THE DETERMINANTS OF FISCAL AND MONETARY POLICIES DURING THE
COVID-19 CRISIS

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ABSTRACT

As countries around the world grapple with Covid-19, their economies are grinding to a halt. For the first time since the Great Depression both advanced economies and developing economies are in recession. Governments and central banks have responded to the pandemic and the economic crisis using both fiscal and monetary tools on a scale that the world has not witnessed before. This paper analyzes the determinants of fiscal and monetary policies during the Covid-19 crisis. We find that high-income countries announced larger fiscal policies than lower-income countries. We also find that a country's credit rating is the most important determinant of its fiscal spending during the pandemic. High-income countries entered the crisis with historically low interest rates and as a result were more likely to use nonconventional monetary policy tools. These findings raise the concern that countries with poor credit histories – those with lower credit ratings and, in particular, lower-income countries – will not be able to deploy fiscal policy tools effectively during economic crises.

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1. Introduction

As countries around the world grapple with the novel coronavirus pandemic by using various public health measures to contain the spread of the virus, they also struggle with the economic consequences of Covid-19. For the first time since the Great Depression, both advanced economies and developing economies are in recession (Gopinath, 2020). Indeed, as of April 2020 the global economy is projected to contract sharply by -3% in 2020, a decline of 6.3% from a pre-Covid-19 projection.[1] Governments and central banks have responded to the pandemic and the ensuing economic crisis using both fiscal and monetary tools on a scale that the world has not witnessed before. These policies have been advocated by such global economics institutions as the International Monetary Fund (IMF):

> *Because the economic fallout reflects particularly acute shocks in specific sectors, policymakers will need to implement substantial targeted fiscal, monetary, and financial market measures to support affected households and businesses. Such actions will help maintain economic relationships throughout the shutdown and are essential to enable activity to gradually normalize once the pandemic abates and containment measures are lifted.[2]*

However, countries are limited in their use of monetary and fiscal tools. Many high-income countries entered this crisis with historically low interest rates, averaging 0.78%. Similarly, their public debt levels were very high. According to the Organization for Economic Cooperation and Development (OECD), at the end of 2019, central government gross marketable debt was estimated at 72.6% of GDP for OECD countries overall. This paper calculates the magnitudes of fiscal and monetary tools deployed by 85 countries around the world and analyzes the determinants of their policy responses and levels.

We find that on average Covid-19 fiscal spending is 4.97% of GDP. When we include government guarantees in fiscal spending, the average increases to 7.71%. Furthermore, high-income countries – those with GDP per capita above the median in our sample – announced fiscal policies that amount on average to 6.8% of GDP, as

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[1] https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020.
[2] World Economic Outlook April 2020: The Great Lockdown, International Monetary Fund, April 2020.

compared to only 3.1% in low-income countries. Similarly, government guarantees are much higher in high-income countries compared to low-income countries.

The mean change in central bank interest rates due to the Covid-19 crisis is -0.63%, with only one country (Denmark) increasing its key base rate and all other countries lowering their rates. Because high-income countries entered the crisis with historically low interest rates – some, such as Switzerland, had negative rates – they lowered their rates less than did low-income countries. The mean interest rate change in high-income countries was -0.43% as compared to -0.84% in low-income countries. Although high-income countries were limited in their ability to use conventional monetary policy, they deployed more nonconventional monetary policy tools, such as central bank guarantees, asset purchases, relaxation of macroprudential rules, and restrictions of dividend payments and share repurchases by financial institutions.

In our regression analysis we run a "horse race" between a number of macroeconomic variables to understand the determinants of fiscal and monetary policies during the Covid-19 crisis. Our regression analysis shows that richer countries are extending larger fiscal programs. One concern with this result is that it is driven by the fact that richer countries experienced more cases of Covid-19. Indeed, in our sample of 85 countries the log number of Covid-19 cases in the high-income countries is 6.99 as compared to 4.35 in low-income countries. However, when we control for the number of Covid-19 cases in our regression, we still find that higher-income countries deploy larger fiscal programs.

We find that perhaps the most important factor affecting a country's fiscal policy is its pre-crisis sovereign credit rating. Of all of the macro variables we include in our empirical models, credit rating is the only variable to show up consistently as the strongest determinant of fiscal policy during the Covid-19 crisis. Although high-income countries have better a credit rating than low-income countries, our results also hold when we control for GDP per capita in our regressions. That is, even among high-income, advanced economies, a country's credit rating affects its ability to pursue expansionary fiscal policies. Similar evidence is documented in Bianchi et al. (2019), who show that countercyclical fiscal policies are not common in countries with high credit risk.

Surprisingly, we do not find a negative correlation between the debt-to-GDP ratio and the size of a country's fiscal programs relative to its GDP. The effect of debt-to-GDP on fiscal spending is either positive or close to zero – a result that contrasts the traditional view that countries with lower debt-to-GDP use fiscal policy more aggressively during crises (Romer and Romer, 2018, and 2019). For example, according to Romer and Romer, 2018: "We find that countries with [fiscal] space use policy – particularly fiscal policy – much more aggressively."[3] We conduct a battery of robustness tests and find that much of the positive association between debt-to-GDP and fiscal spending during the Covid-19 crisis is driven by outlier countries such as Greece and Japan. Nevertheless, even after removing these outlier observations the relation between debt-to-GDP and fiscal spending remains positive although insignificant in some specifications.

When we evaluate the determinants of monetary policy, we find that the strongest determinant of conventional monetary policy is the central bank base rate. Countries that entered the Covid-19 crisis with low interest rate levels – mostly high-income countries – had little margin for adjustment in their arsenal of conventional monetary tools. Instead, those countries were more likely to resort to nonconventional monetary tools. For example, low-interest-rate countries used more central bank guarantees and financial asset purchases and were more likely to relax macroprudential-based lending rules and to limit shareholder payouts in the form of dividends or share repurchases by financial institutions. The patterns in the data are consistent with Bernanke, 2020, who writes: "Chronically low interest rates pose a challenge for the traditional approach to monetary policymaking, based on the management of a short-term policy interest rate."[4]

Overall, the data show that governments reactions to the crisis occur at the confluence of fiscal and monetary policy. Countries with ultra low interest rates at the beginning of the pandemic – those with rates below 1% – deployed larger fiscal spending – chiefly in the form of government guarantees.

Our paper adds to the emerging literature on the macroeconomic effects of Covid-19 (Auerbach, Gorodnichenko and Murphy, 2020, Baqaee and Farhi, 2020,

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[3] Romer and Romer, 2018 p. 2.
[4] See Bernanke, 2020 p. 943. Dell'Ariccia et al., 2018 argue that unconventional monetary policies have been effective in preventing further financial difficulties following the Great Financial Crisis.

Barro, Ursua and Weng, 2020, Bigio, Zhang and Zilberman, 2020, e Castro, 2020, Eichenbaum, Rebelo and Trabandt, 2020, Guerrieri, Lorenzoni, Straub and Werning, 2020). Our paper also sheds new light on the use of fiscal and monetary policies in a low-interest-rate environment. While some economists argue that nonconventional monetary tools may offset the effect of the lower bound and provide space for monetary policy (Bernanke, 2020), others suggest that because of the changing nature of macroeconomics, the ability of monetary policy to accomplish much when interest rates are at their lower bound is limited (DeLong and Summers, 2012; Summers, 2014; Eichenbaum, 2019).

We also show that a country's ability to deploy fiscal policies when short-term rates are ultra-low is limited by its access to credit markets – or its credit rating. The Covid-19 pandemic has affected advanced economies disproportionally in terms of the number of confirmed cases and deaths. The ability of these countries to react to the adverse health shocks with fiscal policies is facilitated by their higher sovereign credit ratings. These findings raise the concern that countries with poor credit histories – those with lower credit ratings and, in particular, lower-income countries – will not be able to deploy fiscal policies of similar magnitudes in times of economic crisis.

The rest of the paper is organized as follows. Section 2 discusses the data and presents summary statistics. Section 3 analyzes the determinants of fiscal and monetary policies during the Covid-19 crisis. Section 4 discusses the confluence of these policies. Section 5 concludes.

2. The data

In this section, we describe our variables and summarize the data.

2.1 Variable definitions

We collect data on 85 countries for which we find information on fiscal and monetary policy responses to the Covid-19 pandemic. Our dataset consists of 35 advanced economies and 50 emerging market and developing economies.[5] We use two main sources to construct our dataset: the IMF website on policy responses to Covid-

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[5] Our sample covers 90% of the world's advanced economies. We use the IMF's definition for advanced economies versus emerging market and developing economies throughout the paper. More information can be found in IMF (2020), table 1.1.

19 and the OECD.[6] We update our database using information up to May 5, 2020. Table 1 describes the variables used in the paper and their sources.

2.2 Summary statistics

Table 1 describes the variables used in this paper, and Table 2 presents the data on the variables. Panel A of Table 2 shows our main macrovariables, and Panels B, C, D, and E of Table 2 present the Covid-19 fiscal, monetary, nonconventional monetary policy, and exchange rate policy response variables, respectively. The standard macrovariables in Panel A are log GDP per capita, log population, debt-to-GDP ratio, log Covid-19 cases per one million people as of May 5, 2020, Fitch sovereign credit rating, and government expenditure to GDP ratio.

Panel B reports summary statistics for the fiscal policies implemented by the countries in our data as a response to the Covid-19 pandemic. The mean fiscal spending (excluding government guarantees) is 4.97% of GDP, and it ranges from 0.4% (Sri Lanka) to 22.8% (Japan). The average fiscal package is already much greater than the total fiscal policy package implemented after the Global Financial Crisis: for example, in the United States, fiscal spending after the Global Financial Crisis was 5.5% of GDP (Auerbach et al., 2009), but after the Covid-19 crisis it now equals 13% of GDP and is projected to grow.[7] Government guarantees amount on average to an additional 2.73% of GDP, with a standard deviation of 4.81%. Detailed information on the allocation of fiscal spending across economic categories is available for more than half of the countries in our data. These categories of fiscal spending are: healthcare, households, and businesses. The mean healthcare Covid-19 policy fiscal spending is 0.67% of GDP, with a range of 0.10% to 3.0%. Fiscal stimulus to households ranges from 0.10% to 8.0% with a mean of 1.70% of GDP, and the mean fiscal stimulus to businesses is 2.53% of GDP, with a standard deviation of 2.36%.

Panel C reports summary statistics for the monetary policies implemented by the countries in our data. The mean interest rate level before the start day of the Covid-19 crisis was 3.55%, and the mean rate ranges from -0.75% (Switzerland and Denmark)

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[6] The IMF's review of policy responses to Covid-19 can be found at https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19. The OECD data can be found at https://www.oecd.org/coronavirus/en/.

[7] As a result of the pandemic, the global economy is projected to contract sharply by –3% in 2020, much worse than during the 2008–9 financial crisis (IMF, 2020).

to 38% (Argentina). The mean change in the monetary interest rate due to the Covid-19 crisis is -0.63%, with a range from -3.5% (Pakistan) to 0.15% (Denmark).[8] Compared to previous crises, this crisis started with ultra-low levels of interest rates among advanced economies after many years of declining rates.[9] The mean initial interest rate level among advanced economies in the Global Financial Crisis was around 4% (IMF, World Economic Outlook, April 2020), whereas in the pandemic crisis it is around 0.5%. After the Global Financial Crisis, central banks in advanced economies reduced rates by an average of 3%, compared to 0.3% in the Covid-19 crisis.

The low central bank interest rate environment in advanced economies has led monetary authorities to rely more on nonconventional monetary tools in the Covid-19 crisis (Baumeister and Benati, 2013; Borio and Zabai, 2016; Borio and Zabai, 2018; Bernanke, 2020).

Panel D reports summary statistics for nonconventional monetary policies implemented by the countries in our data. Central bank guarantees amount on average to 1.42% of GDP, with a standard deviation of 2.22%. Asset purchases as a percentage of GDP due to the Covid-19 crisis is 2.11% on average, with a standard deviation of 2.88%.

Advances economies used asset purchases extensively during and after the Global Financial Crisis, leading to a marked increase in the size of central bank balance sheets in recent years (IMF, 2020). In the current pandemic, central banks in several advanced economies launched new large-scale asset purchase programs. The Federal Reserve bought US Treasury debt and mortgage-backed securities amounting to 4.5% percent of GDP in order to ensure market functioning. The European Central Bank (ECB) commenced a new €750 billion temporary public and private securities purchase program, amounting to 6% of ECB countries' GDP.

In response to the Covid-19 crisis, 22% of the countries in our data lowered their reserve requirements ratio, 31% implemented repo operations, and 73% implemented at least one macroprudential policy tool.[10] In addition, 39% imposed

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[8] The change in interest rate is marked as due to the crisis only if the press release announcement mentions that it is due to the Covid-19 crisis.

[9] Holston et al., 2017 show that estimates of the natural rate of interest in several advanced economies have declined over the past four decades and are now near zero.

[10] The macroprudential policy tools used most commonly are countercyclical capital buffers and LTV limits.

restrictions on dividend payouts, bonus payments, or share buybacks by commercial banks, and 86% eased lending restrictions for financial intermediaries.

Panel E reports summary statistics on exchange rate interventions as a percentage of GDP. The mean change in exchange rates policies is 1.16%, with a standard deviation of 2.55%.

2.3 Comparing policy responses across countries

Table 3 presents the data arranging countries by income level measured as the average log GDP per capita between 2016 and 2018. We split the data based on the median log GDP per capita and report the statistics for countries that are either at or above the median (high-income countries) and those that are below the median (low-income countries). Panel A shows that there is a significant difference in the number of Covid-19 cases until May 5 between high- and low-income countries, which we control for in our regression analysis. Panel B shows that fiscal spending as a proportion of GDP is higher in high-income countries. On average high-income countries announced fiscal policies that amount to 6.8% of GDP compared to 3.1% in low-income countries (t-test 5.23). Similarly, government guarantees in high-income countries are 4.8% of GDP compared to 0.6% in low-income countries (t-test 4.38). We have fewer observations for the subcategories of fiscal policies, but the data suggest a similar pattern – in which higher-income countries have implement larger fiscal programs relative to their GDP. Fiscal programs directed at the healthcare sector are slightly higher in higher-income countries as compared to lower-income countries (0.8% versus 0.5%, t-test -1.84). Fiscal programs targeted toward households average 2.3% of GDP in high-income countries compared to 1.1% in low-income countries (t-test 3.62). Fiscal programs targeted toward businesses average 3.5% of GDP in high-income countries compared to 1.2% in low-income countries (t-test 3.85).

Panel C compares monetary policies between high- and low-income countries. High-income countries had much lower interest rates before the outbreak of the Covid-19 pandemic. The mean interest rate in high-income countries was 0.78% and ranged from -0.75% (Switzerland and Denmark) to 4.25% (Qatar). In contrast, in low-income countries the mean interest rate was 6.39% (t-test for equal mean 5.45). Given that low-income countries had much higher interest rates before the crisis, it is not surprising that they responded by lowering their rates more than high-income countries. The mean

interest rate change in low-income countries was -0.84% compared to -0.43% in high-income countries (t-test for equal means 2.56).

Panel D compares nonconventional monetary policies between high- and low-income countries. High-income countries also implemented larger nonconventional monetary programs, including central bank guarantees (2.21% of GDP compared to 0.61%), financial assets purchases (3.76% compared to 0.43%), and reserve requirements (0.14% compared to 0.31%). Panel D also shows that high-income countries were more likely to loosen macroprudential restrictions on mortgage lending – 91% of high-income countries loosened their policies as compared to 55% of low-income countries. Also, high-income countries were more likely to impose restrictions on dividend payments by banks (58% of high-income countries compared to 19% of low-income countries). On the other hand, there are no significant differences between high- and low-income countries in their propensity to change their repo operations or ease lending requirements.

Last, Panel E provides information on policies targeting exchange rates and shows that high-income countries implemented more exchange rate policies as a percent of GDP: 1.65% compared to 0.67% (t-test for equal means -1.78).

Table 4 repeats the analysis presented in Table 3 using a different comparison of countries. Instead of splitting countries by income, we use the IMF definition of advanced economies versus emerging market and developing economies (IMF, 2020, table 1.1). Our data include 35 advanced economies and 50 countries that are classified as emerging market and developing economies.

Similar to the results in Table 3, Panel A of Table 4 shows a significantly higher number of Covid-19 cases in advanced economies compared to emerging market and developing economies. Panel B of Table 4 shows that advanced economies implemented larger fiscal policies relative to their GDPs. The mean fiscal spending of advanced economies is 7.04% of GDP compared to 3.52% in emerging market and developing economies. Likewise, government guarantees and healthcare, household, and business spending are all higher (as a proportion of GDP) in advanced economies. In the Global Financial Crisis, advanced economies spent 4% of GDP on fiscal policies.

As Panel C of Table 4 shows, and similar to Table 3, advanced economies entered the Covid-19 crisis with lower interest rates compared to emerging market and

developing economies and lowered their rates less than emerging market and developing economies. Panel D shows that advanced economies announced significantly larger nonconventional monetary programs than emerging market and developing economies. These programs include central bank guarantees, asset purchases, macroprudential policies, and dividend distribution restrictions. Similar to the results in Table 3, there are no significant differences between the two types of countries in their propensity to change their repo operations or ease lending requirements. However, emerging market and developing economies are more likely to implement reserve requirement policies. Finally, as Panel E shows, advanced economies spent on average 2.02% of their GDP on exchange rate interventions compared to 0.56% by emerging market and developing economies (t-test for equal means -2.69).

Figure 1.A plots fiscal spending (as a percentage of GDP) and interest rate levels before the Covid-19 crisis across countries sorted by fiscal spending from the highest (United States) to the lowest (Sri Lanka). The figure illustrates two important facts: (1) higher-income countries announced larger fiscal programs, and (2) higher-income countries had much lower interest rates before the Covid-19 crisis, which likely left them with little room to implement conventional monetary policies. In Figure 1.B we extend the definition of fiscal policies to include government guarantees. Although this extended definition changes the ranking of countries with the highest fiscal programs, a similar pattern emerges: richer countries with low initial interest rate levels implemented fiscal tools more heavily.[11]

Figure 2 displays the pre-crisis interest rate level and the monetary response of interest rate change (in absolute values) across countries. The figure shows that in general, countries with higher initial levels of interest rates, mostly developed countries, lowered their interest rates more as a response to the Covid-19 crisis.

Figure 3 plots fiscal spending, including government guarantees, as a percentage of GDP and interest rate changes (in absolute values) across countries. As the figure clearly shows, countries that implemented policies of larger fiscal spending

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[11] Figure 1.B includes the following fiscal tools: deferred and canceled taxes, strengthening the social safety net, direct grants, wage subsidies, money transfers, income support, and government guarantees.

made smaller changes to their interest rates compared to countries that implemented fewer fiscal policy tools.

Finally, Panel A of Figure 4 illustrates the geographical patterns in the preexisting levels of interest rates, and Panel B displays the geographical distribution of Covid-19-related fiscal spending around the world.

3. Determinants of fiscal and monetary policies

In this section, we present cross-sectional results on the determinants of fiscal and monetary policies responses during the Covid-19 crisis.

3.1 Fiscal policy

Table 5 examines the effects of a battery of several macroeconomic variables on Covid-19-related fiscal policy. The dependent variable is the ratio of total fiscal spending (excluding government guarantees) to GDP. The first six columns of Table 5 report results from univariate regressions of fiscal spending on several macrovariables. As column 1 of Table 5 shows, and consistent with Table 3, there is a positive correlation between GDP per capita and fiscal policy: advanced economies and richer countries are more likely to implement higher fiscal spending because they have more debt sustainability. [12] The univariate analysis also shows positive correlations between fiscal policy and the log number of Covid-19 cases (column 4) because richer countries experienced larger number of Covid-19 cases up to May 5; sovereign credit rating (column 5), which means that higher credit rating is positively correlated with higher fiscal spending because high-income countries have better credit ratings; and government expenses relative to GDP (column 6).

After establishing the univariate correlations in the data, we move to a multivariate framework in which we run a "horse race" among the macrovariables. Column 7 reports results from a multivariate regression that includes all six variables used in columns 1–6. We find that the four variables that remain correlated in a statistically significant manner with fiscal spending in a multivariate analysis are: (1) log GDP per capita, (2) debt-to-GDP ratio, (3) sovereign credit rating, and (4) government expenditure to GDP ratio. A one standard deviation increase in the log of GDP per capita (1.27) is associated with a 2.12 percentage point increase in fiscal

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[12] All the macrovariables are measured pre-Covid-19 crisis.

spending as a percentage of GDP, representing a 42.6% increase relative to the unconditional mean of 4.97%. Similarly, a one standard deviation increase in debt to GDP ratio (35.9) is associated with a 1.43 percentage point increase in fiscal spending, representing a 28.8% increase relative to the mean. Moreover, a one standard deviation increase in credit rating (4.39) is associated with a 28.3% increase in fiscal spending relative to the mean. Last, a one standard deviation increase in government expenditure to GDP (10.64) is associated with a 1.1 percentage point decline in fiscal spending as a percentage of GDP – or 22.7% relative to the mean.

In column 8 of Table 5 we use the broader definition of fiscal policy that includes government guarantees as the dependent variable. We obtain similar results for GDP per capita ratio, debt-to-GDP ratio, and sovereign credit rating variables. All three are significantly positively correlated with fiscal spending. However, the government expenditure to GDP ratio is no longer correlated with fiscal spending when we use the broader definition that includes government guarantees.

Japan is an outlier observation with the highest level of debt-to-GDP in our sample (235%) and fiscal spending of 23% of GDP. We drop Japan from the analysis and re-estimate the specifications in columns 7 and 8. When we use the narrower definition of fiscal policy, the point estimate of debt-to-GDP is 0.015 and is statistically insignificant (column 9). However, when we use the broad definition of fiscal policy, which includes government guarantees, the coefficient of debt-to-GDP is still positive (0.046) and statistically significant even when we drop Japan from the sample (column 10). Given that Japan is such an outlier we drop it from most of the analyses presented in the paper.

The positive correlation between fiscal policy during the Covid-19 crisis and debt-to-GDP contrasts with the pre-Covid-19 evidence showing that countries with lower levels of public debt can more easily provide fiscal stimulus to avert a detrimental simultaneous retrenchment of private and public spending (Jorda et al., 2016, Romer and Romer 2018, and 2019).

In Table 6 we further explore the determinants of fiscal spending by focusing on policies aimed at private businesses. As in Table 5, we run univariate regressions (columns 1–6) as well as a multivariate "horse race" among the macrovariables (column 7). We have detailed information on fiscal spending on businesses for 48 countries. The

results reported in Table 6 are similar to those in Table 5. The main determinant of fiscal spending is the pre-crisis sovereign credit rating. A one standard deviation increase in credit rating (4.39) is associated with a 2.13 percentage point increase in the fiscal spending, or a 84% increase relative to the mean fiscal stimulus to private businesses.

3.2 Monetary policy

We next analyze the determinants of traditional monetary policy – that is, central bank interest rates. We estimate cross-country regressions of the change in central bank interest rates (in absolute value) using a number of country-level variables and report the results in Table 7. The variables that have statistical significant univariate correlations with the change in interest rates are: log population (column 2); sovereign credit rating (column 5); government expenses relative to GDP (column 6); and the level of the central bank interest rate before the outbreak of the Covid-19 crisis (column 7).

Column 8 reports the results from a multivariate analysis of the effect of the macro variables on interest rate change. Two variables are significantly correlated with monetary policy: (1) government expenses relative to GDP are negatively correlated with interest rate changes; and (2) the level of the central bank interest rate before the crisis is positively correlated with interest rate changes during the crisis. That is, countries with a higher central bank interest rate before the crisis cut their rate more during the crisis. In terms of economic magnitude, a one standard deviation increase in the government expenses to GDP (10.64) is associated with a 0.21 percentage point decrease compared to the mean change of 0.63 percentage point. In terms of the pre-crisis central bank interest rate, a one percentage point higher interest rate before the crisis is associated with a change in the interest rate of 11% relative to the mean.

3.3 Government guarantees as a fiscal policy tool

In addition to direct fiscal payments, some countries implemented a package of government guarantees – that is, loans that are either fully or partially insured by the government in the event of default by the borrower. These government-guaranteed loans are mostly targeted toward small to medium enterprises (SMEs) and industries directly affected by Covid-19. The goal of this policy is to alleviate frictions in credit markets and facilitate lending by financial intermediaries to distressed borrowers.

Government guarantees differ across countries in both size and scope – in particular, in the percentage of the loan that the government guarantees. For example, in Belgium, the government guarantees up to 80% of the loan, whereas in Australia, government guarantees are up to 50% of the loan amount. Government guarantees can be classified as part of fiscal policy because they are funded by fiscal authorities rather than by the central bank.

Table 8 presents information on the relative size of government guarantees for the countries with the largest government guarantee programs relative to their GDP. The table reports the share of government guarantees to GDP as well as the scope of coverage of these guarantees – relative to the loan amount. Italy announced the largest government guarantee program, amounting to 25% of GDP, followed by Germany (23%), Czech Republic (16%), United Kingdom (14%), France (14%), Luxembourg (13%), and Belgium (11%). The 18 countries listed in Table 8 account for 76% of all government guarantees in our data. The only developing economy listed in Table 8 is Colombia, with a government guarantee program that amounts to 7% of GDP. Most of the countries that implemented government guarantees are in Europe, likely since their monetary and traditional credit tools are controlled by the ECB and due to the low levels of interest rates and their high debt-to-GDP ratio. The table also lists the scope of the guarantees in each program. Among the 18 countries, the average scope of government guarantees is about 80%, with Australia being the country with the lowest scope of guarantees (50%) and Switzerland the highest (up to 100%).

4. The Confluence of Fiscal and Monetary Policies

In this section, we present cross-sectional results on the *joint* determination of fiscal and monetary policies and their confluence.

4.1 The effect of pre-Covid-19 interest rate on fiscal policy

We hypothesize that countries with low interest rates will be more likely to resort to fiscal policy in the crisis since their ability to use traditional monetary tools is limited. A growing literature analyzes the potential effects of fiscal stimulus when nominal interest rates are at the zero-lower bound. For example, Almunia et al., 2010 argue that fiscal stimulus is most effective when banking systems are dysfunctional and monetary policy is constrained by the zero bound. Similarly, Christiano et al., 2011 argue that

fiscal multipliers can be much larger than one around the zero lower bound of interest rate.[13]

Specifically, we estimate the following baseline regression specification:

(1) $FiscalPackage_i = \alpha_0 + \alpha_1 \times interes\_rate_i + X_i\,\beta + e_i,$

where the dependent variable is the ratio of total fiscal spending to GDP.[14] Table 9 presents results from estimating different variants of the model with robust standard errors (in parentheses). Our specifications control for country-level variables that are included in the vector X_i.[15] Our main coefficient of interest is α_1, which measures the effect of the central bank interest rate level before the crisis on fiscal spending.

In Table 9, column 1, we use GDP per capita, the number of Covid-19 cases, and the central bank interest rate as our explanatory variables. As column 1 shows, the level of interest rate before the policy is negative but statistically insignificant. When we add debt-to-GDP and credit rating as additional explanatory variables (column 2), only GDP per capita and credit rating are statistically significant. Column 3 shows that a one standard deviation increase in credit rating (4.39) is associated with a 1.27 percentage point increase in the size of the fiscal policy implemented due to Covid-19, or 25.6% relative to the mean. Also, a one standard deviation increase in the level of government expenditures to GDP before the crisis is associated with a 0.8 percentage point decline in the size of the fiscal policy, representing a 16% decline relative to the unconditional mean. This finding suggests that countries with higher government expenditures before the crisis either did not need or could not afford to spend much during the crisis. In column 4 we add to the regression a dummy variable that equals one for countries with an initial interest rate below 1% and zero otherwise. We use this specification to capture the differential effect of near-zero interest rates on fiscal policy. As column 4 demonstrates, neither variable pertaining to the level of the interest rates is significant in explaining fiscal spending. Other work also points to monetary policy accommodation being less effective when public debt to GDP is high, such as De Luigi and Huber, 2018, who find that expansionary monetary policy helps stabilize an

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[13] Ramey and Zubairy, 2018 provide evidence for multipliers higher than unity around the zero lower bound.

[14] Fiscal policy package implemented by each country from the beginning of the crisis until May 5, 2020.

[15] Given our earlier discussion about Japan we drop it from the sample.

economy in a downturn, but has a lesser effect when the economy is in a high public debt-to-GDP regime.

To further investigate the robustness of the effects of credit rating and debt-to-GDP on fiscal spending we replicate the analysis presented in column 2 of Table 9 in Appendix Table A.1. As column 1 of Table A.1. shows, when we include Japan the coefficient of debt-to-GDP is positive and significant (0.033) but it is close to zero and insignificant when we exclude Japan (column 2) or exclude Japan and Greece (column 3).[16] In columns 4 and 5 of Table A.1. we estimate the specification in column 3 using the jackknife and bootstrap methods to estimate standard errors, respectively. Columns 6-10 of Table A.1. repeat the analysis using the specification reported in column 4 of Table 9 and obtain similar results. That is, the pre-crisis sovereign credit rating and GDP per capita are always significant economically and statistically in explaining fiscal spending. Also, the effect of debt-to-GDP on fiscal spending is close to zero when we drop Japan from the sample.

In Table 10 we present results from estimating regression (1) using the broader definition of fiscal policy that includes government guarantees with robust standard errors in parentheses. As column 1 illustrates, the interest rate level before the Covid-19 crisis is negatively correlated with fiscal spending and is statistically significant. An interest rate that was one percentage point higher before the crisis is associated with a 0.17 percentage point lower fiscal policy package, representing a 2% decline relative to the unconditional mean. When we include debt-to-GDP in the regression (column 2), the interest rate level is still significantly negative. When we add credit rating and government expenditures as additional explanatory variables (column 3), the effect of the initial interest rate level is much smaller and becomes insignificant. The effect of credit rating on broader fiscal policy that includes government guarantees is even higher than its effect on fiscal policy absent government guarantees: column 3 shows that a one standard deviation increase in credit rating (4.39) is associated with a 2 percentage point increase in the size of the fiscal policy, representing 26.1% relative to the mean.

In column 4 we add to the regression a dummy variable that equals one for countries with an interest rate below 1% and zero otherwise. As column 4 shows, the effect of the low-interest-rate dummy on the measure of fiscal spending that includes

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[16] Greece is the country with the second highest pre-crisis debt-to-GDP ratio in our sample (180%).

government guarantees is positive and statistically significant suggesting that countries at the zero lower bound deployed larger fiscal policies in the form of guarantees. In contrast to the results in Table 9, and despite that we have excluded Japan from the analysis, the debt-to-GDP ratio is a significant *positive* determinant of fiscal spending. A one standard deviation increase in the debt-to-GDP ratio increases the fiscal policy that includes government guarantees by 1.6 percentage point.

We repeat the analysis in columns 2 and 4 of Table 10 in Appendix Table A.2. and use the same specifications and estimations as in Table A.1. We find a positive coefficient of debt-to-GDP in 7 out of 10 regressions even when we exclude Japan and Greece and use jackknife and bootstrap procedures to estimate standard errors. These results contrast sharply with prior evidence (Jorda et al., 2016, Romer and Romer, 2018, and 2019), suggesting that the Covid-19 crisis is different and that the traditional "fiscal-space" argument does not explain the ability of countries to deploy fiscal expansionary policies during this crisis.

We rerun regression (1) using the fiscal policy targeted for businesses as our dependent variable and report the results in Table 11. Similar to the analysis in Table 9, the effect of the interest rate on fiscal policy is negative and insignificant (column 1). As in our earlier analysis, the debt-to-GDP ratio and credit rating are significant determinants of fiscal policy for businesses (column 3).[17]

4.2 Determinants of nonconventional monetary policy during the Covid-19 crisis

Given that interest rates in many advanced economies were at their lowest historical levels at the outbreak of the Covid-19 crisis, policymakers in these countries had to rely more heavily on nonconventional monetary tools. We now analyze the determinants of nonconventional monetary policy tools during the crisis.

We estimate the following baseline regression specification:

(2) $Non\ conventional\ Monetary\ Policy_i = \alpha_0 + \alpha_1 \times interest\_rate_i + X_i\ \beta + e_i.$

We use eight dependent variables, each capturing a different nonconventional monetary policy and exchange rate policy tool. These measures are: (1) central bank guarantees to GDP; (2) financial asset purchases as a percentage of GDP; (3) reserve requirements

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[17] It is important to note that debt-to-GDP is positive and significant in column 3 although we drop Japan from the sample.

easing (a dummy variable that takes the value of one if the central bank eases reserve requirements, and zero otherwise); (4) repo operations (a dummy variable that takes the value of one if the country uses repo operations, and zero otherwise); (5) loosening of macroprudential policy[18] (a dummy variable that takes the value of one if a country loosens its macroprudential policy tools, and zero otherwise); (6) payout restrictions[19] (a dummy variable that takes the value of one if a country restricts dividend payment by banks, and zero otherwise); (7) easing loan payments[20] (a dummy variable that takes the value of one if loan repayments are eased, and zero otherwise); and (8) the ratio of exchange rate intervention relative to GDP.

Our main explanatory variable is each country's central bank interest rate level before the crisis. Table 12 presents the results from estimating model (3). All specifications also control for the GDP-per-capita, log Covid-19 cases, and government expenditure to GDP ratios. Given that we are not using debt-to-GDP as an explanatory variable we also include Japan in the analysis. Our main coefficients of interest are the different α_1 in each of the models, which measure the effect of the central bank interest rate level on each of the nonconventional monetary policy tools.

As Table 12 demonstrates, the interest rate level has a significant effect on six of the eight nonconventional monetary policy tools. A higher interest rate level is negatively correlated with central bank guarantees as a percentage of GDP (column 1). In other words, central banks with low interest rates before the Covid-19 pandemic are more likely to implement guarantees due to the crisis. A one percentage point higher interest rate before the crisis is associated with a reduction of 0.06 (4.5% relative to the mean) in central bank guarantees relative to GDP. Similarly, a higher pre-crisis interest rate is negatively and statistically significant correlated with asset purchases (column 2). A one percentage point higher interest rate before the crisis is associated with 0.11% lower amount of asset purchases by the central bank due to the crisis, representing a 5% decline relative to the unconditional mean.[21] Also, the interest rate level has a

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[18] Most common macroprudential tools that were loosen are: countercyclical capital buffer (CCyB), LTV limits, capital requirements, debt-service-to-income (DSTI) ratio, and debt-to-income (DTI) ratio.
[19] Restrictions on dividend distribution (or buy back shares) imposed on banks in order to boost capital and support lending during the Covid-19 crisis.
[20] Easing borrowers' loan repayments, for households and businesses. These include grace periods or extended maturity. The payment break will not affect borrowers' credit records and recordings on the credit registries.
[21] See Borio and Zabai, 2016 and BIS, 2019a, and 2019b for more detailed descriptions on the implementation of large-scale asset purchases.

significant negative effect on implementing macroprudential policy (column 5) and on dividend distribution policy (column 6). A one percentage point higher interest rate before the crisis is associated with lower propensities of easing macroprudential tools or restricting dividend payments. Overall, countries with lower interest rates before the crisis are more likely to implement nonconventional monetary policies as a response to the Covid-19 crisis.

The sole exception is the reserve requirements tool. As column 3 of Table 12 shows, a higher interest rate before the Covid-19 crisis has a positive and statistically significant effect on the likelihood of loosening reserve requirements. Table 12 also shows that the interest rate level before the crisis is not correlated with implementing repo operations (column 4) and implementing exchange rate policy (column 8).

5. Conclusion

This paper analyzes the determinants of fiscal and monetary policies during the Covid-19 crisis. We find that high-income countries announced larger fiscal policies than lower-income countries. We also find that a country's credit rating is the most important determinant of its fiscal spending during the Covid-19 pandemic. High-income countries entered the crisis with historically low interest rates, and as a result they lowered their rates less than low-income countries and were more likely to use nonconventional monetary policy tools. Our findings demonstrate that the ability to deploy fiscal policies when short-term rates are ultra-low is limited by a country's access to credit markets. These findings raise the concern that countries with poor credit histories – those with lower credit ratings and, in particular, lower-income countries – will not be able to use fiscal policy tools effectively during economic crises.

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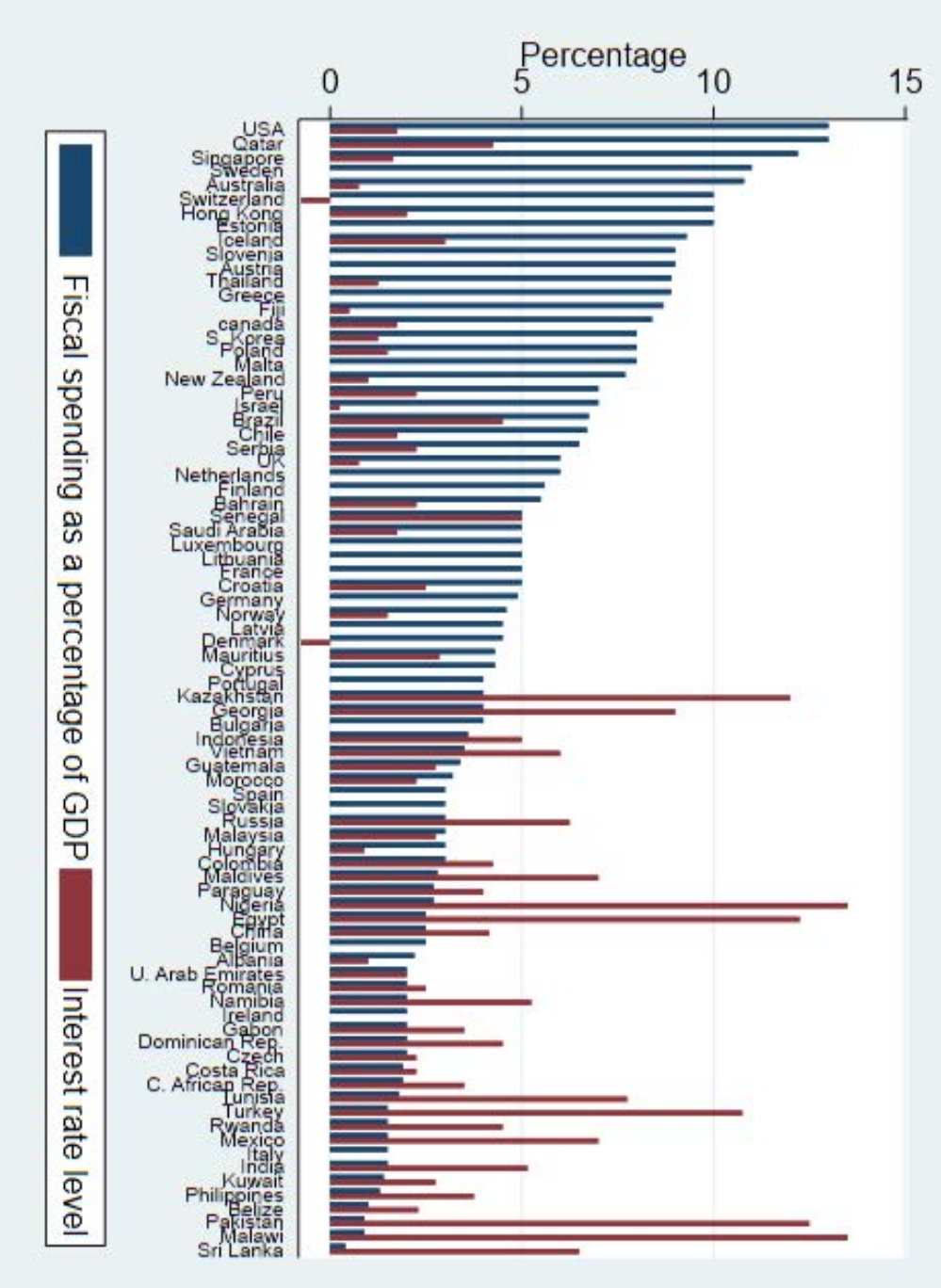
Fig. 1.A. International Comparison of Fiscal Spending as a Response to Covid-19 and Interest Rates Level Before the Crisis.

Note: fiscal spending includes: deferred and canceled taxes, strengthening the social safety net, direct grants, wage subsidies, money transfer, and income support. The interest rate level is the central bank's interest rate before the start day of the Covid-19 crisis. The figure excludes Argentina and Haiti (with interest rate levels of 38% and 22%, respectively) and Japan (with fiscal policy amounting to 23% of GDP).
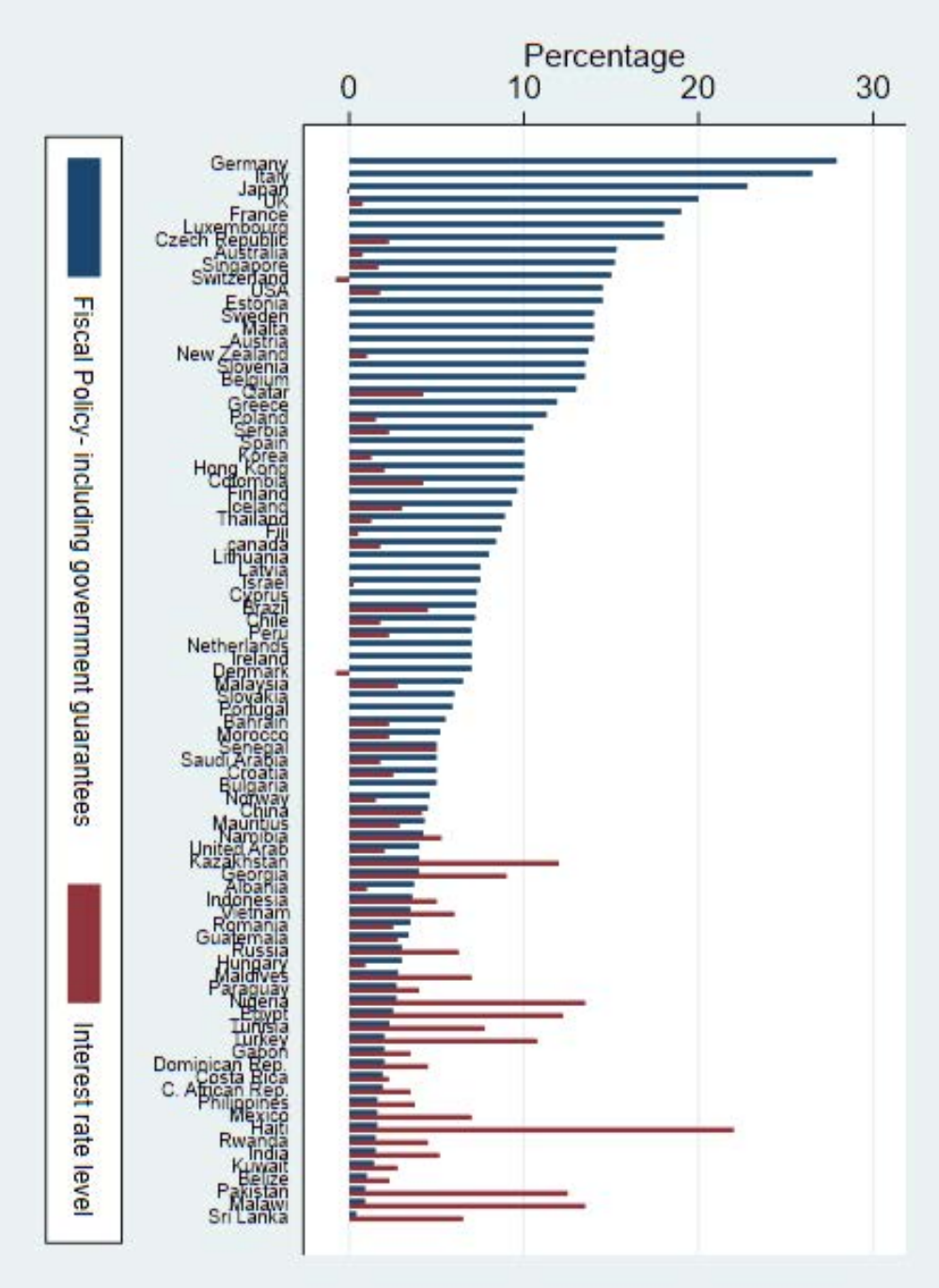
Fig. 1.B. International Comparison of Fiscal Spending, Including Government Guarantees, as a Response to Covid-19 Crisis and Interest Rates Level Before the Crisis.
Note: fiscal spending includes: deferred and canceled taxes, strengthening the social safety net, direct grants, wage subsidies, money transfers, income support, and government guarantees. The interest rate level is the central bank's interest rate before the start day of the Covid-19 crisis. The figure excludes Argentina and Haiti (with interest rate levels of 38 and 22, respectively) and Japan (with fiscal policy amounting to 23% of GDP).

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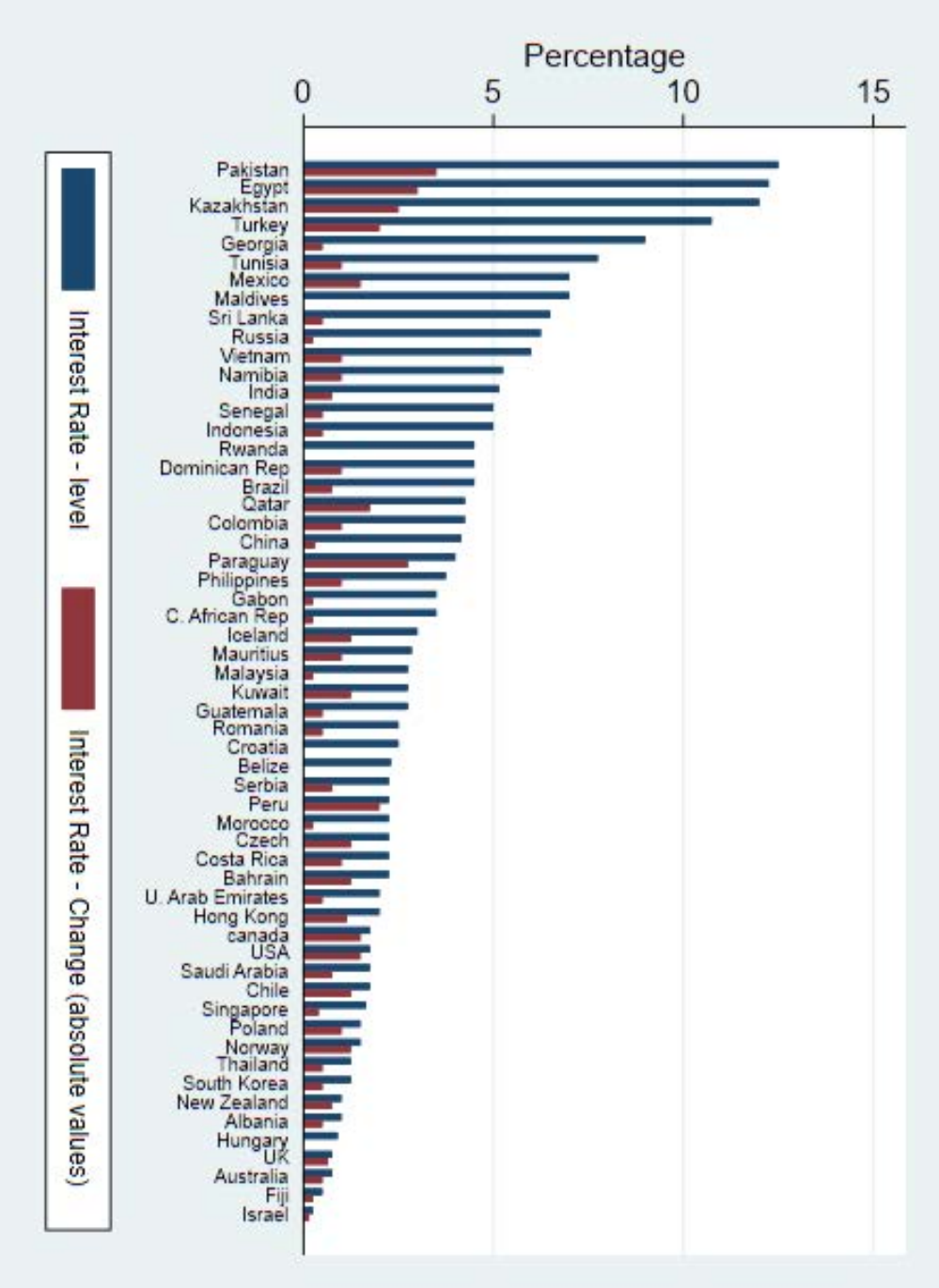
Fig. 2. International Comparison of Interest Rate Levels Before the Crisis and Interest Rate Changes (in Absolute Values) Due to the Crisis.

Note: Interest rate level is the central bank's interest rate for each country in our sample before the beginning of the Covid-19 crisis. Interest rate change is the monetary policy response due to the Covid-19 crisis. The change in interest rate is marked as due to the crisis only if the press release announcement of the change in interest rate mentioned that it was due to the Covid-19 crisis. The figure excludes the EU countries, with zero interest rates and zero change in interest rates. The figure also excludes Argentina, Nigeria, Haiti, and Malawi, all with extreme values of interest rates.
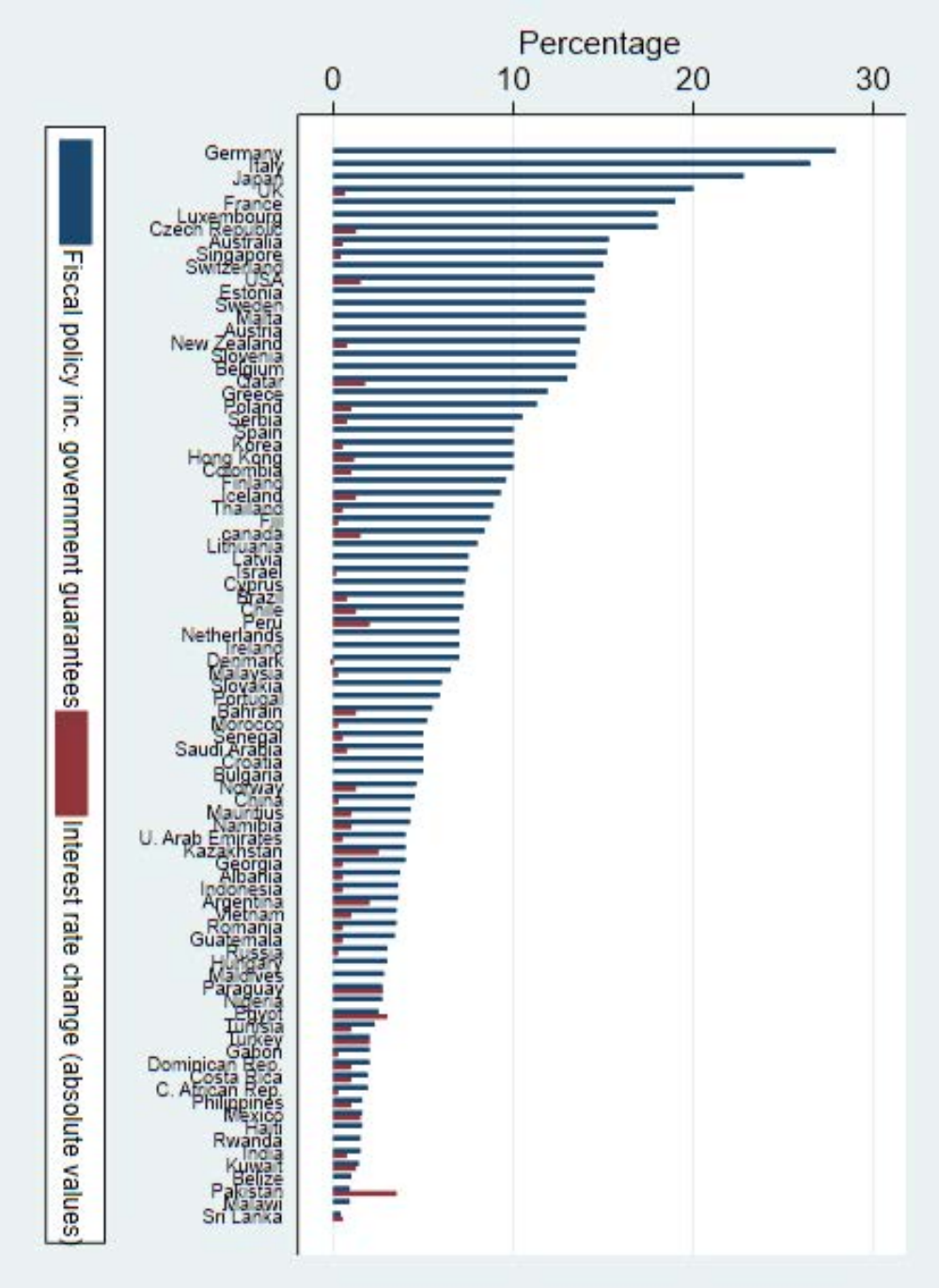
Fig. 3. International Comparison of Fiscal Spending, Including Government Guarantees, and Interest Rates Change (in Absolute Values) as a Response to Covid-19 Crisis.
Note: fiscal spending includes: deferred and canceled taxes, strengthening the social safety net, direct grants, wage subsidies, money transfers, income support, and government guarantees. Interest rate change is the monetary policy response due to the Covid-19 crisis. Interest rate level is the central bank's interest rate before the beginning of the crisis.
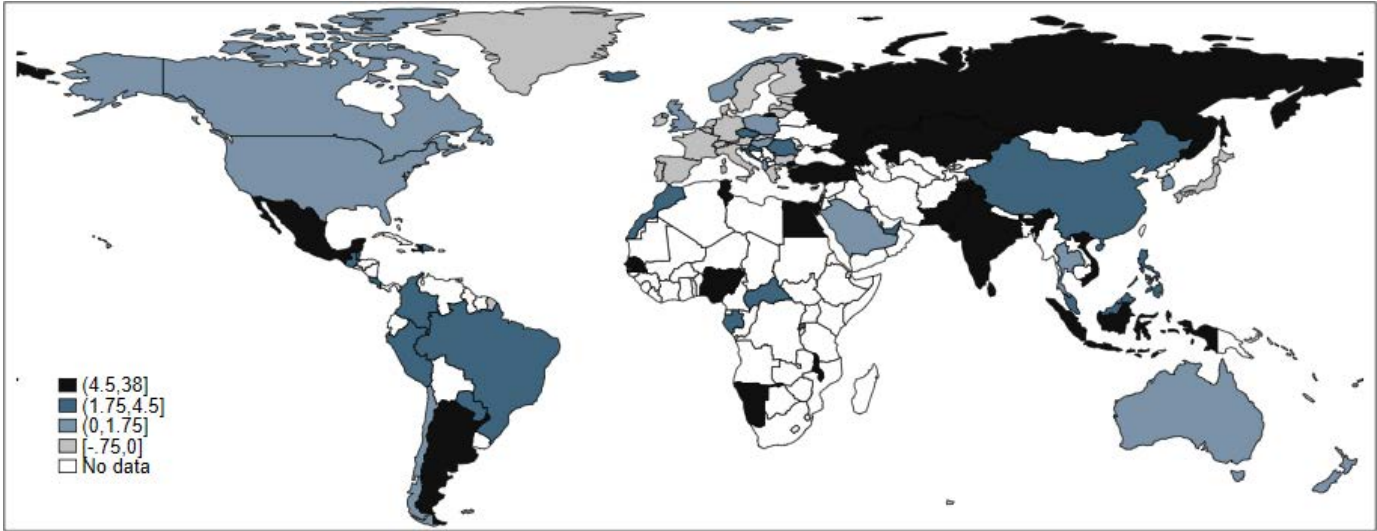
Panel A: Level of interest rates before the crisis
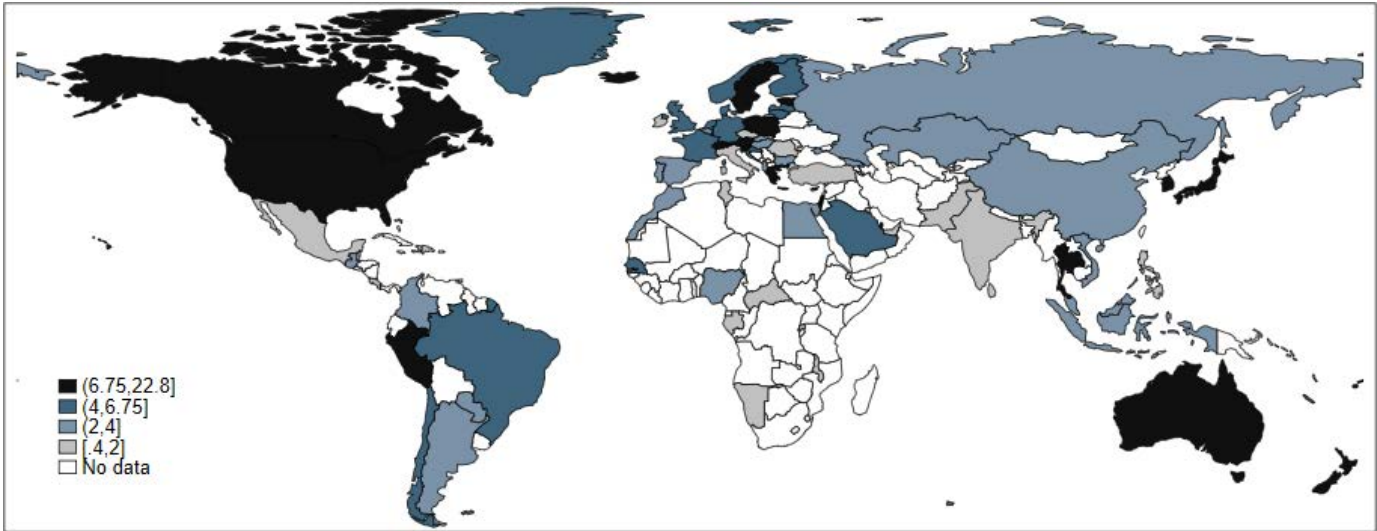
Panel B: Fiscal spending as a percentage of GDP

Fig. 4. Distribution of the Level of Interest Rate Before the Crisis and the Fiscal Spending Response due to the Crisis Across Countries.
Note: fiscal spending includes all the fiscal tools implemented as a response to the Covid-19 crisis (excluding government guarantees): deferred and canceled taxes, strengthening the social safety net, direct grants, wage subsidies, money transfer, and income support. Interest rate change is the monetary policy responds due to the Covid-19 crisis. The change in interest rate is marked as due to the crisis only if the press release announcement of the change in interest rate mentioned that it was due to the Covid-19 crisis. The figure excludes the EU countries, with zero interest rates and zero change in interest rates. The figure also excludes Argentina, Nigeria, Haiti and Malawi, all with extreme values of interest rates.

Table 1
Description of the variables.

| Variable name	Description	Source
GDP per capita, log	Logarithm of gross national income per capita (current U.S.dollars), average 2016-2018	World Bank: World Development Indicators 2019
Population, log	Logarithm of total population, 2018	–
Debt to GDP	General government gross debt as a percentage of GDP, 2017. This includes debt liabilities in the form of SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable.	IMF: World Economic Outlook Database, October 2019
Covid-19 cases, log	Logarithm of Covid-19 cases per 1 million as of May 5, 2020.	https://www.worldometers.info/
Credit rating	Fitch's credit rating as of September 1st, 2019. Credit rating of D defined as 1 and triple-A as 21.	https://tradingeconomics.com/
Government expenditure to GDP	Government total expenditure as a percentage of GDP, 2018. Total expenditure consists of total expense and the net acquisition of nonfinancial assets.	IMF: World Economic Outlook Database, October 2019
Fiscal spending (exc. government guarantees) to GDP	Government spending as a percentage of GDP as a response to the Covid-19 (until May 5, 2020), including deferred and cancelled taxes, strengthening the social safety net, direct grants, wage subsidies, money transfers, and income support.	IMF: https://www.imf.org/en/Topics/imf-and-covid19, OCED: https://www.oecd.org/coronavirus/en/
Government guarantees (%GDP)	Loan guarantees by the government and issues by commercial banks or MFIs (until May 5, 2020), as a percentage of GDP.	–
Healthcare spending (%GDP)	Government spending on the healthcare sector as a response to the Covid-19 (until May 5, 2020), as a percentage of GDP. In countries with no information on the government spending distribution to the health system, the cell is null.	–
Household spending (%GDP)	Government spending on the household sector as a response to the Covid-19 (until May 5, 2020), as a percentage of GDP. In countries with no information on the government spending distribution to the household sector, the cell is null.	–
Business spending (%GDP)	Government spending on the business sector (SMEs and large businesses) as a response to the Covid-19 (until May 5, 2020), as a percentage of GDP. In countries with no information on the government spending distribution to the business sector, the cell is null.	–

Description of the Variables - Cont.

Variable name	Description	Source
Interest rate - level	Central bank policy rates level, before the beginning of the Covid-19 pandemic	BIS website: https://www.bis.org/statistics/cbpol.htm, and https://tradingeconomics.com/country-list/interest-rate, and Central bank's websites/Press release.
Interest rate - change	The total change in central bank policy rates, due to the Covid-19 crisis (until May 5, 2020). This variable receives a negative sign if a country lowered the interest rates due to the crises and zero if there was no change in the interest rate. Denmark is the only country that increased interest rates due to the crisis and therefore it is marked with a positive sign. The change in interest rate was marked as due to the crisis only if the press release announcement mentioned that it was due to the Covid-19 crisis.	-
Central bank guarantees (%GDP)	Loan guarantees by the central bank and issues by commercial banks (until May 5, 2020), as a percenage of GDP.	IMF: https://www.imf.org/en/Topics/imf-and-covid19, OCED: https://www.oecd.org/coronavirus/en/
Asset purchases (%GDP)	Asset purchases, including corporate bonds, government bonds, and stocks, until May 5, 2020, as a percentage of GDP. Receives the value of zero if no such intervention accrued.	-
Reserve requirements, Dummy	Dummy variable that receives one if any reserve requirements intervention has been made (until May 5, 2020), and zero otherwise.	-
Repo operations, Dummy	Dummy variable that receives the value of one if any repo operation change has been made (until May 5, 2020), and zero otherwise.	-
Macroprudential policy, Dummy	Dummy variable that receives the value of one if there was any change in one of the macroprudential policy tools (until May 5, 2020), and zero otherwise.	-
Dividend distribution, Dummy	Dummy variable that receives the value of one if the country implemented restrictions on commercial banks from making dividend payouts and/or bonus payments and/or buy back shares (until May 5, 2020), and zero otherwise.	-
Easing lending requirements, Dummy	Dummy variable that receives one if the country implemented easing lending rules on the financial system, such as a temporary moratorium on loan repayments and extending loan duration or waive penalty interest on overdraft facilities (until May 5, 2020), and zero otherwise.	-
Exchange rate (%GDP)	Foreign exchange operations as a response to the Covid-19 crisis (until May 5, 2020).	-

Table 2

Summary statistics

Variables	Number of obs.	Mean	Standard deviation	Min	Max
	Panel A: Macrovariables				
GDP per capita, log	85	9.46	1.27	5.9	11.6
Population, log	85	16.42	1.77	12.8	21.1
Debt to GDP	85	58.42	35.9	0.1	235
Covid-19 cases, log	85	5.68	1.95	0.7	8.7
Credit rating	80	14.64	4.39	2	21
Gov exp to GDP	85	33.05	10.64	12	56
	Panel B: Fiscal policy variables				
Fiscal spending (exc. government guarantees) to GDP	85	4.97	3.68	0.4	22.8
Government guarantees (%GDP)	85	2.73	4.81	0.1	25.0
Healthcare spending (%GDP)	52	0.67	0.59	0.1	3.0
Household spending (%GDP)	52	1.70	1.40	0.1	8
Business spending (%GDP)	49	2.53	2.36	0.1	12
	Panel C: Monetary variables				
Interest rate - level	85	3.55	5.50	-0.75	38.0
Interest rate - change	85	-0.63	0.77	-3.50	0.15
	Panel D: Nonconventional monetary variables				
Central bank guarantees (%GDP)	85	1.42	2.22	0	13.0
Asset purchases (%GDP)	85	2.11	2.88	0	9.0
Reserve requirements, Dummy	85	0.22	0.42	0	1
Repo operations, Dummy	85	0.31	0.46	0	1
Macroprudential policy, Dummy	85	0.73	0.45	0	1
Dividend distribution, Dummy	85	0.39	0.49	0	1
Easing lending requirements, Dummy	85	0.86	0.35	0	1
	Panel E: Exchange rate				
Exchange rate (%GDP)	85	1.16	2.55	0	14.0

Note: This table reports the summary statistics of the variables used in the paper. Panel A shows our main macrovariables, Panel B presents the Covid-19 fiscal response variables, and Panel C presents the Covid-19 monetary policy response. Panel D reports the change in nonconventional monetary policy tools implemented due to the Covid-19 crisis. Panel E reports summary statistics of the exchange rate policy tool implemented due to the Covid-19 pandemic.

Table 3

Summary statistics, by higher-income vs. lower-income countries.

Variables	Higher-income countries				Lower-income countries		
	Number of obs.	Mean	Standard deviation	t-test	Number of obs.	Mean	Standard deviation
Panel A: MacroVariables							
Covid-19 cases, log	43	6.99	1.07	-8.54	42	4.35	1.72
Panel B: Fiscal Policy Variables							
Fiscal Spending (exc. government guarantees) to GDP	43	6.77	4.05	-5.23	42	3.13	2.01
Government guarantees (%GDP)	43	4.78	5.98	-4.38	42	0.64	1.39
Healthcare spending (%GDP)	28	0.80	0.69	-1.84	24	0.51	0.41
Households spending (%GDP)	26	2.33	1.65	-3.62	26	1.07	0.66
Business spending (%GDP)	28	3.52	2.63	-3.85	21	1.21	0.92
Panel C: Monetary Variables							
Interest rate - level	43	0.78	1.11	5.45	42	6.39	6.66
Interest rate - change	43	-0.43	0.57	-2.56	42	-0.84	0.88
Panel D: Nonconventional monetary variables							
Central bank guarantees (%GDP)	43	2.21	2.58	-3.56	42	0.61	1.38
Asset purchases (%GDP)	43	3.76	3.18	-6.53	42	0.43	0.91
Reserve requirements, Dummy	43	0.14	0.35	1.90	42	0.31	0.47
Repo operations, Dummy	43	0.30	0.46	0.07	42	0.31	0.47
Macroprudential policy, Dummy	43	0.91	0.29	-4.03	42	0.55	0.50
Dividend distribution, Dummy	43	0.58	0.50	-3.99	42	0.19	0.40
Easing lending requirements, Dummy	43	0.84	0.37	0.57	42	0.88	0.33
Panel E: Exchange rate							
Exchange rate (%GDP)	43	1.65	3.31	-1.78	42	0.67	1.27

Note: This table presents the summary statistics for higher-income countries, countries with log GDP per capita (on average between 2016-2018) above the median, versus lower-income countries, with GDP per capita below the median. Panel A reports summary statistics for the Covid-19 cases. Panel B reports the fiscal policy tools that were implemented due to the Covid-19 crisis. Panel C reports the monetary interest rate tool that was changed due to the crisis, and the level of interest rate before the Covid-19 crisis. Panel D reports the change in the number of nonconventional monetary policy tools implemented due to the crisis. Panel E reports the change in the exchange rate policy tool implemented due to the Covid-19 pandemic.

Table 4

Summary statistics, advanced economies vs. emerging market and developing Economies.

Variables	Advanced economies			t-test	Emerging market and developing economies		
	Number of obs.	Mean	Standard deviation		Number of obs.	Mean	Standard deviation
Panel A: Macrovariables							
Covid-19 cases, log	35	7.03	1.12	-6.51	50	4.74	1.85
Panel B: Fiscal policy variables							
Fiscal spending (exc. government guarantees) to GDP	35	7.04	4.11	-4.91	50	3.52	2.49
Government guarantees (%GDP)	35	5.71	6.25	-5.56	50	0.65	1.36
Healthcare spending (%GDP)	25	0.81	0.72	-1.68	27	0.54	0.42
Households spending (%GDP)	24	2.44	1.67	-4.01	28	1.07	0.64
Business spending (%GDP)	25	3.62	2.72	-3.71	24	1.40	1.13
Panel C: Monetary variables							
Interest rate - level	35	0.47	0.88	4.88	50	5.71	6.30
Interest rate - change	35	-0.31	0.51	-3.51	50	-0.86	0.83
Panel D: Nonconventional monetary variables							
Central bank guarantees (%GDP)	35	2.19	2.03	-2.78	50	0.88	2.20
Asset purchases (%GDP)	35	4.36	3.13	-7.99	50	0.53	1.10
Reserve requirements, Dummy	35	0.09	0.28	2.62	50	0.32	0.47
Repo operations, Dummy	35	0.29	0.46	0.33	50	0.32	0.47
Macroprudential policy, Dummy	35	1.00	0.00	-5.40	50	0.54	0.50
Dividend distribution, Dummy	35	0.71	0.46	-6.15	50	0.16	0.37
Easing lending requirements, Dummy	35	0.86	0.36	0.04	50	0.86	0.35
Panel E: Exchange rate							
Exchange rate (%GDP)	35	2.02	3.57	-2.69	50	0.56	1.19

Note: This table presents the summary statistics for advanced economies versus emerging market and developing economies. We use the IMF's definition of advanced economies versus emerging market and developing economies. Panel A reports summary statistics for the Covid-19 cases as a measure of how much a country was affected by the pandemic. Panel B reports the fiscal policy tools that were implemented due to the Covid-19 crisis. Panel C reports the monetary interest rate tool that was changed due to the crisis, and the level of interest rate before the Covid-19 crisis. Panel D reports the change in the number of nonconventional monetary policy tools implemented due to the crisis. Panel E reports the change in the exchange rate policy tool implemented due to the Covid-19 pandemic.

Table 5

The determinants of fiscal policy spending.

	Dependent variable: fiscal policy as a percentage of GDP									
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP per capita, log	1.501***						1.666***	2.119***	1.262**	2.027**
	(0.254)						(0.587)	(0.707)	(0.490)	(0.774)
Population, log		-0.124					-0.045	0.292	-0.067	0.287
		(0.253)					(0.168)	(0.270)	(0.159)	(0.273)
Debt to GDP			0.033				0.040**	0.052***	0.015	0.046**
			(0.022)				(0.018)	(0.012)	(0.012)	(0.018)
Covid-19 cases, log				0.647***			-0.381	-0.241	-0.094	-0.176
				(0.163)			(0.328)	(0.332)	(0.258)	(0.367)
Credit rating					0.414***		0.321***	0.487***	0.267***	0.474***
					(0.073)		(0.104)	-0.127	(0.090)	(0.122)
Government expenditure to GDP						0.064*	-0.106**	0.031	-0.079**	0.038
						(0.032)	(0.041)	(0.051)	(0.038)	(0.051)
Constant	-9.226***	7.014*	3.049**	1.294	-1.056	2.869**	-11.488**	-26.988***	-7.733*	-26.134***
	(2.209)	(4.043)	(1.203)	(0.977)	(0.979)	(1.135)	(5.304)	(7.746)	(4.557)	(8.553)
Observations	85	85	85	85	80	85	80	80	79	79
R-squared	0.271	0.004	0.103	0.117	0.237	0.034	0.481	0.563	0.422	0.530

Note: This table presents the results from regressions of fiscal spending as a percentage of GDP on a battery of macro-economic variables. The dependent variable is the ratio of fiscal spending (excluding government guarantees) to GDP. The first six columns report results from univariate regressions of fiscal spending on macro variables. Column 7 reports results from a multivariate regression that includes all six variables used in columns 1-6. Column 8 uses a broader definition of fiscal policy that includes government guarantees as the dependent variable. Columns 9 and 10 report results from multivariate regressions shown in columns 7 and 8, respectively, but exclude Japan from the sample. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 6

The determinants of fiscal policy spending for businesses.

	Dependent variable: fiscal spending for businesses as a percentage of GDP						
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP per capita, log	0.763***						-0.737
	(0.230)						(0.578)
Population, log		-0.211					-0.318*
		(0.183)					(0.182)
Debt to GDP			0.008				0.022**
			(0.013)				(0.010)
Covid-19 cases, log				0.357**			-0.119
				(0.138)			(0.210)
Credit rating					0.249***		0.487***
					(0.061)		(0.115)
Government expenditure to GDP						0.026	-0.043
						(0.028)	(0.028)
Constant	-5.037**	5.836*	1.930***	0.240	-1.460*	1.506	8.240
	(2.072)	(3.107)	(0.656)	(0.725)	(0.794)	(0.989)	(5.327)
Observations	48	48	48	48	47	48	47
R-squared	0.205	0.029	0.013	0.117	0.296	0.021	0.410

Note: This table presents the results from regressions of fiscal spending for businesses as a percentage of GDP on a battery of macro-economic variables. The dependent variable is the fiscal spending for businesses as a percentage of GDP. The first six columns report results from univariate regressions of fiscal spending on macro variables. Column 7 reports results from a multivariate regression that includes all six variables used in columns 1-6. The regressions reported in this table exclude Japan from the sample. There are 48 countries for which we have detailed information on fiscal spending for businesses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 7

The determinants of the change in monetary policy.

	Dependent variable: change in the interest rate (in absolute values)							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita, log	-0.089							-0.040
	(0.076)							(0.179)
Population, log		0.115**						0.068
		(0.049)						(0.045)
Debt to GDP			-0.004					-0.002
			(0.003)					(0.003)
Covid-19 cases, log				-0.035				0.107
				(0.041)				(0.076)
Credit rating					-0.042**			0.010
					(0.021)			(0.034)
Government expenditure to GDP						-0.021***		-0.020**
						(0.007)		(0.008)
Interest rate - level							0.058***	0.071***
							(0.021)	(0.025)
Constant	1.479*	-1.240	0.849***	0.838***	1.268***	1.341***	0.430***	-0.346
	(0.757)	(0.778)	(0.173)	(0.264)	(0.349)	(0.287)	(0.073)	(1.363)
Observations	84	84	84	84	79	84	84	79
R-squared	0.022	0.070	0.022	0.008	0.057	0.088	0.176	0.345

Note: This table presents the results from regressions of the change in the central bank interest rate on a battery of macro-economic variables. The dependent variable is the change in the central bank interest rate (in absolute value). The first seven columns report results from univariate regressions of monetary policy on macro variables. Column 8 reports results from a multivariate regression that includes all seven variables used in columns 1-7. The regressions reported in this table exclude Japan from the sample. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 8

Government guarantees as a percentage of GDP, by country.

Country	Government guarantees (% GDP)	Scope of the guarantees
Italy	25	70-90
Germany	23	80-90
Czech Republic	16	80-90*
United Kingdom	14	80
France	14	80
Luxembourg	13	85
Belgium	11	80
Colombia	7	60
Spain	7	60-80
Austria	7	80
Malta	6	90**
New Zealand	6	80
Ireland	5	80
Switzerland	5	85-100
Australia	4.5	50
Slovenia	4.5	80
Estonia	4.5	90
Finland	4	50-80

Note: This table presents the relative size of government guarantees for the countries with the 18 largest government guarantees programs relative to their GDP. The table reports the share of government guarantees to GDP as well as the scope of the coverage of these guarantees – relative to the loan amount. * limited to 30 percent of the entire loan portfolio, ** limited to 50 percent of the entire loan portfolio.

Table 9

The effect of the level of interest rates on the size of the fiscal package.

	Dependent variable: fiscal spending as a percentage of GDP			
Variables	(1)	(2)	(3)	(4)
GDP per capita, log	1.513***	1.138**	1.293***	1.322***
	(0.403)	(0.437)	(0.454)	(0.454)
Covid-19 cases, log	-0.192	-0.146	-0.075	-0.075
	(0.269)	(0.273)	(0.261)	(0.262)
Debt to GDP		0.007	0.016	0.016
		(0.012)	(0.012)	(0.012)
Credit rating		0.243***	0.290***	0.287***
		(0.088)	(0.085)	(0.084)
Government expenditure to GDP			-0.079**	-0.073*
			(0.037)	(0.043)
Interest rate - level	-0.050	0.034	0.043	0.036
	(0.032)	(0.042)	(0.046)	(0.048)
interest rate<1%, dummy				-0.298
				(0.974)
Constant	-8.252***	-9.293***	-9.768***	-10.081***
	(2.717)	(2.978)	(3.012)	(3.132)
Observations	84	79	79	79
R-squared	0.320	0.381	0.424	0.425

Note: this table presents the results from regressions of fiscal spending as a percentage of GDP on several macro-economic variables. The dependent variable is the ratio of fiscal spending (excluding government guarantees) to GDP. In column 4 we add to the regression a dummy variable that equals to one for countries with an interest rate below 1% and zero otherwise. We use this specification to capture the differential effect of near-zero interest rates on fiscal policy. The regressions reported in this table exclude Japan from the sample. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 10

The effect of the level of interest rates on the size of the fiscal package (including government guarantees).

Dependent variable: fiscal spending (including government guarantees) as a percentage of GDP				
Variables	(1)	(2)	(3)	(4)
GDP per capita, log	2.716***	2.806***	1.856**	1.597**
	(0.602)	(0.593)	(0.742)	(0.739)
Covid-19 cases, log	-0.126	-0.236	-0.211	-0.209
	(0.352)	(0.366)	(0.385)	(0.392)
Debt to GDP		0.034*	0.049**	0.045***
		(0.019)	(0.019)	(0.017)
Credit rating			0.495***	0.519***
			(0.159)	(0.150)
Government expenditure to GDP			0.033	-0.016
			(0.052)	(0.064)
Interest rate - level	-0.171***	-0.156***	-0.023	0.044
	(0.057)	(0.051)	(0.078)	(0.072)
interest rate<1%, dummy				2.690*
				(1.551)
Constant	-16.788***	-18.988***	-19.781***	-16.961***
	(4.089)	(4.355)	(4.808)	(4.737)
Observations	84	84	79	79
R-squared	0.425	0.455	0.524	0.548

Note: this table presents the results from regressions of fiscal spending (including government guarantees) as a percentage of GDP on several macro-economic variables. The dependent variable is the ratio of fiscal spending (including government guarantees) to GDP. In column 4 we add to the regression a dummy variable that equals to one for countries with an interest rate below 1% and zero otherwise. The regressions reported in this table exclude Japan from the sample. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 11

The effect of the level of interest rates on the size of the fiscal package for businesses.

Dependent variable: fiscal spending for businesses as a percentage of GDP			
Variables	(1)	(2)	(3)
GDP per capita, log	0.798*	0.810*	-0.866
	(0.401)	(0.435)	(0.610)
Covid-19 cases, log	-0.108	-0.130	-0.125
	(0.207)	(0.227)	(0.220)
Debt to GDP		0.005	0.023**
		(0.013)	(0.010)
Population, log		-0.036	-0.287
		(0.222)	(0.209)
Credit rating			0.505***
			(0.125)
Government expenditure to GDP			-0.057
			(0.038)
Interest rate - level	-0.056	-0.048	-0.006
	(0.077)	(0.098)	(0.096)
interest rate < 1%, dummy			0.585
			(0.823)
Constant	-4.605	-4.294	8.949
	(3.184)	(4.182)	(5.492)
Observations	48	48	47
R-squared	0.213	0.218	0.420

Note: This table presents the results from regressions of fiscal spending for businesses as a percentage of GDP on several macro-economic variables. In column 3 we add to the regression credit rating, government expenditure to GDP, and a dummy variable that equals to one for countries with an interest rate below 1% and zero otherwise. We use this specification to capture the differential effect of near-zero interest rates on fiscal policy. The regressions reported in this table exclude Japan from the sample. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 12

The effect of interet rate level on implementing nonconventional monetary policy.

Variables	Central bank guarantees to GDP	Asset purchases	Reserve requirements, dummy	Repo operations, dummy	Macro prudential policy, dummy	Dividend distribution, dummy	Easing lending requirements	Exchange rate to GDP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita, log	-0.071	0.327	0.008	-0.019	0.182***	0.009	-0.124**	1.279***
	(0.247)	(0.336)	(0.066)	(0.081)	(0.067)	(0.068)	(0.056)	(0.478)
Covid-19 cases, log	0.041*	0.071**	-0.005	-0.007	0.000	0.013**	0.005	-0.059
	(0.021)	(0.028)	(0.005)	(0.006)	(0.004)	(0.005)	(0.004)	(0.051)
Government exp. to GDP	0.206	0.109	0.006	0.051	-0.058	0.027	0.066*	-0.278
	(0.213)	(0.208)	(0.034)	(0.053)	(0.045)	(0.048)	(0.036)	(0.230)
Interest rate - level	-0.064***	-0.111***	0.023***	-0.007	-0.021***	-0.014**	0.006*	-0.002
	(0.022)	(0.038)	(0.006)	(0.006)	(0.007)	(0.006)	(0.003)	(0.028)
Constant	-0.225	-3.563	0.204	0.445	-0.588	-0.225	1.470***	-7.395***
	(1.594)	(2.217)	(0.442)	(0.487)	(0.486)	(0.446)	(0.309)	(2.788)
Observations	85	85	85	85	85	85	85	85
R-squared	0.154	0.302	0.110	0.038	0.252	0.203	0.076	0.164

Note: this table presents the results of regressions of various measures of non-conventional monetary policy on log GDP per capita, Covid-19 cases, government expenditure to GDP, and the central bank interest rates. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table A.1   Robustness Tests of the Effects of Debt-to-GDP on Fiscal Spending.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable: fiscal spending as a percentage of GDP										
GDP per capita, log	1.510***	1.138**	0.990**	0.990**	0.990**	1.691***	1.322***	1.176***	1.176**	1.176**
	(0.549)	(0.437)	(0.403)	(0.447)	(0.463)	(0.539)	(0.454)	(0.424)	(0.569)	(0.458)
Covid-19 cases, log	-0.496	-0.146	-0.069	-0.069	-0.069	-0.356	-0.075	0.009	0.009	0.009
	(0.376)	(0.273)	(0.259)	(0.274)	(0.241)	(0.326)	(0.262)	(0.248)	(0.272)	(0.234)
Debt to GDP	0.033*	0.007	-0.002	-0.002	-0.002	0.042**	0.016	0.008	0.008	0.008
	(0.019)	(0.012)	(0.012)	(0.013)	(0.013)	(0.018)	(0.012)	(0.012)	(0.013)	(0.012)
Credit rating	0.302***	0.243***	0.271***	0.271***	0.271***	0.356***	0.287***	0.317***	0.317***	0.317***
	(0.094)	(0.088)	(0.087)	(0.092)	(0.102)	(0.095)	(0.084)	(0.084)	(0.099)	(0.114)
Government exp. to GDP						-0.104**	-0.073*	-0.075*	-0.075	-0.075
						(0.047)	(0.043)	(0.043)	(0.048)	(0.048)
Interest rate - level	0.048	0.034	0.048	0.048	0.048	0.055	0.036	0.049	0.049	0.049
	(0.042)	(0.042)	(0.042)	(0.057)	(0.069)	(0.050)	(0.048)	(0.049)	(0.126)	(0.074)
interest rate<1%, dummy						-0.155	-0.298	-0.350	-0.350	-0.350
						(1.005)	(0.974)	(0.985)	(1.059)	(1.142)
Constant	-13.057***	-9.293***	-8.381***	-8.381**	-8.381**	-13.398***	-10.081***	-9.192***	-9.192**	-9.192***
	(3.944)	(2.978)	(2.873)	(3.209)	(3.672)	(3.819)	(3.132)	(3.015)	(4.371)	(3.363)
Observations	80	79	78	78	78	80	79	78	78	78
R-squared	0.426	0.381	0.397	0.397	0.397	0.485	0.425	0.445	0.445	0.445

Note: this table presents the results from regressions of fiscal spending as a percentage of GDP on several macro-economic variables. The dependent variable is the ratio of fiscal spending (excluding government guarantees) to GDP. In column 2 we exclude Japan. In column 3 we exclude Japan and Greece. In columns 4 and 5 we report standard errors that were calculated with jackknife and bootstrap procedures, respectively. In column 6 we add to the regression government expenditure to GDP and a dummy variable that equals to one for countries with an interest rate below 1% and zero otherwise. In column 7 we use the same specification as in column 6 but exclude Japan. In column 8 we exclude Japan and Greece. In columns 9 and 10 we use the same specification as in column 8 with jackknife and bootstrap standard errors, respectively. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table A.2   Robustness Tests of the Effects of Debt-to-GDP on Fiscal Spending (including government guarantees).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable: fiscal spending (including government guarantees) as a percentage of GDP										
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP per capita, log	2.968***	2.806***	2.837***	2.837***	2.837***	1.676**	1.597**	1.626**	1.626*	1.626
	(0.548)	(0.593)	(0.615)	(0.666)	(0.781)	(0.692)	(0.739)	(0.790)	(0.951)	(1.007)
Covid-19 cases, log	-0.356	-0.236	-0.265	-0.265	-0.265	-0.269	-0.209	-0.225	-0.225	-0.225
	(0.328)	(0.366)	(0.390)	(0.416)	(0.470)	(0.358)	(0.392)	(0.423)	(0.468)	(0.491)
Debt to GDP	0.042***	0.034*	0.038	0.038	0.038	0.050***	0.045***	0.046**	0.046*	0.046**
	(0.014)	(0.019)	(0.024)	(0.026)	(0.024)	(0.011)	(0.017)	(0.021)	(0.024)	(0.023)
Credit rating						0.534***	0.519***	0.513***	0.513***	0.513***
						(0.155)	(0.150)	(0.159)	(0.174)	(0.190)
Government exp. to GDP						-0.022	-0.016	-0.016	-0.016	-0.016
						(0.063)	(0.064)	(0.064)	(0.068)	(0.064)
Interest rate - level	-0.156***	-0.156***	-0.157***	-0.157**	-0.157*	0.048	0.044	0.042	0.042	0.042
	(0.051)	(0.051)	(0.052)	(0.073)	(0.088)	(0.072)	(0.072)	(0.075)	(0.156)	(0.114)
interest rate<1%, dummy						2.721*	2.690*	2.700*	2.700	2.700
						(1.543)	(1.551)	(1.563)	(1.644)	(1.721)
Constant	-20.267***	-18.988***	-19.283***	-19.283***	-19.283***	-17.674***	-16.961***	-17.138***	-17.138***	-17.138**
	(3.950)	(4.355)	(4.594)	(5.053)	(5.800)	(4.346)	(4.737)	(5.024)	(6.465)	(6.896)
Observations	85	84	83	83	83	80	79	78	78	78
R-squared	0.491	0.455	0.453	0.453	0.453	0.580	0.548	0.545	0.545	0.545

Note: this table presents the results from regressions of fiscal spending (including government guarantees) as a percentage of GDP on several macro-economic variables. The dependent variable is the ratio of fiscal spending (including government guarantees) to GDP. In column 2 we exclude Japan. In column 3 we exclude Japan and Greece. In columns 4 and 5 we report standard errors that were calculated with jackknife and bootstrap procedures, respectively. In column 6 we add to the regression credit rating, government expenditure to GDP, and a dummy variable that equals to one for countries with an interest rate below 1% and zero otherwise. In column 7 we exclude Japan. In column 8 we exclude Japan and Greece. In columns 9 and 10 we use the same specification as in column 8 with jackknife and bootstrap standard errors, respectively. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.