East Asia is the only significant regional FE. *** means significant at 1%, ** at 5%, and * at 10%.

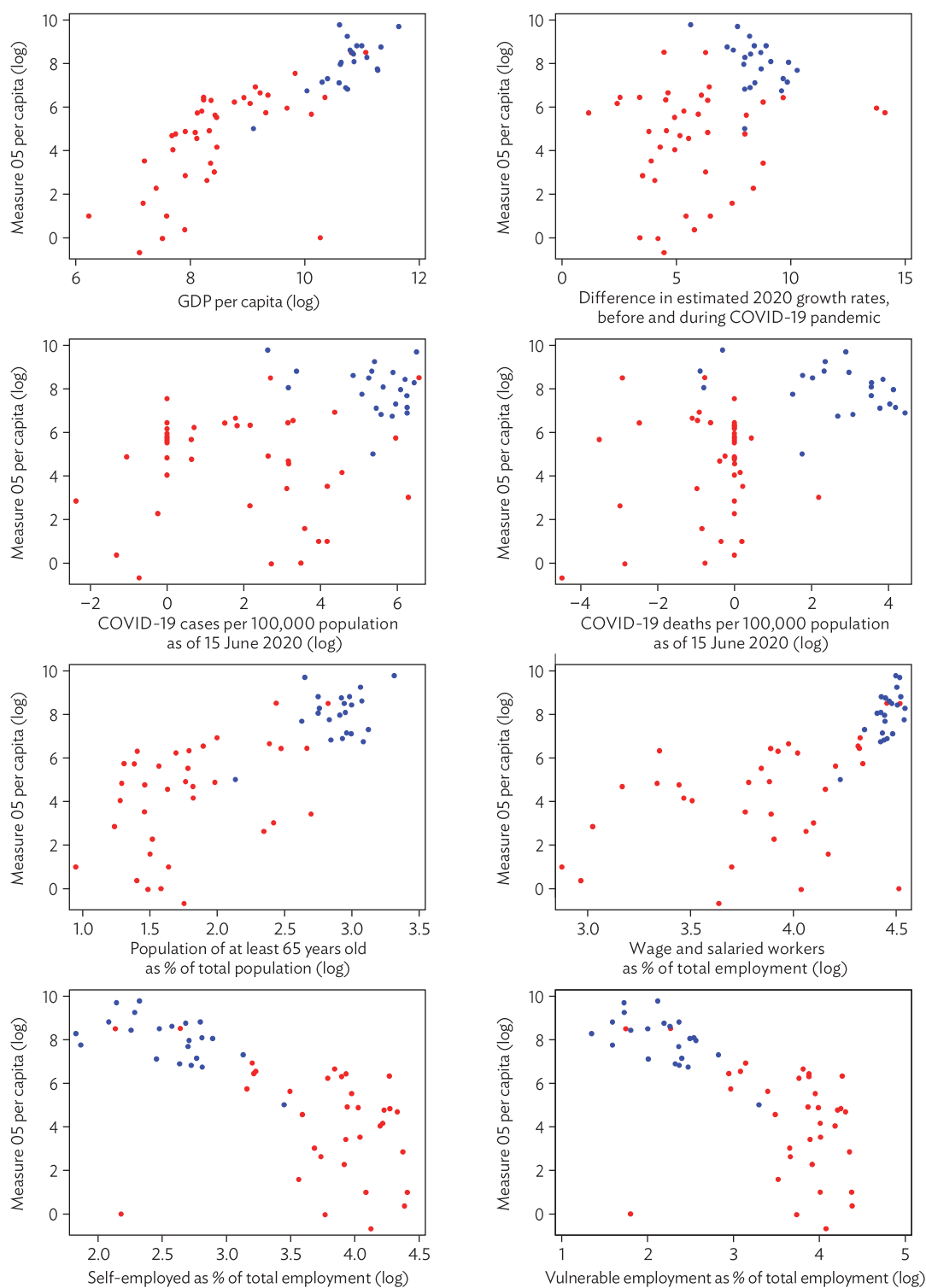
Source: Authors' calculations. See data sources in Table 7.

Figure A.1: Total Package as Percent of Gross Domestic Product and Correlates, 15 June 2020 Version

COVID-19 = coronavirus disease, GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

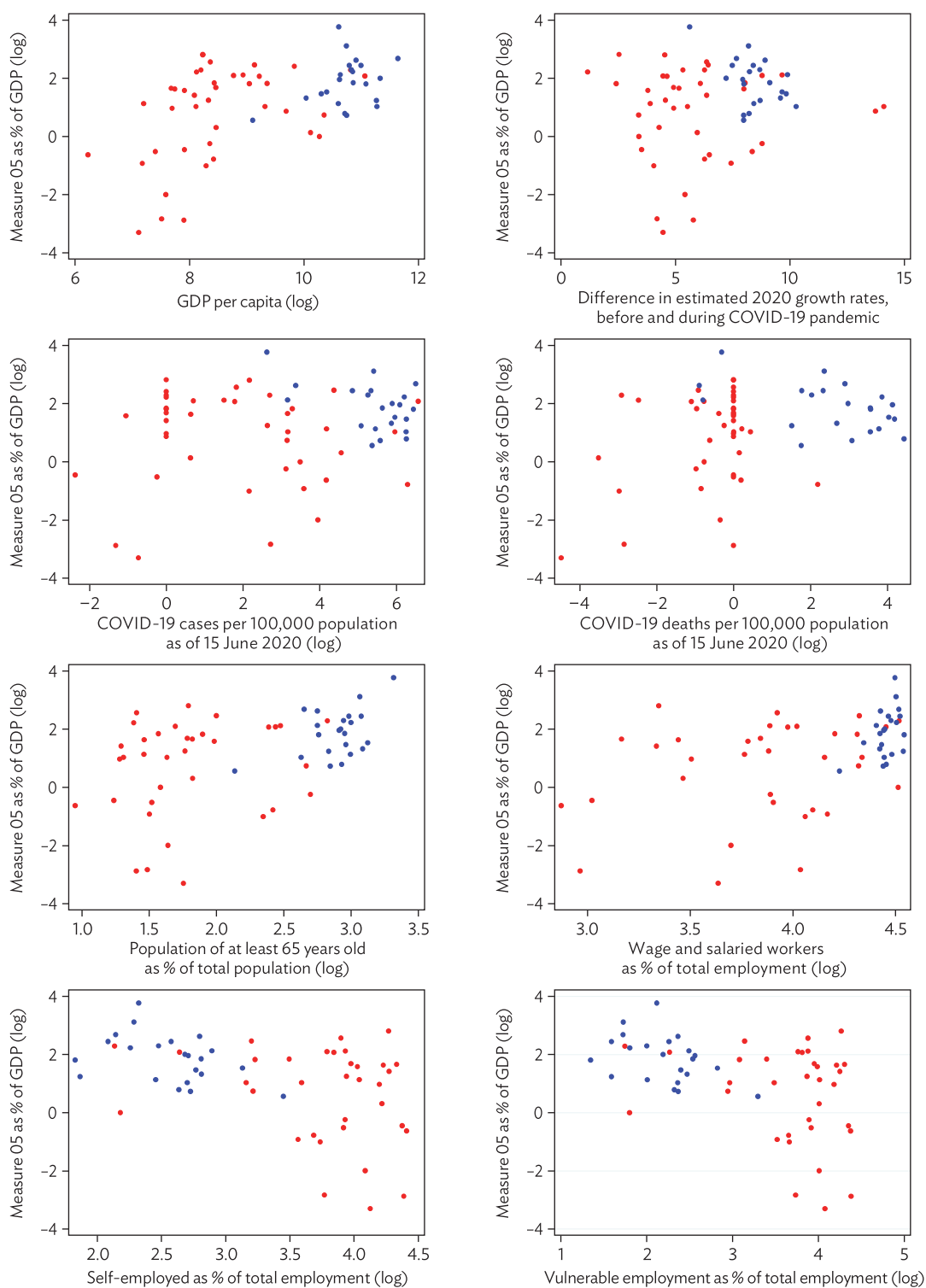
Source: Authors' calculations. See data sources in Table 7.

Figure A.2: Measure O5 per Capita and Correlates, 15 June 2020 Version

COVID-19 = coronavirus disease, GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

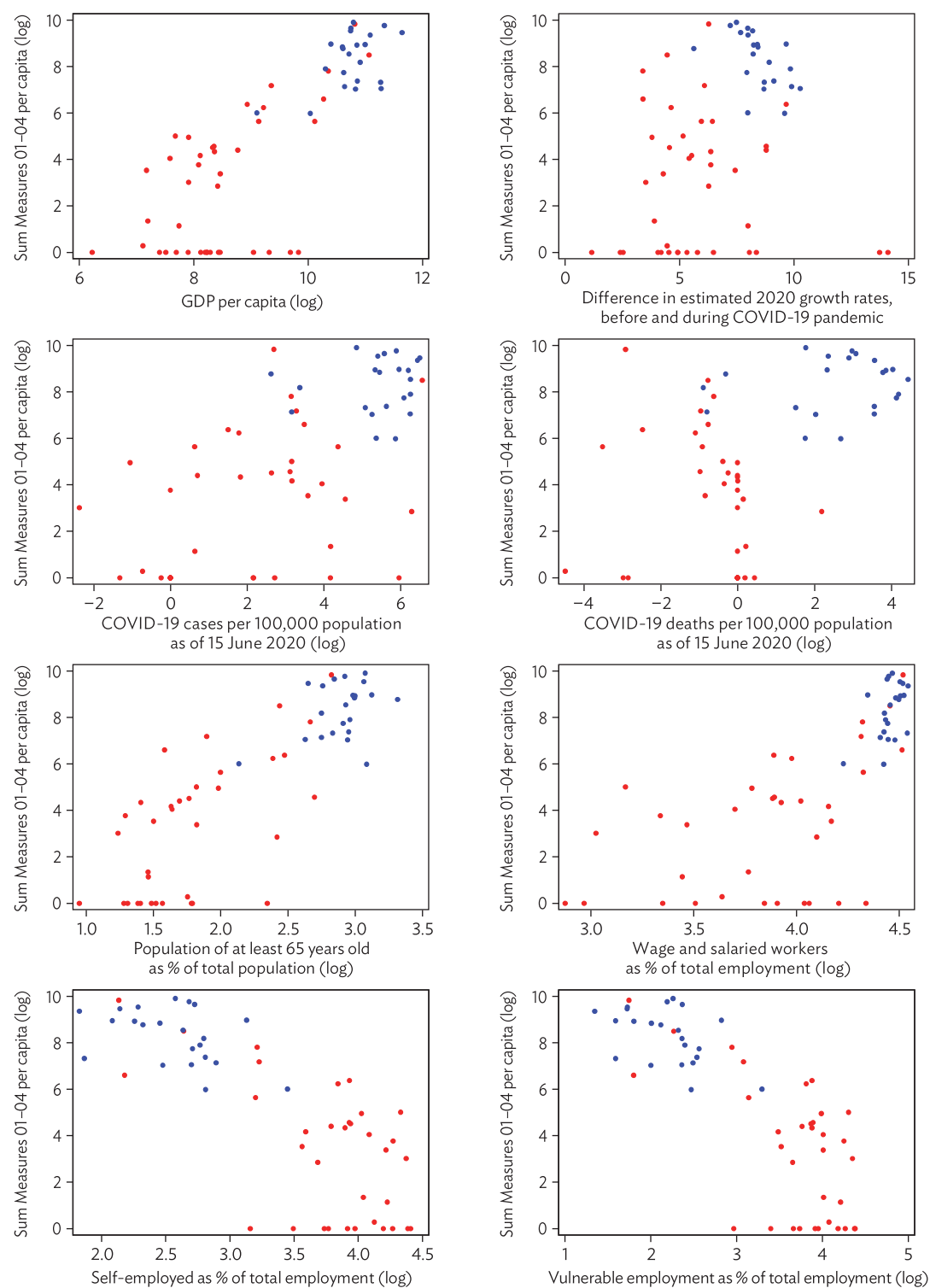
Source: Authors' calculations. See data sources in Table 7.

Figure A.3: Measure 05 as Percent of Gross Domestic Product and Correlates, 15 June 2020 Version

COVID-19 = coronavirus disease, GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

Source: Authors' calculations. See data sources in Table 7.

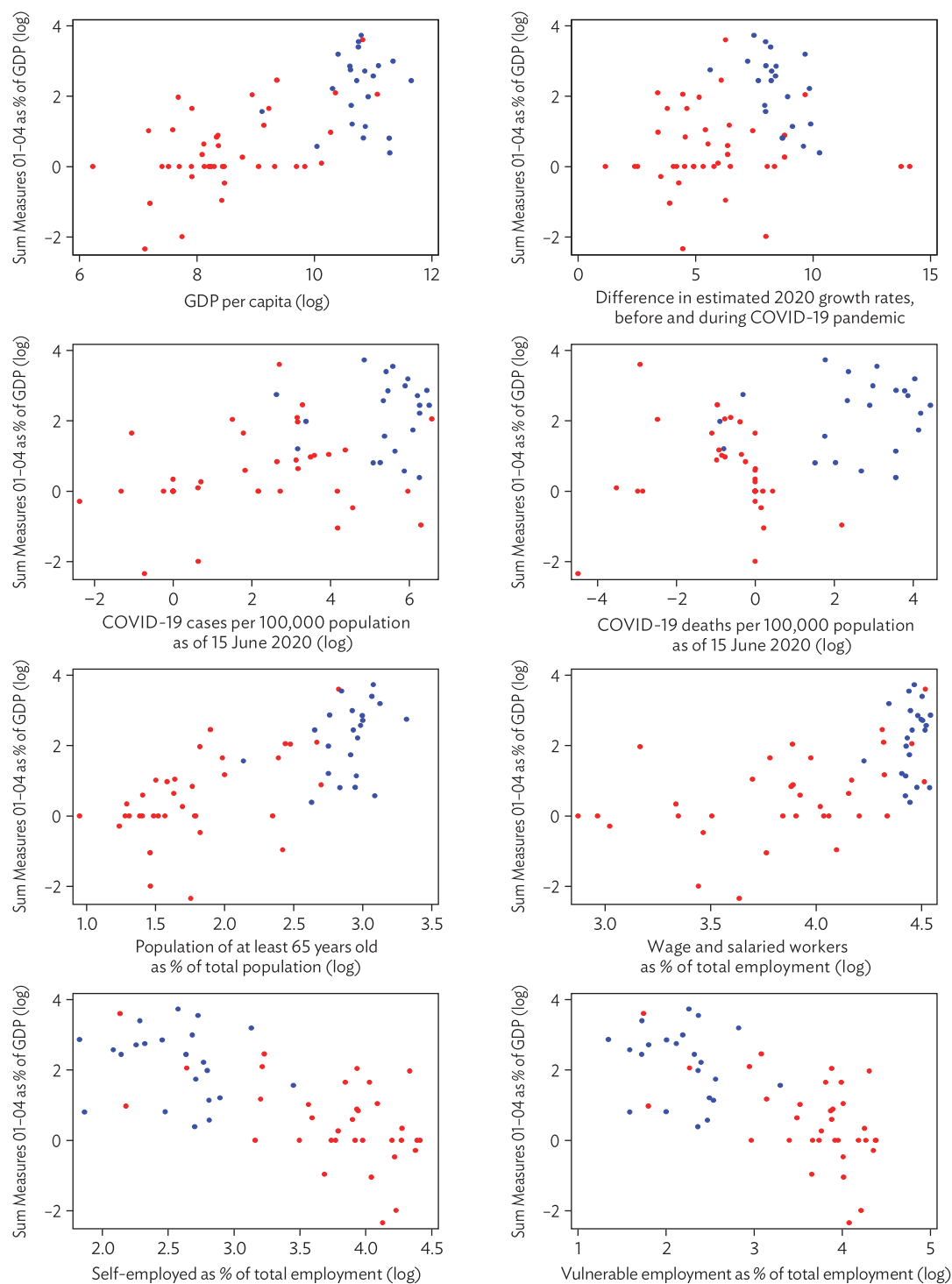
Figure A.4: Sum of Measures 01 to 04 per Capita and Correlates, 15 June 2020 Version

COVID-19 = coronavirus disease, GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

Source: Authors' calculations. See data sources in Table 7.

Figure A.5: Sum of Measures 01 to 04 as Percent of Gross Domestic Product and Correlates, 15 June 2020 Version



COVID-19 = coronavirus disease, GDP = gross domestic product.

Note: ADB's developing members are in red. Other ADB members are in blue.

Source: Authors' calculations. See data sources in Table 7.

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An Analysis of the Worldwide Response to the COVID-19 Pandemic

What and How Much?

This paper analyzes the packages implemented by the 68 members of the Asian Development Bank (ADB), plus the European Central Bank and the European Union, to combat the coronavirus disease (COVID-19) pandemic. Using the ADB COVID-19 Policy Database, the paper (i) provides a detailed account of the measures taken and the amounts announced between 20 April and 15 June; (ii) discusses the specifics of five Asian economies by comparing their financial packages qualitatively and quantitatively; and (iii) includes a statistical analysis to understand what determines the size of a package, which allows comparison between actual and estimated packages, given the correlates.

About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members—49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.



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