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What Policy Combinations Worked?

The Effect of Policy Packages on Bank Lending during COVID-19

Divya Kirti, Soledad Martinez Peria, Prachi Mishra, and Jan Strasky

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What Policy Combinations Worked? The Effect of Policy Packages on Bank Lending during COVID-19

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ABSTRACT: This paper analyzes the impact of fiscal, monetary, and prudential policies during the COVID-19 pandemic on bank lending across a broad sample of countries. We combine a comprehensive announcement-level dataset of policy actions with bank and firm-level information to analyze the effectiveness of different types of policies. We document that different types of policies were introduced together and hence accounting for policy combinations, or packages, is crucial. Lending grew faster at banks in countries that announced packages combining fiscal, monetary, and prudential measures relative to those that relied on some, but not all, policy dimensions. Within packages including all three types of policy measures, banks in countries with more and larger measures saw faster loan growth. The impact was larger among more constrained banks with low equity levels. Large packages combining fiscal, monetary and prudential policies also increased liquidity for bank dependent firms, but did not disproportionately benefit unviable firms.

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I - Introduction

The onset of the COVID-19 pandemic triggered a dramatic—and somewhat peculiar—global economic downturn. From a macroeconomic perspective, countries faced rapid, sharp negative supply and demand shocks simultaneously. Deep uncertainty was another defining feature of the shock. Countries responded with unprecedented economic and financial policies.

Given the regulatory reforms implemented after the 2008 Global Financial Crisis, banks generally entered the crisis in good shape.[1] Nevertheless, many policy actions taken in response to the pandemic either directly targeted the banking sector or had the potential to affect it: monetary policy was loosened; direct fiscal support was provided to firms and households; public guarantee programs were either put in place or ramped up significantly; capital buffers were released and other prudential measures were relaxed.

Countries' policies adopted during the pandemic had the potential to shape banks' lending decisions in several ways. First, policies may have directly shifted banks' incentives to lend at the margin. This includes policies with the potential to lower the probability of defaults of borrowers (such as direct transfers and tax relief or deferrals to firms and households), reduce expected losses in the case of defaults (such as credit guarantees), or lower the cost of funding (both conventional and unconventional monetary policies). Second, policies may have changed the tightness of constraints faced by banks. This includes policies that increased balance sheet capacity to lend (via temporary relaxations of capital, provisioning, or liquidity requirements) or otherwise affected bank balance sheets (restrictions on dividend distributions). Third, monetary and fiscal policies could also have had significant effects on bank lending by changing the demand for credit. Hence, in assessing the impact of policies on bank lending, it is important to take a broad approach that accounts for countries' actions in each of these areas. Furthermore, because the impact of policies likely varied depending on banks' capacity to lend at the start of the pandemic, considering the interaction of countries' policies with pre-crisis bank characteristics, and in particular equity, is also relevant.

This paper provides a comprehensive assessment of the effectiveness of economic and financial policies in supporting bank lending during the first year of the pandemic. We rely on a granular new dataset detailing policy actions taken by countries to respond to COVID-19 (Kirti et al., 2022). Unique features of this dataset include a careful classification of policies by type (e.g., fiscal, monetary, and prudential policies at a broad level, with more detailed information on policy tools within each category), announcement dates, and important characteristics including measures of size of policies and programs. We combine this policy announcement dataset with quarterly bank-level information across 49 countries to examine the behavior of bank lending during 2020 in response to these policy measures. To support our analysis at the bank level, we collect quarterly firm-level data across 39 countries and examine whether countries' COVID-19 policies translated into additional liquidity support for non-financial firms during the same period.

In assessing the impact of policies during COVID-19 on bank lending, it is crucial to account for how policies were combined. Ideally, the granular data on policies and bank lending we work with would allow us to trace which individual policies were effective, helping inform how policymakers should approach future crises. However, as the scale of the potential economic impact of the health shock became clear, many different

[1] There are exceptions, of course, as in the case of some countries dealing with legacy asset quality concerns (e.g., Ukraine) or rising NPLs even prior to the pandemic (India and China to some extent).

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types of policies were introduced simultaneously. Over the course of 2020, more than 80 percent of country-quarters in our sample include a combination of more than one of fiscal, monetary, or prudential policies that we refer to as “packages”. Even with more granular policy classifications and at higher frequencies, policies were introduced in combinations (Kirti et al., 2022). Therefore, empirically assessing the effectiveness of policies in this episode necessarily requires recognizing policy combinations or packages. Doing so is one of the key contributions of this paper.

We find that lending grew faster among banks in countries that adopted packages combining fiscal, monetary, and prudential measures, relative to those that implemented some, but not all, of these policies. Moreover, loan growth was faster the larger the number and size of policies in packages combining all three types of measures. Both the scope and size of policy packages are critical: packages combining all policies, but where only some were large, were less effective.

At the most granular level, we find that grants, credit facilities, and relaxations of capital requirements were more frequently employed tools in packages combining large policies on all dimensions, while equity injections, FXI and reserve requirements were less prevalent. Importantly, each of the 28 granular policy tools we observe were more prevalent in these broad and large—and successful—packages, compared to their frequency in other packages.

Across banks, the impact of policies was larger for banks that were a priori more constrained to lend due to low equity levels. These findings suggest that binding constraints and factors affecting banks’ marginal incentives to lend were jointly relevant in holding back credit growth.

Our bank-level results are robust to alternative definitions of large policies, controlling for base effects in credit, different estimation methodologies, and focusing on measures of packages that highlight the importance of new policy announcements rather than the stock of existing policies.

Consistent with our results at the bank level, we find that packages combining all of fiscal, monetary, and prudential measures helped provide bank-dependent firms with additional liquidity to allow them to stay afloat and pay their expenses while pandemic-linked health measures constrained their ability to generate revenue. Within bank-dependent firms, we do not find differential effects in the extent to which liquidity was available to firms displaying poor pre-pandemic performance. While COVID-19 economic and financial policy packages were generally not narrowly targeted, this latter evidence suggests that policy support at least did not disproportionately benefit unviable firms.

This paper makes an important contribution to the literature analyzing the combined impact and interaction of policies during crises. A growing number of studies examine the impact of policy measures adopted in response to COVID-19 on corporate stock returns (Alfaro et al. 2020, Capelle-Blancard and Desroziers, 2020, Cox et al., 2020, ElFayoumi and Hengge, 2021), corporate insolvencies (Gourinchas et al., 2022, Demmou et al. 2021, Guerini et al. 2020), listed firms’ performance (Igan et al., 2021), employment (Autor et al., 2020; Granja et al., 2020; Hubbard and Strain, 2020), and bank equity prices (Demirguc-Kunt et al., 2020, Valencia et al., 2021). Another strand of the literature focuses more specifically on bank lending but typically examines specific policies, predominantly in the U.S. This literature includes studies on the impact of the Paycheck Protection Program (Granja et al., 2020; Bartik et al., 2021; Berger et al., 2021; Beck and

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Keil, 2021).[2] Other studies, typically focused on individual countries, examine the impact of guarantees (see Cascarino et al., 2022 for Italy, Jiménez et al., 2022 for Spain, Altavilla et al., 2021 for several euro area economies) or countercyclical capital buffer releases (BSBS 2021; Couaillier et al. 2022) on bank lending.[3] In addition, there are also case studies looking at the effects of multiple Covid-19 policies on bank lending for a specific country, such as Acosta-Henao et al. (2022) for Chile.[4]

However, evidence on the impact of different COVID-19 policies on bank lending across countries, and on how policies of different types interact more generally, remains scarce.[5] Some work, mostly calibrated from past episodes, has been conducted in the context of the euro area. Altavilla et al. (2020a) study the impact of credit facilities and changes in capital requirements adopted in the past and assess the overall effects on lending by euro area banks by calibrating the parameters of their model using detailed information on pandemic responses. Using a semi-structural model developed at the ECB, Budnik et al. (2021) study the impact of macroprudential and fiscal policies (but not monetary policies) adopted in the Euro Area to support bank lending during the first half of 2020 and conclude that the measures likely helped to maintain higher lending to the nonfinancial private sector. Casanova, Hardy and Onen (2021) empirically examine how changes in banks' lending capacity—which they attribute to (but do not directly link with) policy measures—affected loan growth during the pandemic. They also examine the response of bank lending to the size of loan guarantee programs and find a positive association. We contribute to this literature by examining the impact of policy combinations or packages adopted by countries during COVID-19. To our knowledge, we are the first to study interactions across fiscal, monetary and macro prudential policies on bank lending, particularly in the context of a global economic crisis.

The remainder of the paper is organized as follows. Section II describes the data used and provides stylized facts about the behavior of bank lending and the policy measures implemented in response to the pandemic. Section III discusses the empirical methodology adopted to examine the impact of policies on bank lending and Section IV presents these results. Section V concludes.

II - Data

We assemble and use three main datasets. First, we obtain bank balance sheet and income statement data at a quarterly frequency from S&P Capital IQ Pro. The bank-level dataset includes roughly 1,500 banks operating in 49 countries: 18 advanced economies (AEs) and 31 emerging and developing countries

[2] There is a separate literature analyzing the use of the pre-existing credit lines (Acharya and Steffen, 2020; Chodorow-Reich et al., 2021; Greenwald et al., 2020; Li, Strahan and Zhang, 2020) at the start of the pandemic.

[3] This work on guarantees in individual countries often also examines impact (e.g., net additional credit accounting for any loans repaid) at the firm level.

[4] Several studies focusing on the pre-pandemic period consider the effectiveness of individual policies—monetary, fiscal, or prudential—used in response to economic and financial crises, often in specific countries. See for example, Caldara et al. (2020), IMF (2009), and Potter and Smets (2019).

[5] One area that has received some attention (although not specifically during crises) is the interaction of monetary policy with macroprudential policy (see Bruno et al. 2017; Gambacorta and Murcia 2017; Takats and Temesvary 2019; Altavilla, Laeven, and Peydro 2020).

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(EMDEs).[6] The main variable of interest from this dataset is net customer loans. Figure 1 shows the distribution of quarterly growth of net customer loans across countries for 2019Q4-2021Q1. There is a marked decline in quarterly loan growth across all countries at the start of the pandemic, followed by a steady recovery. Second, we obtain quarterly firm-level data for about 6,200 firms operating in 39 countries. Importantly, in addition to standard balance sheet variables like assets and debt and income statement variables like revenues, expenses, and net income, we observe the quantity of debt from banks.

Figure 2 compares the level of lending during 2020 to pre-pandemic levels (indexed to the last quarter of 2019). The figure shows a significant decline in lending during 2020Q1 for countries in the bottom quartile of the sample, a very small drop for the median country, and practically no change for countries in the top quartile of the sample. For countries above the median of the distribution, lending recovered quickly and exceeded pre-pandemic levels, while for countries below the 25th percentile, credit had barely recovered to pre-crisis levels even by the end of 2020. This suggests significant heterogeneity across countries and banks in terms of lending behavior and potentially their response to policies. The goal of this paper is to evaluate whether policies played a role in explaining the variation in credit across countries, banks, and over time.

To understand the role of policies in explaining developments in bank credit, our final dataset is a new comprehensive announcement-level panel dataset that tracks fiscal, monetary, and prudential policy responses to COVID-19 at a daily frequency and granular level (see Kirti et al. 2022). The database provides detailed information for 28 granular policies, (including information on their sizes where available), adopted by 74 countries during 2020 (Kirti et al. 2022). It is built starting from the IMF's Policy Tracker—which draws on the institution's regular surveillance activities and provides an account and summary of the main policies that countries adopted in response to COVID-19—combined with information from several additional sources including other existing trackers, government websites, news reports, and various reports from government agencies or the private sector. Overall, merging information and cross-checking facts from a series of alternative sources helps to provide a more comprehensive and accurate description of the policy announcements in response to COVID-19. In the analysis that follows, the focus is on the 49 countries for which we have quarterly bank-level data as well as information on the policies adopted in response to COVID-19.

The policies are categorized into three broad groups: fiscal, monetary, and prudential. Fiscal policies include direct support to households and firms (in the form of grants, tax relief, tax deferral and equity participation) as well as public guarantees and loans. We also include moratoria among these policies. Monetary policies include both conventional (changes in interest rates and reserve requirements) and unconventional measures (asset purchases) along with lending operations. Prudential policies include measures targeted at relaxing capital constraints of banks (e.g., macroprudential buffers), and non-capital measures such as those related to lending standards and supervisory expectations.

[6] The following AEs: Austria, Canada, Czech Republic, Denmark, Estonia, Finland, France, Israel, Italy, Japan, South Korea, Latvia, Norway, Portugal, Spain, Sweden, United Kingdom, United States; and EMDEs: Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Ghana, India, Indonesia, Kuwait, Kyrgyzstan, Malaysia, Mauritius, Mexico, Morocco, Nepal, Nigeria, Oman, Pakistan, Panama, Philippines, Poland, Qatar, Russia, Saudi Arabia, Sri Lanka, Thailand, Turkey, Ukraine, United Arab Emirates, Vietnam are included in our sample.

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Figure 3 shows the frequency of different combinations of these policies announced by the 49 countries in our data during 2020. A key stylized fact that emerges from the data is that announcements were highly correlated across the three groups of policies. About 90 percent and 70 percent of countries used all three of fiscal, monetary, and prudential policies simultaneously in the first and second quarters, respectively.[7] In later quarters, we find more variation, with only about 25 percent of countries using all three types of policies in the fourth quarter of 2020.

The count of policies can approximate the intensity with which packages were used across countries. This proxy for importance can be constructed even where information on sizes is not available. We construct the count as the number of individual policy announcements within each package. Figure 4 shows how the average count of policies varied across packages by quarter of announcement (Panel A). Even though the average number of policies declined in the course of 2020 for most packages, the rate of decrease clearly varies across the combinations of policies. Figure 4 also shows an upward-sloping relationship between the number of fiscal policies, for which sizes are consistently available, and their cumulative size for each country measured as a fraction of 2019 GDP (Panel B).

To assess whether large policies are more effective we construct dummies for large policy announcements for policy types where we have consistent information on sizes.[8] Figure 5 illustrates the distributions of sizes for these policies and the threshold we use to delineate large policies. For both fiscal policy (above the line measures, and loans and contingent liabilities) and monetary policy (asset purchases and rate cuts) measures, we define large policies as those with sizes above the 90th percentile of announced measures observed in our data at the country-quarter level. Sizes for fiscal policies and unconventional monetary policy are measured relative to 2019 GDP. For monetary policy rate cuts, we focus on the size of cuts relative to the level of rates at the end of 2019 (excluding one instance of a rate cut smaller than 50 basis points that would otherwise be classified as large).

III - Empirical Methodology

Bank-level analysis

As we observed in Figure 3, countries tended to introduce different policies simultaneously. Standalone policy announcements are rarely observed in the data. This makes it challenging to isolate the impact of specific policies on outcomes, and more appropriate to analyze the effect of combinations of policies. To examine the association between combinations of policy measures and credit at the bank level, we begin by estimating Equation (1):

$$\Delta \ln(L)_{b,c,q} = \alpha P_{c,q-1} + \delta Country\ controls_{c,q} + \gamma X_{b,q} + \beta_b + \varepsilon_{b,c,q} \quad (1)$$

[7] The high correlation of announcements across policies is also present at higher frequencies: packages spanning more than one policy category represent the majority of announcements in the weeks of March and April 2020; see Appendix Figure A1.

[8] For some types of policies—particularly prudential policies—it is challenging to assign sizes. Restrictions on dividend payments, for example, are difficult to quantify. For specifications where we rely on sizes in other dimensions, we include robustness using the count of prudential policies as a proxy for sizes.

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where $\Delta \ln(L)_{b,c,q}$ is the quarter-on-quarter log change in lending by bank b in country c during quarter q. $P_{c,q-1}$ is a vector of policy packages, lagged by a quarter. We term a specific combination of policies observed in the data as a "policy package". Each policy package is defined by a matrix of dummies equal to one for countries and periods where that package is announced. Alternatively, we also use counts of policies to define a package by computing the sum of the number of individual policy announcements (scaled by the number of broad policy groups) in each package in that country-quarter.[9] Using information where sizes are available, we also estimate (1) to separately assess the effect of packages including large policies.

$Country\ controls_{c,q}$ includes indicators of health-related developments (as measured by the cumulative number of COVID-19 cases per million), financial stress (captured by sovereign bond spreads), the intensity of the economic shock (measured by quarterly revisions in confidential IMF forecasts of GDP growth for the duration of the crisis), and measures of de facto mobility (based on data from Google).[10] β_b represent bank-level fixed effects and $X_{b,q}$ are bank-level characteristics that can affect bank lending (e.g., bank size, capitalization, asset and liability composition). As we work with short time series, we cluster standard errors by country.

Notably, our empirical methodology incorporates the following features: (i) specifications are estimated at the bank level while policies are adopted at the country-time level; (ii) policy combinations are lagged; and (iii) bank fixed effects and extensive country-time varying controls are included. Importantly, the use of lagged policy packages helps mitigate potential concerns about reverse causality. Indeed, if countries introduced policy packages in anticipation of poor subsequent outcomes, this would bias against finding a positive effect of policy packages in the subsequent quarter. As COVID-19 was a global shock that presented countries with highly multidimensional policy choices, alternative approaches such as reliance on other countries' choices as proxies or attempts to construct 'synthetic control' countries are difficult to justify and implement.

We also examine differences in effectiveness of policy packages across banks with different characteristics (ω_b), which allows us to include country x quarter fixed effects ($\theta_{c,q}$) to capture the impact of policies and macro variables as in (1), as well as to account for any potentially omitted country-time level variables that could influence both the policy response and the lending behavior of banks.

$$\Delta \ln(L)_{b,c,q} = \tilde{\alpha} P_{c,q-1} \times \omega_b + \tilde{\delta} Country\ controls_{c,q} \times \omega_b + \theta_{c,q} + \beta_b + \gamma X_{b,q} + \varepsilon_{b,c,q} \quad (2)$$

[9] For example, for a package combining fiscal and prudential policies, the count is divided by 2, while for a package combining all of fiscal, monetary, and prudential policies, the count is divided by 3.

[10] Our measure of financial stress relies on spreads of sovereign bond yields to US treasuries, using the level of yields for the US, and yields on regional JP Morgan Bond Indices where country specific yields are not available. Data on individual bond yields is from Bloomberg. Within each quarter, we calculate an average of the absolute and percent change in the yield spread from the start of the quarter to the peak. To measure the (expected) intensity of economic shock, we calculate the quarterly change in the forecasted sum of GDP in 2020 and 2021 relative to 2019 relying on confidential IMF forecasts. The measure of mobility is an average of the percent change in transit and workplace mobility indices from Google.

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In particular, in estimating equation (2), we examine the differential response to policies for banks with high and low equity (sorting banks based on whether their equity to asset ratio was above or below within-country median levels prior to the pandemic). Less well capitalized banks are relatively more constrained in their ability to lend, so a priori we would expect policies that support banks' ability to lend to have a larger impact on banks with lower levels of equity. This approach will naturally be more effective at isolating the impact of policies that differentially affect more constrained banks. By including $\tilde{\delta} Country\ controls_{c,q} \times \omega_{b,c}$, we allow for the possibility that the effect of country controls on bank lending also vary depending on banks' equity levels.

Firm-level analysis

Next, we conduct firm-level estimations to examine the extent to which policy packages helped firms stay afloat (and pay for their expenses) via a higher level of bank borrowing during the pandemic, reflecting the broad objective of economic and financial policies early on in the crisis. In particular, we employ firm-level data to examine the association between combinations of policy measures and $\Delta \ln(E)_{f,c,q}$, the quarter-on-quarter change in bank debt for firm f in country c during quarter q, as a fraction of the firm's pre-pandemic expenses, measured in 2019, in months. Expenses are calculated as total revenue minus net income of the firm. $\Delta \ln(E)_{f,c,q}$, captures the extent to which firms possessed sufficient liquidity to cover their expenses during the pandemic even in the absence of revenue due to needed but sweeping health measures.

We examine differences in effectiveness of policy packages across bank-dependent firms (ω_f) by estimating equation (3):

$$\Delta \ln(E)_{f,c,q} = \hat{\alpha} P_{c,q-1} \times \omega_f + \theta_{c,q} + \gamma X_{f,q} + \beta_f + \varepsilon_{f,c,q} \quad (3)$$

Bank dependent firm (ω_f) is defined by an indicator which takes the value of 1 if the firm is in the top quartile of the fraction of bank debt to total debt within country prior to the pandemic. $P_{c,q-1}$ is the vector of policy packages, lagged by a quarter, defined as before. $\hat{\alpha}$ captures the relative effectiveness for bank-dependent firms of policy package P in terms of the number of months the firm could survive with the additional liquidity provided by the policy package, if its expenses remained unchanged at pre-pandemic levels. The regressions include country-quarter and firm fixed effects, as well as time varying firm-level controls.

Finally, the firm-level analysis also allows us to trace differential effects of policy packages depending on firm quality. In particular, we ask whether policy packages *misallocated* resources to ex-ante low quality firms. We estimate Equation (4) to answer this question:

$$\Delta \ln(E)_{f,c,q} = \hat{\alpha} P_{c,q-1} \times \omega_f + \hat{\varphi} P_{c,q-1} \times \omega_f \times q_f + \theta_{c,q} + \gamma X_{f,q} + \beta_f + \varepsilon_{f,c,q} \quad (4)$$

Where q_f is defined by an indicator which takes the value of 1 if the firm is of low quality pre-Covid. Low quality is defined by the bottom quartile within country based on four different proxies, measured by averages over 2017-19. The four proxies include: interest coverage ratio, return on assets, book equity scaled by assets, and a distance to insolvency measure (Checo and Chen 2022). $\hat{\varphi}$ captures the relative effectiveness of policy package P for low quality bank dependent firms compared with that for high quality firms.

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IV – Results

Bank-level results

Table 1 shows the results from estimating Equation (1). We begin by assessing the impact of packages defined by broad policy categories: fiscal, monetary, and prudential policies. The dependent variable is quarterly growth in bank credit, while the explanatory variables include all packages (or combination of types of policies) observed in the data—fiscal only; fiscal, monetary, and no prudential; fiscal, prudential, and no monetary; and fiscal, monetary, and prudential (which we also refer to as the "all-three" package). The omitted category consists of packages with no fiscal, covering only about 5 percent of country-quarters, and country-quarters with no policies, covering an additional 4 percent of the sample. All specifications include bank fixed effects. Column 1 controls for bank characteristics that could affect the growth of loans: bank size, deposit to liability ratios, equity to asset ratios, and net customer loan to asset ratios. Column 2 adds health (cumulative COVID-19 cases) and mobility (de facto measures from Google) controls, while Column 3 also includes measures of economic and financial stress constructed based on revisions in IMF forecasts and sovereign spreads, respectively.

We find that announcements of packages that included fiscal, monetary, and prudential policies had a positive and significant impact on bank lending (Table 1). Though the degree of statistical significance for the estimated coefficient on the all-three package is reduced when we include economic and financial controls, it still remains significant at least at the 15 percent level. Based on Column 3, in the quarter following announcements of these policies, loan growth was approximately 300 basis points higher per quarter, relative to a no-policy or standalone policy (excluding fiscal only) counterfactual. These are large increases in loan growth in economic terms. To put them in context, note that in 2019, average quarterly loan growth in our sample was 200 basis points per quarter, with a standard deviation of 400 basis points. Policy packages with a combination of fiscal, monetary, and prudential policies, therefore, lifted loan growth by more than their pre-pandemic average levels, and by three-quarters of the pre-pandemic standard deviation.

Table 2 presents the results capturing the intensity of policy packages by counts of policies. The results are consistent with Table 1. Greater the intensity of the "all-three" package, more effective is the combination of fiscal, monetary, and prudential policies in enhancing bank credit. This effect is statistically distinguishable from zero, and higher than the effectiveness of other packages. Based on the estimates in Column 3 of Table 2, more intensive use of the all-three package by one unit (i.e., three additional announcements) is associated with a 44 basis point increase in quarterly credit growth. The effect is consistently significant at the 1 percent level across specifications.

In Table 3, we examine non-linearities in the effectiveness of packages in enhancing bank credit, based on whether the packages were large in size (a large package is defined as one where *at least* one granular policy within each sub-group of fiscal and monetary policies is large). As discussed in Section II, a granular policy is defined as large if its size lies in the top decile in the sample.[11]

[11] Size is defined as a percent of GDP wherever applicable. Large interest rate changes are calculated by taking the top quartile of changes relative to the initial level for the country. We discuss robustness to accounting for the inclusion of large prudential elements of packages based on the number of policies introduced below.

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We find that large-size packages with combinations of all three—fiscal, monetary, and prudential—measures were the most effective in enhancing bank credit. Based on Column 3, the estimated magnitude on "all-three-large" policies package is about seven and half times that from small packages. Loan growth was about 600 basis points higher in the quarter following announcements of a large package which included fiscal, monetary, and prudential policies.

While Table 3 establishes the importance of "all-three-large" packages (where at least one granular policy is large) in enhancing credit, it is not able to isolate the effects of other large packages, e.g., a package with only large size fiscal policies, which are rarely observed in the data. To allow splitting the all-three-large package into more granular bins, Table 4 relaxes the definition of a "large" size package, where a granular policy is defined as large if its size lies in the top quartile, tercile, and median in the sample (Columns 2, 3, and 4 respectively), rather than using the decile as the cutoff in Table 3. This allows us to distinguish the effects of all-three-large package from other combinations of large size policies. Indeed, the findings suggest that the combination of large monetary policies and large fiscal relaxations with prudential measures, was a particularly successful package in boosting credit by banks. Loan growth was 460 basis points higher in the quarter following announcements of a large package which included large changes in monetary policies, combined with large fiscal, and prudential policies. The estimated effectiveness of all-three-all-large package in enhancing credit is statistically and economically higher than the effect of other large packages, for example, almost four times the effect of a large fiscal-only package. Overall, the results further support our main finding that countries which were able to go "all out" both in terms of breadth and intensity of policies reported the biggest increases in credit growth following the COVID-19 shock.

The next natural question to ask is which granular policy measures were more prevalent in "all out" packages. At the most granular level we find that the large-all-three combinations were mostly unique; for example, among all 38 country-quarters with above median size of large fiscal, monetary policies, each granular combination of 28 policies occurred only once. That said, we do find that some granular policies were used more frequently than others (Figure 5). For example, grants were the most common fiscal measure, used in *all* successful packages, compared with only 60 percent of the time in other packages. In contrast, equity injections were the least prevalent. Within monetary policies, credit facilities, asset purchases, and policy rates were frequently used, whereas FXI and reserve requirements were less common. Finally, among prudential policies, relaxation of capital requirements, supervisory expectations, and reporting requirements were pervasive, whereas changes to guidance on underwriting were used less. Importantly, each of the 28 granular policy tools were more prevalent in successful packages, compared to their frequency in other packages (Figure 5), confirming our main finding of the effectiveness of all-out combinations at the most granular level.

The baseline results presented in Tables 1-4 are broadly robust to (i) dropping those country-bank-quarters with packages that do not contain any fiscal policies, reducing the sample by less than 2 percent (Table A1), (ii) including lagged credit growth as an additional explanatory variable to control for base effects (Table A2), (iii) using an alternative definition of large monetary policies, (Table A3), (iv) including large prudential policies using counts to define "large" (Table A4), (v) reweighting the sample to put equal weights on countries, and (vi) focusing on measures of packages that highlight the importance of new policy announcements rather than the stock of existing policies (Table A6).

Specifically, Table A1 shows that when the same policy packages as those in Table 3 are compared to a counterfactual of no policies (instead of considering either no policies or policy combinations not shown in Table 3), the main finding that large packages, combining fiscal, monetary, and prudential policies are the

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most significant in driving bank loan growth remains. Similarly, Table A2 allows us to confirm that our results survive once we control for base effects related to past credit growth. In Table A3, instead of including among the monetary policy actions changes in interest rates defined relative to their 2019 level, we present results considering the absolute change in interest rates and confirm that our main finding prevails. Because we do not have a measure of the size of prudential policies, in Table A4 we consider as a proxy the number of prudential policy actions. Our main results do not change in this case either. Table A5 shows that are results remain broadly similar if we reweight the sample to put equal weights on each country.

Finally, we explore whether the estimated effects capture the effect of "new" policy announcements, or policies that were already in place. While we do not have enough data to separate these effects at a quarterly level, we address this issue in Table A6, where we include dummies for weeks with combinations of one, two, or three policy announcement types. Figure A1 highlights that policies were frequently announced as packages even at a weekly frequency. We do find that credit growth was higher following quarters with more weeks of all-three package announcements compared to quarters with more standalone, or two policy combinations. Our results in Table 2 focusing on counts of policies also point to the impact of incremental policy announcements.

In principle, the impact of policies adopted in response to COVID-19 on bank lending could vary depending on bank characteristics. In particular, banks' capitalization could constrain their ability to lend and hence could affect their response to policies. We explore bank heterogeneity by estimating Equation (2). The inclusion of bank and country-quarter fixed effects also allows us to isolate better the impact of policies on bank lending. Table 5 reports the results. The first column focuses on package dummies without separating large packages, showing a statistically significant differential effect of packages combining all three types of policies for low-capital banks. The second column (as in Table 2) focuses on counts of policies in packages to capture the intensity of packages. Packages with greater intensity that combined all three types of policies drove stronger credit growth at less well capitalized banks. In the final column, we find that all-three-large combination was relatively more effective for low-capital banks, with the estimated loan growth 100 basis points larger for less well capitalized banks. Overall, these findings support the interpretation that packages which included fiscal, monetary, and prudential policies, and in particular all-three-large packages, were most effective in raising lending by banks which were more constrained in their ability to lend due to lower levels of equity. Table A7 shows that we obtain similar results splitting the specification in Table 3 by whether banks had above or below median capital levels.

Firm-level results

Next, we move to our firm-level analysis. The objectives of this analysis are to examine (a) which policy packages allowed firms to maintain sufficient liquidity (by raising bank debt) to meet their expenses and (b) the extent to which the impact of policies on liquidity was larger for low quality firms, providing evidence of misallocation. Table 6 reports firm-level results from estimating Equation (3). Column 1, and 2, include interactions of bank dependent firms with dummies for policy combinations, and counts of policies respectively. Column 3 reports the results for relative effectiveness of large size packages for bank dependent firms. The results suggest that announcements of packages that included fiscal, monetary, and prudential policies, were relatively more effective for bank-dependent firms. Greater the intensity of the "all-three" package, and larger the size, more effective these were for bank-dependent firms. The estimated coefficient, for example, on "L.Fiscal & monetary & prudential - Large x Bank dependent" in Column 3

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suggests that the “all-out” package provided enough extra liquidity for firms to survive two additional months relative to non-bank dependent firms, assuming its expenses did not change from pre-pandemic levels. Table A8 shows that our results are robust to defining bank dependence based on the top tercile of the bank fraction of debt within country rather than the top quartile.

Finally, we explore whether the “all-out” policy packages misallocated resources to ex-ante low quality firms. Table 7 reports the results for estimating Equation (4). The dependent variable is the same as in Table 6—the quarter-on-quarter change in bank debt, as a fraction of the firm’s pre-pandemic expenses. Columns 1-4 report the results with the four different proxies of firm quality—interest coverage ratio, return on assets, book equity scaled by assets, and distance to insolvency—respectively. Strikingly, in all four specifications, with distinct proxies for quality, the estimated coefficients on the triple interaction between “L.Fiscal & monetary & prudential - Large x Bank dependent x Low quality” are statistically indistinguishable from zero. In other words, there is little evidence that, on average, the additional liquidity from the all-out policy packages differentially affected low- and high-quality firms.

V – Conclusions

This paper analyzes the impact of different combinations of policies enacted during the pandemic on bank lending. We assemble a granular dataset of fiscal, monetary, and prudential policy announcements for a wide sample of advanced and emerging and developing economies. We examine both the impact of the announcement of different policy packages as well as their count and sizes. In addition, we explore heterogeneity across banks in the impact of policy combinations as well as the impact on liquidity for non-financial firms.

Our analysis shows that loan growth was faster for banks in countries that announced packages which combined fiscal, monetary, and prudential measures relative to those that relied on some, but not all, of these three types of policies. Moreover, within packages including fiscal, monetary, and prudential measures, those that announced more and larger measures saw faster loan growth. Across banks, the impact of policies was larger among banks that were a priori more constrained to lend due to low capital levels.

Consistent with our evidence at the bank-level, large packages combining fiscal, monetary, and prudential measures helped channel additional liquidity to bank-dependent firms. Within bank-dependent firms, we do not find that policy packages disproportionately benefited firms with poor pre-COVID performance.

The results underscore the importance of decisive action in terms of breadth and intensity of policies following the COVID-19 shock. In future crises that combine, as the pandemic did, negative supply and demand shocks with significant uncertainty, a similarly concerted, coordinated, “all out” approach may have an important role to play in supporting the economy. Although COVID-19 was an unusual shock in many ways, further global shocks—including wars and other geopolitical shifts—are not hard to conceive.

While this paper highlights the benefits of an “all out” approach in response to a global shock like Covid-19, not all countries could or will be able to respond in such an aggressive fashion. As shown by Bergant and Forbes (2021), the size of countries’ response to Covid-19 was largely driven by the degree of policy space prior to the pandemic. In this sense, emerging and developing countries have been and will likely be more constrained. Moreover, it is important to recognize that there are costs and unintended consequences from

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an “all out” approach. Large fiscal and monetary packages that support bank credit and economic recovery may also lead to inflationary pressures. In countries with already high debt levels, an increase in discretionary spending could give rise to concerns about debt sustainability. How to calibrate the appropriate “all out” response to minimize the costs and unintended consequences is beyond the scope of this paper and merits further research.

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References

Acharya, V., Steffen S. (2020). The Risk of Being a Fallen Angel and the Corporate Dash for Cash in the Midst of Covid. *The Review of Corporate Finance Studies*, 9(3), 430-71.

Acosta-Henao, M., Fernández, A., Gomez-Gonzales, P., & S. Kalemli-Özcan (2022). The Covid-19 shock and firm financing: government or market? Or both?
Alfaro, L., Chari, A., Greenland, A.N., Schott, P.K. (2020). Aggregate and Firm-Level Stock Returns during Pandemics, in Real Time, NBER Working Paper No. 26950.

Altavilla C., Barbiero F., Boucinha M., Burlon L. (2021). The Great Lockdown: Pandemic Response Policies and Bank Lending Conditions. ECB Working Paper 2465.

Altavilla, C., Laeven, L. Peydró, J.L. (2020). Monetary and Macroprudential Policy Complementarities: Evidence from European Credit Registers. ECB Working Paper Series No 2504.

Altavilla, C., Ellul, A., Pagano, M., Polo, A., Vlassopoulos, T. (2021). Loan Guarantees, Bank Lending and Credit Risk Reallocation. CEPR Working Paper 16727.

Autor, D., Cho D., Crane, L., Goldar, M. Lutz, B., Montes, J., Peterman, W., Ratner, D., Villar, D. and Yildirmaz, A. (2020). An Evaluation of the Paycheck Protection Program Using Administrative Payroll Microdata. Working Paper, MIT.

Bachas, N., Kim, O. S., Yannelis, C. (2021). Loan Guarantees and Credit Supply. *Journal of Financial Economics*, 139 (3), 872–894.

BCBS (2021). Early lessons from the Covid-19 pandemic on the Basel reforms. July 2021.

Beck, T., Keil, J. (2021). Are Banks Catching Corona? Effects of Covid on Lending in the U.S. Mimeo.

Bergant, K., Forbes, K. (2021). Macroprudential Policy during Covid-19: The Role of Policy Space. NBER Working Paper 29346.

Bruno, V., Shim, I., Shin, H.S. (2017). Comparative Assessment of Macroprudential Policies. *Journal of Financial Stability* 28: 183-202.
Budnik, K., Dimitrov, I., Groß, J. Jancokova, M. (2021). Policies in Support of Lending Following the Coronnavirus (Covid-19) Pandemic. ECB Occasional Paper No. 2021/257.

Caldara, Dario, Etienne Gagnon, Enrique Martínez-García, and Christopher J. Neely (2020). "Monetary Policy and Economic Performance since the Financial Crisis," Finance and Economics Discussion Series 2020-065. Washington: Board of Governors of the Federal Reserve System.

Capelle-Blancard, G., Desroziers, A. (2020). The Stock Market is not the Economy? Insights from the COVID-19 crisis, Covid Economics: Vetted and Real-Time Papers, CEPR.

Casanova, C., Hardy, B., Onen, M. (2021). Covid-19 Policy Measures to Support Bank Lending. BIS Quarterly Review, September 2021.

Cascarino, G., Gallo, R., Palazzo, F. Sette, E. (2022). Public Guarantees and Credit Additionality during the Covid-19 Pandemic. Mimeo.

Checo, S., Chen, S. (2022). Distance to Insolvency: A New Cross-Country Dataset of Corporate Vulnerability. Mimeo.

Chodorow-Reich, G., Darmouni, O., Luck, S., Plosser, M. (2021). Bank Liquidity Provision across the Firm Size Distribution. *Journal of Financial Economics*.

Couaillier, C., Reghezza, A., Rodriguez d'Acri, C., Scopelliti, A. (2022). How to release capital requirements during a pandemic? Evidence from euro area banks. ECB Working Paper Series No 2720.
Cox, J., Greenwald, D., Ludvigson, S. (2020). What Explains the COVID-19 Stock Market? NBER Working Paper No. 27784.

Demirgüç-Kunt, A, Pedraza, A., Ruiz-Ortega, C. (2020). Banking Sector Performance during the COVID-19 Crisis. World Bank Policy Research Working Paper No. 9363.

©International Monetary Fund. Not for Redistribution

Demmou, L., Calligaris, S., Franco, G., Dlugosch, D., Adalet McGowan, M., Sakha, S. (2021). Insolvency and debt overhang following the COVID-19 outbreak: assessment of risks and policy responses. OECD Economics Department Working Paper No. 1651.

ElFayoumi, K., Hengge, M. (2021). Capital Markets, Covid-19 and Policy Measures, IMF Working Paper No. 2021/033.

Gambacorta, L., Murcia, A. (2017). The Impact of Macroprudential Policies and their Interaction with Monetary Policy: An Empirical Analysis Using Credit Registry Data. BIS Working Paper No 636.

Gourinchas, P. O., Kalemli-Ozcan, S., Penciakova, V., & Sander, N. (2022). Estimating SME Failures in Real Time: An Application to the COVID-19 Crisis. Mimeo.

Granja, J., Makridis, C., Yannelis, C., & Zwick, E. (2020). Did the Paycheck Protection Program Hit the Target? Becker Friedman Institute Working Paper 2020-52.

Greenwald, D., Krainer, J. Paul, P. (2020). The Credit Line Channel. Federal Reserve Bank of San Francisco Working Paper 2020-2026.

Guerini, M., Nesta, L., Ragot, X., Schiavo, S. (2020). Firm Liquidity and Solvency under the Covid-19 lockdown in France. OFCE Policy Brief (76).

Hubbard, R. G., Strain, M. R. (2020). Has the Paycheck Protection Program Succeeded? Brookings Papers on Economic Activity, Fall 2020.

Igan, D., Mirzaei, A., Moore T. (2021). A Shot in the Arm: Stimulus Packages and Firm Performance during COVID-19. Mimeo.

International Monetary Fund, 2009, “From Recession to Recovery: How Soon and How Strong?,” World Economic Outlook, Chapter 3.

Jiménez, G., Laeven, L., Martínez-Miera, D., & Peydró J.-L. (2022). Public guarantees, relationship lending and bank credit: evidence from the Covid-19 crisis.

Kirti, D., Liu, Y., Martinez Peria, S., Mishra, P., Strasky, J. (2022). Tracking Economic Policies during COVID-19: An Announcement-Level Database. IMF. Mimeo.

Li, L., Strahan, P. E., Zhang, S. (2020). Banks as Lenders of First Resort: Evidence from the Covid-19 Crisis. *The Review of Corporate Finance Studies*, 9 (3), 472–500.

Potter , Simon M, and Frank Smets (2019), Unconventional monetary policy tools: a cross-country analysis. CGFS Papers No 63. October 2019.

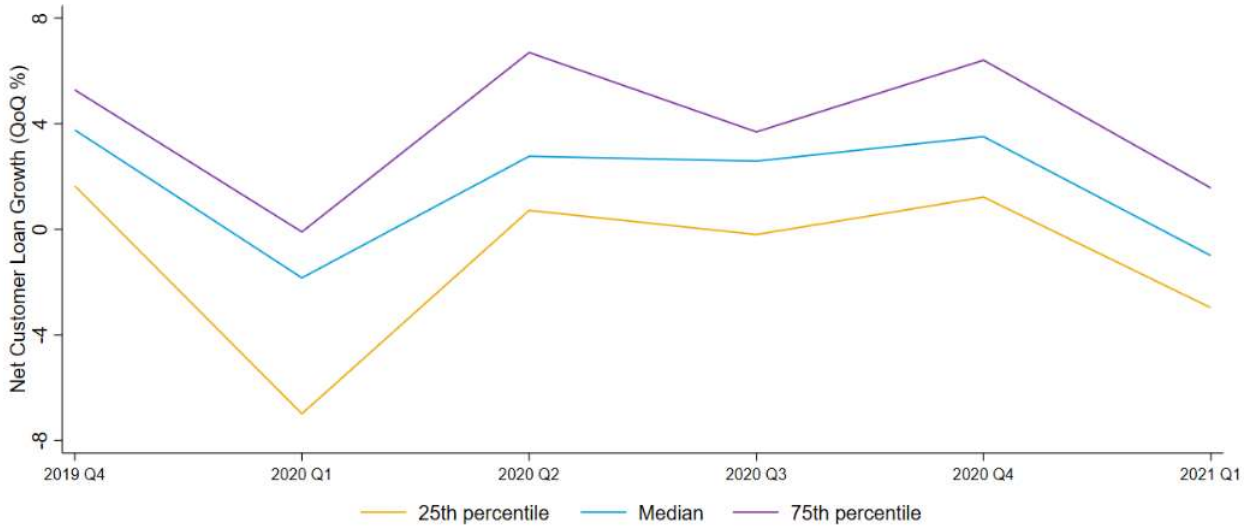
Takats, E., Temesvary, J., (2019). How Does the Interaction of Macroprudential and Monetary Policies affect Cross-Border Bank Lending. BIS Working Papers No 782.

Valencia, F., Varghese, Richard, Yao, Weijia, Yepez, Juan, 2021. Handle with Care: Regulatory Easing in Times of Covid-19. The B.E. Journal of Macroeconomics.

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Figure 1: Credit growth

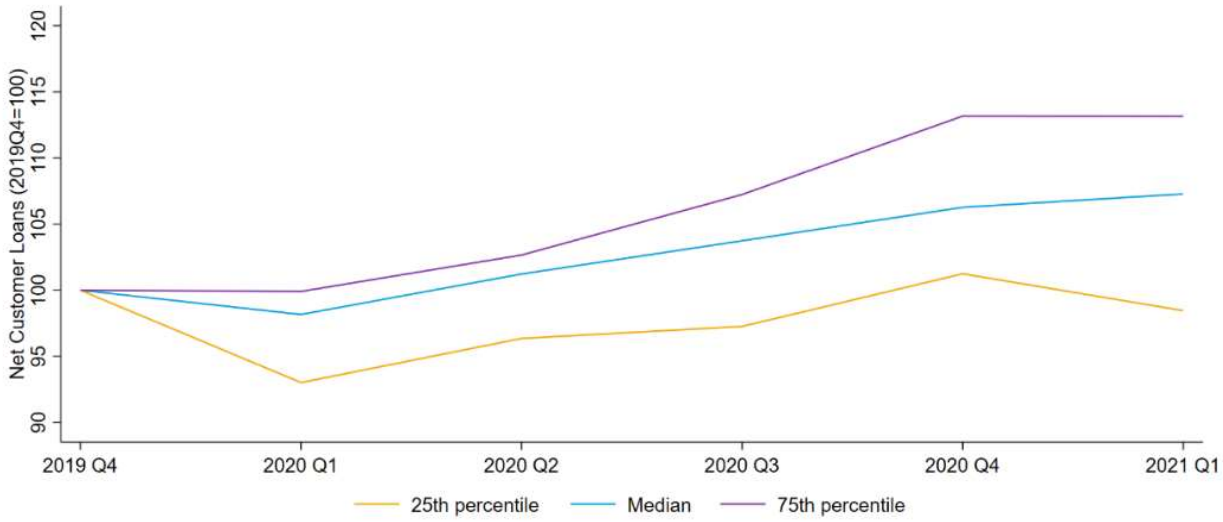
Notes: This figure shows the distribution of growth in net customer loans (QoQ, percent) at the country level for our sample of 49 countries using data at the bank-quarter level. Panels B and C respectively cover samples of 18 AEs and 31 EMs. For countries included in the sample, data is available for at least 5 banks covering either 60 percent of assets reported in annual data or $100bn in assets. Loan growth for each country-quarter is an average of growth at the bank level winsorized at the 5th and 95th percentiles within quarter. Percentiles may represent different countries in different quarters.



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Figure 2: Credit index to pre-COVID levels

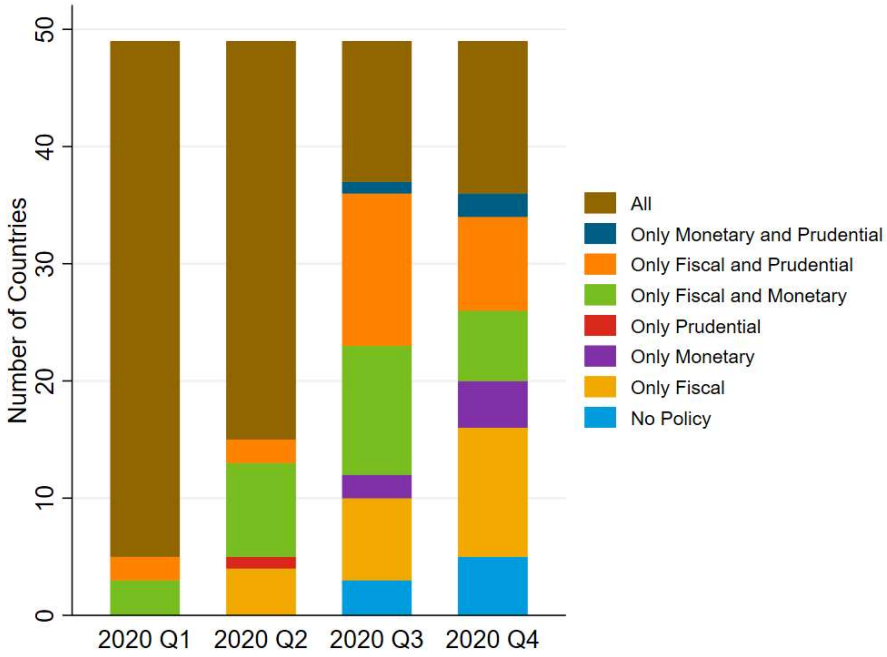
Notes: This figure shows the distribution of net customer loans indexed to 2019Q4 (pre-COVID-19) at the country level using the same sample as in Figure 1. Indexed loan levels for each country-quarter are averages of bank-level data winsorized at the 5th and 95th percentiles within quarter. Percentiles may represent different countries in different quarters.



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Figure 3: Policy package distribution

Notes: This figure shows how country policy announcements were distributed into packages comprising fiscal, monetary, and prudential policies at a quarterly frequency in 2020.

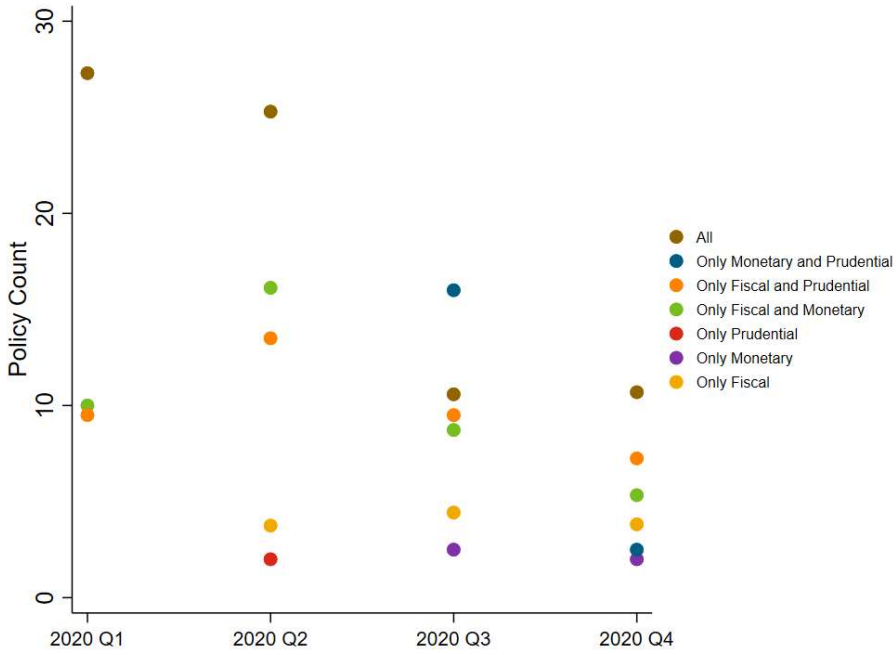


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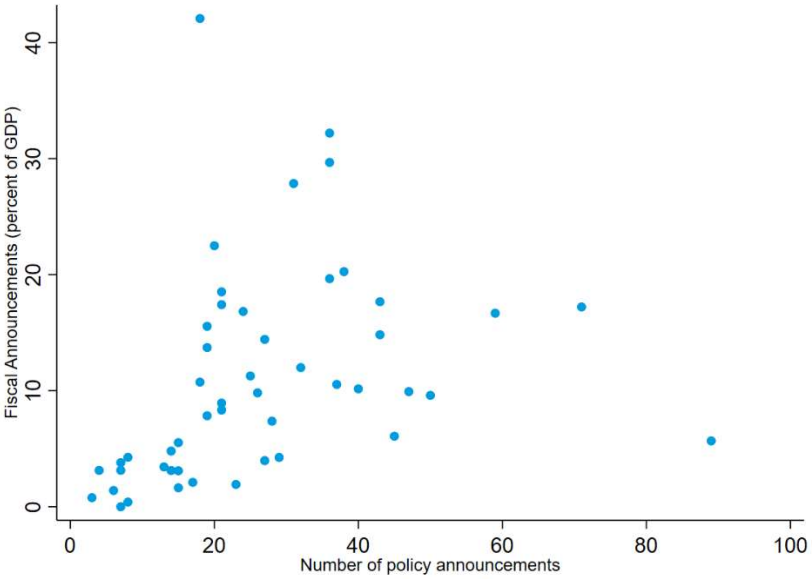
Figure 4: Counts of policies within packages and relationship to sizes

Notes: This figure shows how counts of policies within package vary over time and relate to sizes where available. Panel A shows the average number of policies in each package type and quarter (only packages that are observed are shown). Panel B shows the number of fiscal policies (above the line, below the line, and contingent measures) adopted by each country in the sample during 2020 together with their cumulative size as percentage of GDP.

Panel A: Distribution of counts across packages



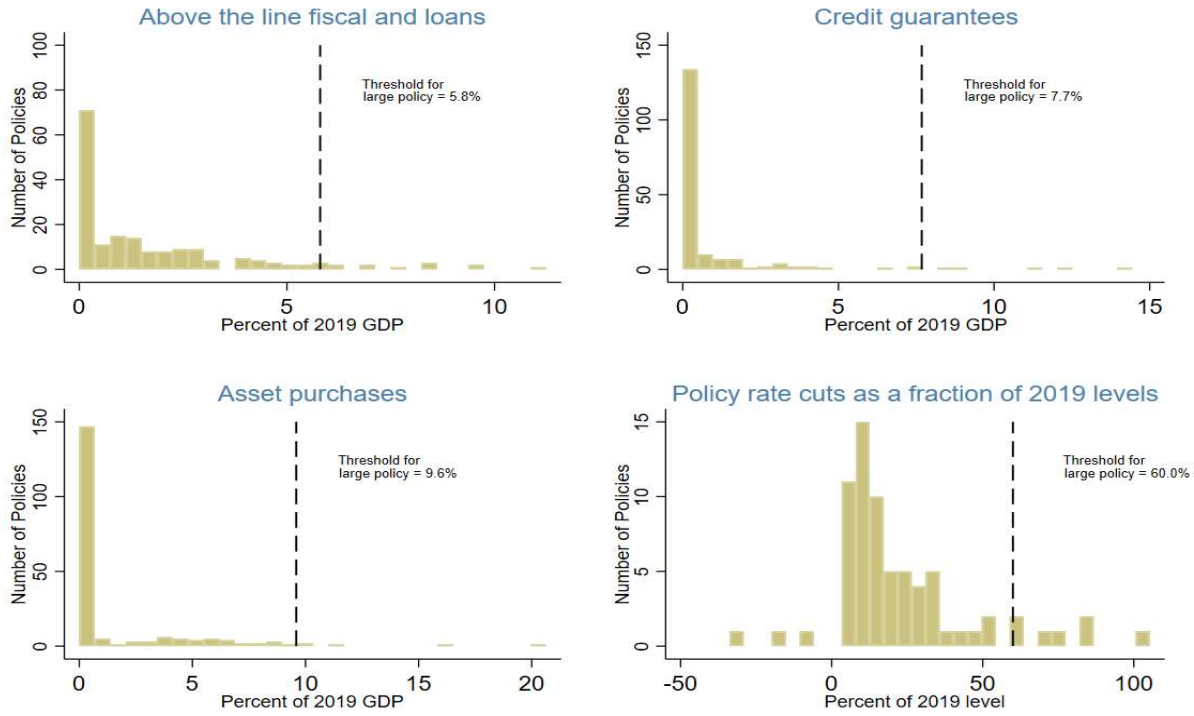
Panel B: Counts and sizes for fiscal policies



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Figure 5: Size distribution of policies and thresholds for large policies

Notes: This figure shows the distribution of policies for which sizes are available and indicates the top 10th percentile threshold that we use as a cut off to define large policies. While sizes for fiscal policy measures, guarantees asset purchase programs are measured relative to 2019 GDP, cuts in monetary policy interest rate are measured as a fraction of their level at the end of 2019. We cumulate sizes within policy to the country-quarter level before identifying large policies.

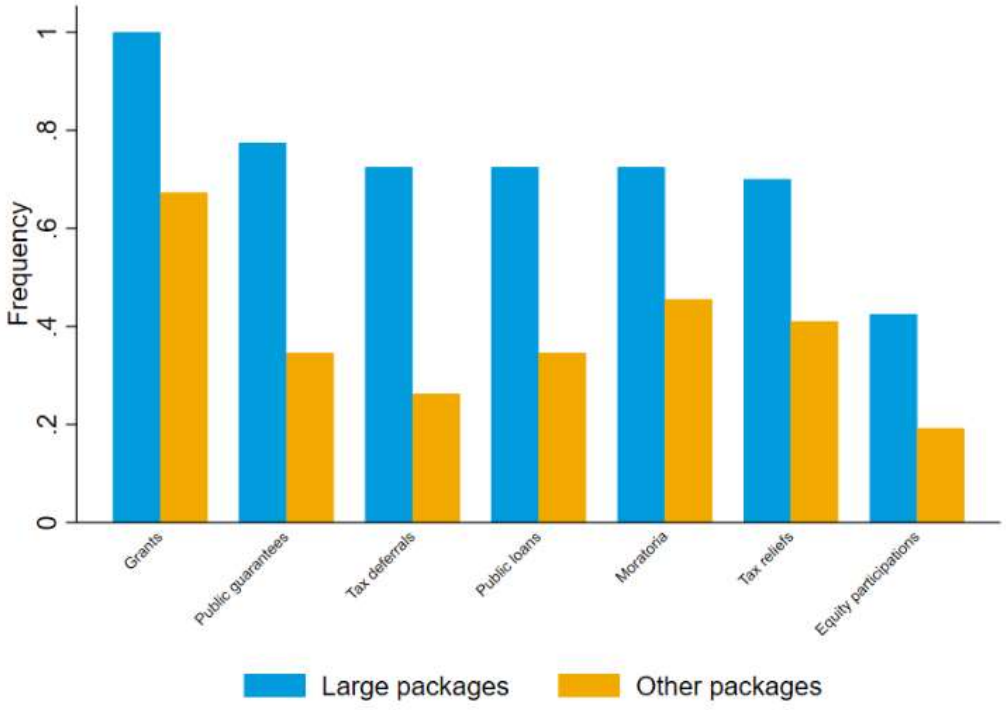


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Figure 5: Granular composition of large and other packages

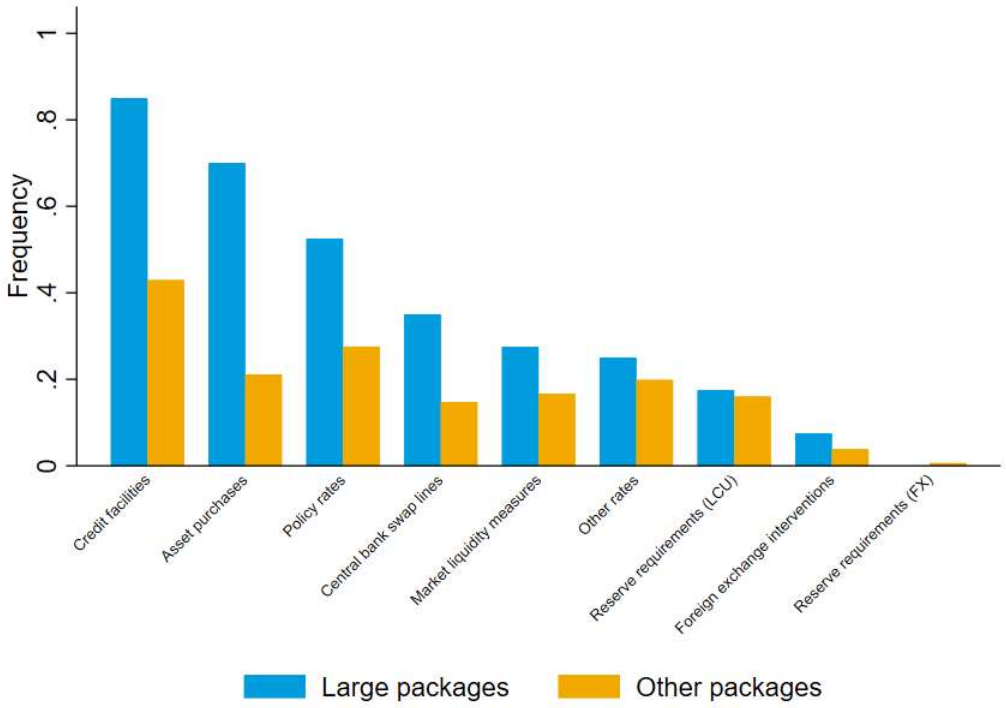
Notes: This figure shows the prevalence of the individual granular policies in our data across policy packages separated into two groups. The first is large packages (with components with above median sizes as in Column 4 of Table 4) with all three types of policies. The other group contains all other packages.

Panel A: Fiscal policies

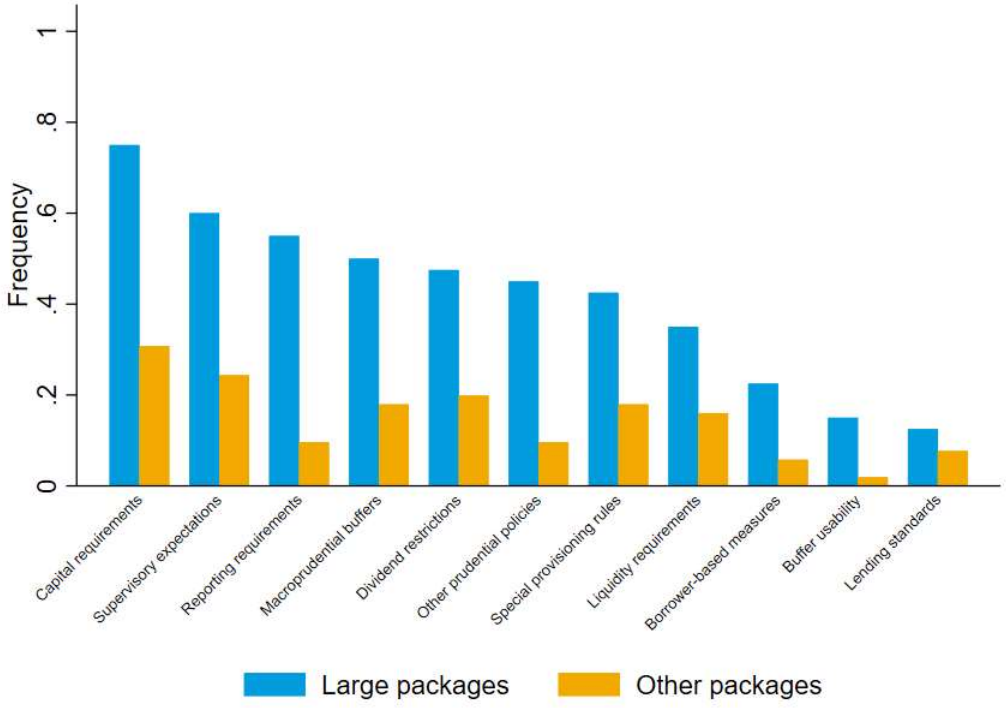


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Panel B: Monetary policies



Panel C: Prudential policies



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Table 1: Policy packages and bank credit

Notes: This table shows regressions at the bank-quarter level where the dependent variable is the log change in net customer loans in basis points (QoQ ln change x 10000), winsorized at the 5th and 95th percentiles by quarter. Regressions use data for 2020Q1-2021Q1 for a sample of 49 countries for which data is available for at least 5 banks covering either 60 percent of assets reported in annual data or $100bn in assets and control variables are available. The main independent variables are lagged dummies identifying combinations of policies into mutually exclusive packages (fiscal policy announcements without announcements of monetary or prudential policies, fiscal and monetary policy announcements without announcements of prudential policies, fiscal and prudential policy announcements without announcements of monetary policies, and announcements of all three types together). All specifications include lagged ln assets, deposit to liability ratio, equity to asset ratio, and net customer loan to asset ratio, winsorized at the 5th and 95th percentiles by quarter, as controls. The second column also controls for cumulative COVID cases per million and mobility (using an average of workplace and public transit indices from Google). The third column also controls for quarterly revisions in IMF GDP forecasts and a sovereign spread-based proxy of financial stress (see the text for details). All specifications include bank fixed effects. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only	423.7***	194.0	169.1
	(125.5)	(207.0)	(264.3)
Fiscal & monetary only	317.8	58.0	68.7
	(212.6)	(264.2)	(310.5)
Fiscal & prudential only	555.0***	279.9	289.7
	(114.8)	(191.6)	(271.1)
Fiscal & monetary & prudential	487.8***	273.6**	294.6
	(84.7)	(113.4)	(197.5)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.45	0.46	0.47
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table 2: Intensities (counts) of policy packages and bank credit

Notes: This table shows regressions at the bank-quarter level where the main independent variables are lagged counts of the number of policies included in each mutually exclusive package of policies. Specifications across all three columns otherwise match Table 1. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only	19.1	-5.2	-6.4
	(15.8)	(14.7)	(14.1)
Fiscal & monetary only	27.5*	0.8	0.5
	(14.4)	(16.6)	(16.0)
Fiscal & prudential only	53.9*	29.1	29.2
	(30.1)	(28.6)	(29.4)
Fiscal & monetary & prudential	46.7***	41.5***	43.7***
	(2.7)	(5.8)	(9.8)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.48	0.51	0.52
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table 3: Sizes of policy packages and bank credit

Notes: This table shows regressions at the bank-quarter level where the main independent variables are lagged dummies for mutually exclusive packages of policies where each package is separated into packages that do contain at least one large element on all dimensions and those that do not. Large elements of packages are defined as those in the top decile (see Figure 5 and the main text). Packages that do not appear (e.g., packages with fiscal policies only with large fiscal policies) are not observed. Specifications across all three columns otherwise match Table 1. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only - Other	339.8***	55.0	-50.1
	(122.1)	(133.3)	(142.5)
Fiscal & monetary only - Other	280.5	-14.7	-65.2
	(205.3)	(215.2)	(220.6)
Fiscal & prudential only - Other	487.1***	183.2	94.9
	(110.2)	(152.8)	(167.5)
Fiscal & monetary & prudential only - Other	371.0***	160.2	90.9
	(105.5)	(110.6)	(128.0)
Fiscal & monetary & prudential only - Large	888.0***	722.9***	693.1***
	(125.8)	(187.2)	(212.0)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.49	0.51	0.52
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table 4: Sizes of policy packages (varying definitions across columns) and bank credit

Notes: This table shows regressions at the bank-quarter level where the main independent variables are dummies for mutually exclusive packages of policies where each package is separated into packages that do contain at least one large element on all dimensions and those that do not. Large elements of packages are defined as those respectively in the top decile, quartile, tercile, or half of the distribution in the first to fourth columns. Packages that do not appear (e.g., packages with fiscal policies only with large fiscal policies in the first column) are not observed. Specifications across all three columns otherwise match Table 1. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Log change in credit (BPS)			
	Decile	Quartile	Tercile	Median
	(1)	(2)	(3)	(4)
Fiscal only - Other	-54.0	-52.0	-37.9	90.1
	(140.3)	(131.9)	(133.1)	(215.3)
Fiscal only - Large		-248.7*	-97.9	113.2
		(142.4)	(168.1)	(202.1)
Fiscal & monetary only - Other	-71.1	-85.0	-74.4	-8.2
	(218.4)	(207.6)	(222.0)	(282.1)
Fiscal & monetary only - Large			-15.5	151.4
			(125.4)	(236.5)
Fiscal & prudential only - Other	102.2	129.4	170.3	251.5
	(165.7)	(161.8)	(164.3)	(237.3)
Fiscal & prudential only - Large		-27.9	45.6	296.1
		(371.9)	(290.3)	(252.2)
Fiscal & monetary & prudential - Other	76.5	35.2	38.0	148.9
	(125.7)	(121.2)	(123.8)	(138.0)
Fiscal & monetary & prudential - Monetary or Fiscal Large	264.5*	136.1	128.1	184.1
	(141.5)	(126.6)	(125.5)	(185.1)
Fiscal & monetary & prudential - Fiscal & Monetary Large	687.2***	663.2***	629.7***	463.0**
	(209.6)	(213.6)	(212.3)	(226.1)
Bank FE	Y	Y	Y	Y
Bank Controls	Y	Y	Y	Y
Health Controls	Y	Y	Y	Y
De facto mobility Controls	Y	Y	Y	Y
Macro Controls	Y	Y	Y	Y
Financial Stress Controls	Y	Y	Y	Y
R^2	0.52	0.52	0.52	0.49
Bank-Quarters	7,480	7,480	7,480	7,480
Banks	1,496	1,496	1,496	1,496
Countries	49	49	49	49

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Table 5: Differential effects of policy packages across banks with varying capital levels

Notes: This table shows regressions at the bank-quarter level where main independent variables are lagged dummies, counts, or dummies accounting for sizes of policy packages (as in Tables 1-3) interacted with dummies identifying capital constrained banks (banks with 2019 equity to asset ratios below within country median). All specifications control for interactions of the low capital dummy with cumulative COVID cases per million, mobility (using an average of workplace and public transit indices from Google), quarterly revisions in IMF GDP forecasts, and a sovereign spread-based proxy of financial stress All specifications include lagged ln assets, deposit to liability ratio, equity to asset ratio, and net customer loan to asset ratio, winsorized at the 5th and 95th percentiles by quarter and bank and country x quarter fixed effects. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Log change in credit (BPS)		
	Package dummies	Policy counts	Package size
	(1)	(2)	(3)
L.Fiscal only x Low E/A	19.2	2.3	
	(75.5)	(6.3)	
L.Fiscal & monetary only x Low E/A	79.1*	6.2	
	(46.6)	(3.8)	
L.Fiscal & prudential only x Low E/A	50.3	-2.0	
	(76.1)	(9.4)	
L.Fiscal & monetary & prudential x Low E/A	90.3**	4.9**	
	(42.0)	(2.2)	
L.Fiscal only - Other x Low E/A			13.1
			(78.9)
L.Fiscal & monetary only - Other x Low E/A			75.0
			(46.4)
L.Fiscal & prudential only - Other x Low E/A			44.6
			(78.4)
L.Fiscal & monetary & prudential - Other x Low E/A			84.5*
			(43.4)
L.Fiscal & monetary & prudential - Large x Low E/A			100.8**
			(43.6)
Country x Quarter FE	Y	Y	Y
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	Y	Y	Y
De facto mobility Controls	Y	Y	Y
Macro Controls	Y	Y	Y
Financial Stress Controls	Y	Y	Y
R^2	0.71	0.71	0.71
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table 6: Differential effects of policy packages on liquidity for bank dependent firms

Notes: This table shows regressions at the firm-quarter level where the dependent variable is additional liquidity (the qoq change in bank debt scaled by 2019 expenses in months, where expenses are calculated as the difference between total revenue and net income). The main independent variables are lagged dummies, counts, or dummies accounting for sizes of policy packages (as in Tables 1-3), interacted with dummies identifying bank dependent firms (firms with the fraction of bank debt as of end 2019 in the top quartile within country). All specifications control for interactions of the bank dependent dummy with cumulative COVID cases per million, mobility (using an average of workplace and public transit indices from Google), quarterly revisions in IMF GDP forecasts, and a sovereign spread-based proxy of financial stress. All specifications control for lagged log firm-level revenue growth and include firm and country x quarter fixed effects. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Additional liquidity (months of 2019 expenses)		
	Package dummies	Policy counts	Package size
	(1)	(2)	(3)
Fiscal only x Bank dependent	1.7	0.2	
	(1.5)	(0.5)	
Fiscal & monetary only x Bank dependent	0.4	0.1	
	(0.7)	(0.1)	
Fiscal & prudential only x Bank dependent	1.3	0.1	
	(1.0)	(0.2)	
Fiscal & monetary & prudential x Bank dependent	1.5**	0.2***	
	(0.7)	(0.0)	
Fiscal only - Other x Bank dependent			1.3
			(1.4)
Fiscal & monetary only - Other x Bank dependent			0.2
			(0.6)
Fiscal & prudential only - Other x Bank dependent			1.1
			(0.9)
Fiscal & monetary & prudential - Other x Bank dependent			1.0
			(0.6)
Fiscal & monetary & prudential - Large x Bank dependent			2.1*
			(1.0)
Firm FE	Y	Y	Y
Country x Quarter FE	Y	Y	Y
Health Controls	Y	Y	Y
De facto mobility Controls	Y	Y	Y
Macro Controls	Y	Y	Y
Financial Stress Controls	Y	Y	Y
Firm Controls	Y	Y	Y
R^2	0.21	0.21	0.21
Firm-Quarters	31,035	31,035	31,035
Firm	6,207	6,207	6,207
Countries	39	39	39

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Table 7: Differential effects of policy packages on liquidity for poor quality bank dependent firms

Notes: This table shows regressions at the firm-quarter level where specifications broadly the third column of Table 6 with the introduction of an additional dimension of firm-level heterogeneity: a proxy for pre-COVID firm quality. For each proxy of firm quality, we include all interactions between packages and bank dependence shown in the third column of Table 6, interactions between packages and the proxy of firm quality, and triple interactions between packages, bank dependence, and firm quality. The proxies of quality across the columns are (i) interest coverage ratio; (ii) return on assets; (iii) book equity scaled by assets; and (iv) a distance to insolvency measure. For each proxy we use a dummy for firms in the bottom quartile within country based on the average indicator for 2017-19. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

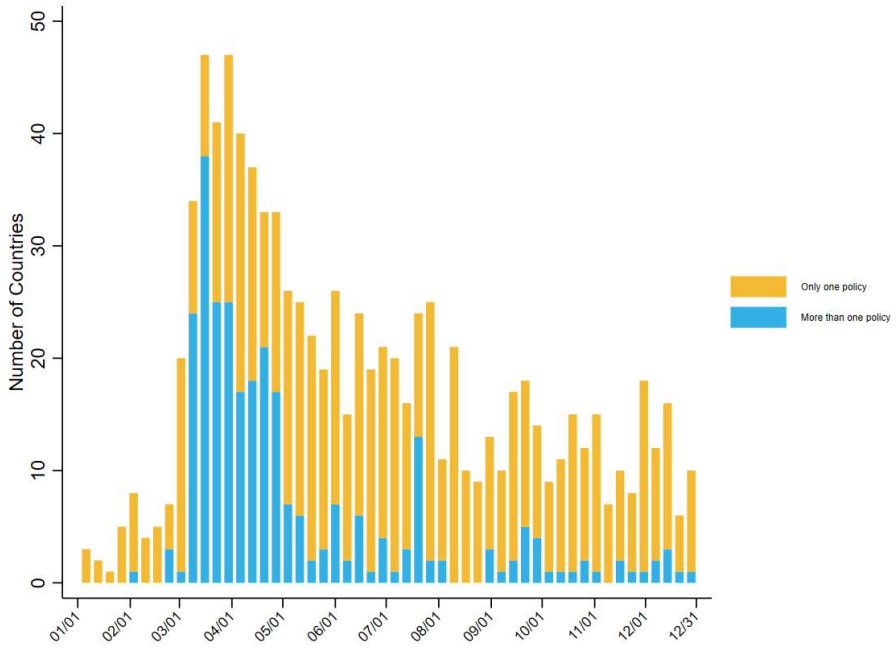
	Additional liquidity (months of 2019 expenses)			
	ICR	ROA	E/A	DI
	(1)	(2)	(3)	(4)
Fiscal & monetary & prudential - Large x Bank dependent	2.1*	2.2**	2.3*	1.3
	(1.1)	(1.1)	(1.2)	(0.9)
Fiscal & monetary & prudential - Large x Low firm quality (pre-COVID)	-0.3	0.4	0.7	-0.4
	(1.2)	(1.0)	(0.8)	(0.4)
Fiscal & monetary & prudential - Large x Bank dependent x Low firm quality (pre-COVID)	-0.2	-0.5	-0.9	0.2
	(0.7)	(0.7)	(0.9)	(0.5)
Firm FE	Y	Y	Y	Y
Country x Quarter FE	Y	Y	Y	Y
Health Controls	Y	Y	Y	Y
De facto mobility Controls	Y	Y	Y	Y
Macro Controls	Y	Y	Y	Y
Financial Stress Controls	Y	Y	Y	Y
Firm Controls	Y	Y	Y	Y
Other packages and interactions	Y	Y	Y	Y
R^2	0.22	0.21	0.21	0.21
Firm-Quarters	30,675	31,035	31,030	29,715
Firm	6,135	6,207	6,206	5,943
Countries	39	39	39	39

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Appendix: Additional figures and tables

Figure A1: Distribution of multiple policy packages at a weekly frequency

Notes: This figure shows the number of countries announcing packages consisting of more than one policy group (monetary, fiscal and prudential) in each week of 2020 compared to the number of countries announcing packages with policies in just one group.



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Table A1: Table 3 repeated with narrower omitted category

Notes: This table repeats Table 3 but drops country-quarters in which some policies are observed but policies are not in any of the packages explicitly shown. The counterfactual is therefore restricted explicitly to country-quarters with no policies.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only - Other	340.9***	71.4	-28.0
	(125.2)	(130.5)	(143.0)
Fiscal & monetary only - Other	253.6	-26.9	-69.7
	(210.5)	(212.8)	(224.2)
Fiscal & prudential only - Other	496.1***	209.9	134.6
	(112.8)	(149.4)	(168.4)
Fiscal & monetary & prudential only - Other	385.4***	185.8*	129.5
	(110.4)	(110.5)	(131.5)
Fiscal & monetary & prudential only - Large	895.2***	738.2***	717.3***
	(126.8)	(189.9)	(219.0)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.50	0.52	0.53
Bank-Quarters	7,338	7,338	7,338
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table A2: Table 3 repeated controlling for lagged credit growth

Notes: This table repeats Table 3 but controls for one lag of credit growth at the bank level (i.e., one lag of the dependent variable) to control for base effects.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only - Other	360.8***	93.6	-41.6
	(128.8)	(138.2)	(140.9)
Fiscal & monetary only - Other	269.3	7.2	-74.9
	(202.6)	(219.3)	(212.8)
Fiscal & prudential only - Other	476.7***	213.9	76.5
	(103.6)	(154.0)	(162.3)
Fiscal & monetary & prudential only - Other	327.6***	164.4	46.2
	(84.0)	(105.1)	(125.3)
Fiscal & monetary & prudential only - Large	863.7***	760.8***	696.3***
	(126.2)	(190.4)	(205.2)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.51	0.53	0.54
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table A3: Table 3 repeated with large rate cuts defined in absolute terms

Notes: This table repeats Table 3 but defines large policy rate cuts in absolute terms rather than relative to the pre-COVID level.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only - Other	338.5***	54.9	-52.3
	(122.7)	(133.0)	(142.1)
Fiscal & monetary only - Other	280.5	-11.8	-63.5
	(205.3)	(215.3)	(220.1)
Fiscal & prudential only - Other	476.3***	175.1	83.9
	(113.7)	(153.8)	(167.8)
Fiscal & monetary & prudential only - Other	372.0***	165.8	94.7
	(105.7)	(110.8)	(128.3)
Fiscal & monetary & prudential only - Large	891.9***	733.2***	703.8***
	(126.8)	(191.8)	(215.8)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.49	0.51	0.52
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table A4: Table 3 repeated using counts of prudential policies as proxy for size

Notes: This table repeats Table 3 but also requires the count of prudential policies to be in the top decile for packages including prudential policies to be treated as large.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only - Other	423.7***	193.8	169.1
	(125.5)	(207.1)	(264.3)
Fiscal & monetary only - Other	317.7	57.8	68.7
	(212.6)	(264.3)	(310.5)
Fiscal & prudential only - Other	555.5***	280.4	290.5
	(114.8)	(191.4)	(270.8)
Fiscal & monetary & prudential only - Other	487.6***	273.6**	294.9
	(84.8)	(113.3)	(197.4)
Fiscal & monetary & prudential only - Large	576.4***	382.1***	413.3**
	(78.2)	(137.2)	(167.7)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.45	0.46	0.47
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table A5: Table 3 with sample reweighted

Notes: This table repeats Table 3 but weights each observation by the inverse of the number of banks in that country so that each country receives equal weight.

	Log change in credit (BPS)		
	(1)	(2)	(3)
Fiscal only - Other	316.5***	123.1	35.6
	(80.9)	(97.8)	(98.0)
Fiscal & monetary only - Other	387.0***	205.2	125.5
	(115.5)	(130.8)	(126.7)
Fiscal & prudential only - Other	485.8***	295.6**	198.1*
	(81.6)	(112.3)	(110.0)
Fiscal & monetary & prudential - Other	462.3***	379.6***	269.1***
	(72.5)	(73.2)	(85.7)
Fiscal & monetary & prudential - Large	585.8***	536.9***	433.3***
	(127.9)	(139.8)	(149.8)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	N	Y	Y
De facto mobility Controls	N	Y	Y
Macro Controls	N	N	Y
Financial Stress Controls	N	N	Y
R^2	0.41	0.43	0.43
Bank-Quarters	7,480	7,480	7,480
Banks	1,496	1,496	1,496
Countries	49	49	49

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Table A6: Weekly packages and bank credit

Notes: This table shows regressions at the bank-quarter level where the main independent variables are counts for the numbers of weeks in the country-quarter with one, two, or three of fiscal, monetary, and prudential policies. Columns 4-6 also include a dummy for whether all three types of policies were used in the quarter. Specifications in columns 1-3 and 4-6 otherwise follow the columns of Table 1. Standard errors clustered by country are shown in parentheses. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels respectively.

	Log change in credit (BPS)					
	(1)	(2)	(3)	(4)	(5)	(6)
Weeks combining one types of policies	45.5**	0.8	-2.9	37.6	-11.6	-14.8
	(18.9)	(24.1)	(22.1)	(23.9)	(26.4)	(25.3)
Weeks combining two types of policies	-26.5	-8.6	-12.5	-26.4	-9.6	-12.8
	(19.0)	(12.2)	(10.6)	(16.9)	(9.9)	(9.8)
Weeks combining three types of policies	303.0***	262.1***	257.4***	282.0***	239.2***	234.4***
	(77.6)	(72.8)	(74.7)	(76.4)	(78.1)	(75.6)
Fiscal & monetary & prudential in Quarter				68.4	111.2	112.1
				(83.2)	(87.7)	(89.3)
Bank FE	Y	Y	Y	Y	Y	Y
Bank Controls	Y	Y	Y	Y	Y	Y
Health Controls	N	Y	Y	N	Y	Y
De facto mobility Controls	N	Y	Y	N	Y	Y
Macro Controls	N	N	Y	N	N	Y
Financial Stress Controls	N	N	Y	N	N	Y
R^2	0.46	0.49	0.50	0.46	0.50	0.50
Bank-Quarters	7,480	7,480	7,480	7,480	7,480	7,480
Banks	1,496	1,496	1,496	1,496	1,496	1,496
Countries	49	49	49	49	49	49

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Table A7: Table 3 for subsamples split by bank capital level

Notes: The first column in this table repeats the third column of Table 3. The second and third columns repeat the same specification but respectively restrict the sample to banks below and above the median level of bank capital relative to assets within country as of end-2019.

	Log change in credit (BPS)		
	Full sample	Below median E/A	Above median E/A
Fiscal only - Other	-50.1	-61.8	-47.1
	(142.5)	(158.3)	(138.9)
Fiscal & monetary only - Other	-65.2	-33.1	-95.8
	(220.6)	(222.3)	(220.2)
Fiscal & prudential only - Other	94.9	124.0	68.4
	(167.5)	(180.8)	(165.6)
Fiscal & monetary & prudential only - Other	90.9	135.1	50.7
	(128.0)	(130.9)	(129.9)
Fiscal & monetary & prudential only - Large	693.1***	735.0***	645.6***
	(212.0)	(222.5)	(208.2)
Bank FE	Y	Y	Y
Bank Controls	Y	Y	Y
Health Controls	Y	Y	Y
De facto mobility Controls	Y	Y	Y
Macro Controls	Y	Y	Y
Financial Stress Controls	Y	Y	Y
R^2	0.52	0.54	0.51
Bank-Quarters	7,480	3,605	3,875
Banks	1,496	721	775
Countries	49	49	49

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Table A8: Table 6 repeated with different definition of bank dependence

Notes: This table repeats Table 6 but defines bank dependent firms as firms with bank debt fractions as of end-2019 in the top tercile within country.

	Additional liquidity (months of 2019 expenses)		
	Package dummies	Policy counts	Package size
	(1)	(2)	(3)
Fiscal only x Bank dependent	2.5	0.3	
	(1.6)	(0.6)	
Fiscal & monetary only x Bank dependent	0.3	0.1	
	(0.5)	(0.1)	
Fiscal & prudential only x Bank dependent	-0.0	-0.0	
	(0.9)	(0.2)	
Fiscal & monetary & prudential x Bank dependent	1.0**	0.1***	
	(0.5)	(0.0)	
Fiscal only - Other x Bank dependent			2.3
			(1.6)
Fiscal & monetary only - Other x Bank dependent			0.2
			(0.5)
Fiscal & prudential only - Other x Bank dependent			-0.2
			(0.9)
Fiscal & monetary & prudential - Other x Bank dependent			0.8
			(0.5)
Fiscal & monetary & prudential - Large x Bank dependent			1.3*
			(0.7)
Firm FE	Y	Y	Y
Country x Quarter FE	Y	Y	Y
Health Controls	Y	Y	Y
De facto mobility Controls	Y	Y	Y
Macro Controls	Y	Y	Y
Financial Stress Controls	Y	Y	Y
Firm Controls	Y	Y	Y
R^2	0.21	0.21	0.21
Firm-Quarters	31,035	31,035	31,035
Firm	6,207	6,207	6,207
Countries	39	39	39

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What Policy Combinations Worked? The Effect of Policy Packages on Bank Lending during COVID-19

Working Paper No. **WP/2023/025**