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Financial Sector Policy Response to COVID-19 in Emerging Markets and Developing Economies

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A B S T R A C T

This paper introduces a new global database and a policy classification framework that records the financial sector policy response to the COVID-19 pandemic across 155 jurisdictions and over time. It documents that authorities around the world have taken a diverse array of measures to mitigate financial distress in the markets and for borrowers, and to support the provision of critical financial services to the real economy. Using Cox proportional hazards and Poisson regressions, the paper takes initial steps to analyze the determinants of policy makers' responsiveness and activity in emerging markets and developing economies, respectively. The results indicate that policy makers in richer and more populous countries have been significantly more responsive and have taken more policy measures. Belonging to a monetary union is also significantly associated with a faster and more frequent intervention. Countries with higher private debt levels tend to respond earlier with banking sector and liquidity and funding measures. The spread of COVID-19, macro-financial fundamentals, pressure on foreign exchange markets, political settings, and fiscal and containment policies appear to play a limited role in determining policy response. In a substantially smaller sample, the paper explores the role of banking sector characteristics and finds that emerging markets and developing economies with higher private bank credit to GDP and that have adopted Basel III reforms have taken fewer policy measures.

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1. Introduction

The macro-financial shock caused by the COVID-19 pandemic precipitated a global economic recession and put severe pressure on financial markets and institutions around the world. Policy makers reacted by implementing an unprecedented array of public health, fiscal, monetary, macroprudential, and financial measures to contain the spread of the virus and support the real economy. For example, authorities introduced travel bans, mandated the closure of businesses, limited social gatherings, and scaled up unemployment and social protection programs. Financial sector authorities undertook a complementary, wide-ranging set of temporary measures to preserve the well-functioning of core markets and maintain the provision of critical financial services to the real economy, including credit and payments, while at the same time safeguarding prudent risk management standards, bank balance sheet transparency, and financial resilience.

Financial sector policy measures have focused on providing liquidity to financial institutions and markets (e.g., lowering reserve...
requirements, purchasing financial assets); maintaining operational and business continuity (e.g., extensions of deadlines on supervisory reporting); facilitating the flow of credit and supporting borrowers that face short-term repayment difficulties either directly (e.g., lowering interest rates, introducing debt repayment moratoria, facilitating loan restructuring) or by providing regulatory relief (e.g., encouraging banks to use available capital and liquidity buffers, allowing for the flexible treatment of non-performing loans and asset classification). Several standard-setting bodies for the financial sector have also issued guidance (e.g., encouraging and clarifying the use of the flexibility embedded in the global standards) to ensure a coordinated global response and some have deferred the implementation of components of certain global standards, notably of the Basel III capital framework.

This paper introduces a new global database and a policy classification framework that records the financial sector policy response to the COVID-19 pandemic. It makes three main contributions. First, it introduces a new global database and a simple policy classification typology to support policy formulation and evaluation by authorities and researchers. Periodically updated, this unique database provides a detailed and comprehensive coverage, both over time and across countries and regions, of the emergency measures adopted by authorities to mitigate and manage the impact of the COVID-19 pandemic on the financial sector. Second, using the data available as of April 15th, 2021, the paper documents patterns of the emergency response deployed around the world and introduces the COVID-19 Financial Sector Policy Activity Index, an elementary country-level indicator that tracks the total number of financial sector measures being implemented. Third, as an initial step towards understanding the determinants of the policy response in emerging markets and developing economies, the paper explores the association between relevant country characteristics and policy makers’ speed of response and activity. This analysis sheds light on the factors that facilitated or constrained policy action which is related to a more effective and less costly resolution of financial crises (Furceri and Mourougane, 2009; Boissay et al., 2020). An in-depth analysis of the impact of policy interventions (for example, the effectiveness and potential unintended consequences of policy interventions) or the effect of the timing of financial response is left for future research.

1.1. Overview of policy response surveillance initiatives

Various surveillance efforts exist which track the policy responses to COVID-19. Some take stock of a broad range of interventions, such as fiscal, monetary, and prudential policies (e.g. IMF Policy Tracker; COVID-19 Financial Response Tracker (CFRT) by the Yale Program on Financial Stability; and OECD Country Policy Tracker5); others focus exclusively on prudential regulatory measures (e.g. Institute of International Finance’s (IIF) Regulatory Measures5) or containment and economic support measures (e.g. Oxford COVID-19 Government Response Tracker, OxCGRT6). Except for OxCGRT, the abovementioned policy tracker providers describe the description of the measures being taken, the date of the policy action, and the name of the organization that implemented the measure.

Compared to these projects, our database offers three distinctive features. First, it tracks the financial sector policy response in over 150 individual countries. While also covering several advanced economies, the database focuses on emerging markets and developing economies (EMDEs). Small and low-income economies are underrepresented in the other policy trackers (except the IMF Policy Tracker and OxCGRT), while our database provides extensive coverage of these countries.

Second, the database provides broad detail about each measure. Each entry is dated and accompanied by the relevant authority who implemented the measure as well as a short description of the contents of the measure. Where available, a link to the primary source is also provided. In addition, while most of the other policy trackers provide this information, our database expands on the termination and extension date of the measure, if applicable, allowing to observe the duration of the policy as well as its eventual amendments over time.

Third, the database adopts a tiered classification system which provides a rich typology of policy measures using objective criteria (see section 2.1 below). Other policy trackers provide a rather aggregated classification of the measures, allowing for a limited number of applications. For example, the IMF Policy tracker distinguishes between three groups of policies, namely fiscal, monetary and macro-financial, and exchange rate and balance of payments. We provide instead a more granular classification of policies to Banking Sector, Financial Markets and Non-bank financial institutions (NBFI), Liquidity and Funding, and Payment Systems measures that are further disaggregated into focus areas (see Table 1 for more detail). For example, focus areas of the banking sector policies include integrity, operational continuity, crisis management, support to borrowers as well as prudential measures, all of which were key to provide a wide-ranging response to the challenges posed by the crisis. Taken together, these features enhance the ability of both policy makers and researchers to comprehensively analyze and benchmark policy responses and their impacts at different stages of the pandemic at the local, regional and global levels.

1.2. Related literature

This paper contributes to a small, but burgeoning literature that explores the impact of COVID-19 on the financial sector, analyzes the drivers of the policy response, and evaluates policy effectiveness.

The financial sector has been put under strain by the COVID-19 crisis. Core markets became dislocated, EMDEs experienced massive capital outflows, and some borrowers faced liquidity and repayment challenges (e.g., BIS (2020), IMF (2020), and Powell and Rojas-Suárez (2020)). Due to a concerted effort by policy makers, market functioning was largely restored, risk asset prices rebounded, capital flows to EMDEs resumed, and credit to the real economy was largely maintained. However, downside risks still loom large and legacy challenges of elevated debt and non-performing loan levels may adversely interact with the pandemic’s impact in some countries. The pandemic represents the first major test of the G20 global regulatory reforms since the 2007-2009 Global Financial Crisis (GFC). As a result of these reforms, the global financial system entered the pandemic on a strong footing and was able to mitigate rather than amplify the shock (Financial Stability Board, 2020). The sector also plays a central role in contributing to the foundations of economic recovery (Beck, 2020).

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4 The IMF Policy Tracker is available at: https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19.
5 The Yale policy tracker is available at: https://sum.yale.edu/faculty-research-centers/centers-initiatives/program-on-financial-stability/covid-19-tracker.
6 The OECD Country Policy Tracker is available at: https://www.oecd.org/coronavirus/country-policy-tracker/.
7 The IFI prudential regulatory measures can be retrieved at: https://www.ifi.com/Portals/0/Files/Databases/COVID-19_regulatory_measures.pdf?ver=2021-02-05-140736-500.
6 OxCGRT is available at: https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker.
Table 1
Classification of the Financial Sector Policy Response to COVID-19.

| Category                              | Focus                      | All countries | High Inc. | EAP | ECA | LAC | MENA | SAR | SSA |
|---------------------------------------|----------------------------|---------------|-----------|-----|-----|-----|------|-----|-----|
| Banking sector                        | Prudential                 | 2068          | 1027      | 133 | 294 | 225 | 49   | 180 | 160 |
|                                       | Support borrowers          | 1067          | 618       | 51  | 148 | 90  | 15   | 71  | 74  |
|                                       | Integrity                  | 855           | 352       | 64  | 128 | 110 | 32   | 92  | 77  |
|                                       | Operational continuity     | 69            | 27        | 8   | 7   | 15  | 0    | 8   | 4   |
|                                       | Crisis management          | 60            | 26        | 7   | 5   | 9   | 1    | 8   | 4   |
| Financial Markets and NBFIs          | Market functioning         | 483           | 222       | 36  | 60  | 60  | 3    | 58  | 36  |
|                                       | Non-bank financial institutions | 147               | 83         | 8   | 17  | 13  | 0    | 12  | 14  |
|                                       | Public debt management     | 46            | 10        | 11  | 4   | 9   | 0    | 4   | 8   |
| Monetary and liquidity conditions    | Liquidity support          | 907           | 350       | 76  | 101 | 155 | 19   | 70  | 136 |
|                                       | Easing of policy rates     | 247           | 50        | 35  | 38  | 46  | 11   | 18  | 49  |
|                                       | Asset purchases            | 90            | 72        | 2   | 1   | 5   | 0    | 4   | 6   |
| Payments systems                      | Digital payments           | 278           | 39        | 20  | 30  | 32  | 25   | 30  | 102 |
|                                       | Easing regulatory requirements | 209                | 26        | 18  | 19  | 23  | 18   | 21  | 84  |
|                                       | Consumer protection and availability of cash | 25            | 3         | 0   | 4   | 6   | 0    | 3   | 9   |
| TOTAL                                 |                            | 3738          | 1648      | 265 | 485 | 472 | 96   | 338 | 434 |

Panel B. Number of countries that took at least one measure (up to April 15th, 2021)

| Category                              | Focus                      | All countries | High Inc. | EAP | ECA | LAC | MENA | SAR | SSA |
|---------------------------------------|----------------------------|---------------|-----------|-----|-----|-----|------|-----|-----|
| Total # of countries Banking sector   | Prudential                 | 155           | 37        | 25  | 19  | 25  | 10   | 8   | 41  |
|                                       | Support borrowers          | 150           | 37        | 14  | 19  | 25  | 10   | 8   | 37  |
|                                       | Integrity                  | 121           | 33        | 11  | 18  | 21  | 3    | 7   | 28  |
|                                       | Operational continuity     | 142           | 37        | 14  | 19  | 25  | 10   | 8   | 29  |
|                                       | Crisis management          | 50            | 24        | 3   | 7   | 8   | 0    | 5   | 3   |
| Financial Markets and NBFIs          | Market functioning         | 84            | 28        | 7   | 12  | 8   | 1    | 4   | 24  |
|                                       | Liquidity support          | 63            | 21        | 7   | 10  | 8   | 1    | 4   | 12  |
|                                       | Asset purchases            | 51            | 26        | 4   | 6   | 7   | 0    | 3   | 5   |
| Monetary and liquidity conditions    | Easing of policy rates     | 26            | 8         | 2   | 4   | 2   | 0    | 2   | 8   |
|                                       | Asset purchases            | 145           | 36        | 13  | 18  | 23  | 7    | 8   | 40  |
| Payments systems                      | Digital payments           | 127           | 33        | 12  | 14  | 20  | 5    | 8   | 35  |
|                                       | Easing regulatory requirements | 109           | 25        | 12  | 15  | 19  | 5    | 5   | 28  |
|                                       | Asset purchases            | 34            | 20        | 1   | 1   | 4   | 0    | 2   | 6   |
|                                       | Consumer protection and availability of cash | 90            | 21        | 6   | 10  | 12  | 7    | 6   | 28  |

Source: World Bank COVID-19 Financial Sector Policy Response Database.
Note: High Inc. = High income; EAP = East Asia Pacific; ECA = Europe & Central Asia; LAC = Latin America & Caribbean; MENA = Middle East & North Africa; and SSA = Sub-Saharan Africa. WBG regions exclude high income countries. Focus measures under the category payments systems do not sum up to the aggregate numbers (reported in bold) as the residual category “Other” has been excluded from the table.

Few studies exist that provide a cross-country overview and rationale for the usage of different policy instruments to mitigate the impact of the COVID-19 crisis. Benmelech and Tzur-Ilan (2020) analyze the determinants of fiscal and monetary policies during the COVID-19 crisis. This study shows that high-income countries, and especially those with high credit ratings, announced larger fiscal policy packages. Further, high-income countries used predominantly non-conventional monetary policy as they entered the crisis with interest rates close to the zero-lower bound. Moreover, some central banks in EMDEs were able to cut interest rates even in the face of currency depreciation and capital outflows, in part because cross-border spillovers of monetary policy intervention in advanced economies reduced the pressure to engage in procyclical domestic policies (Aguilar and Cantú, 2020).

As the pandemic continues to unfold and the outlook remains uncertain, the literature on the effectiveness of the policy response remains sparse, but a few exceptions exist. First, quantitative easing proved to be effective at boosting prices and lowering spreads in the United States (Haddad et al., 2020) as well as reducing local government bond yields both in developed and developing economies (Hartley and Rebucci, 2020). Second, distinguishing between fiscal transfers and credit policies, Bigio et al. (2020) show that the former is preferable when debt limits are tight, whereas the latter is preferable when they are slack. Moreover, a credit policy has the advantage of targeting fiscal resources toward agents that matter most for stabilizing demand. In this regard, Li et al. (2020) analyze credit provision by banks in the United States and show a much larger increase in lending at banks near large COVID-19 outbreaks. Pre-crisis financial conditions did not limit US banks’ ability to supply liquidity, mostly due to inflows of funds from both the Federal Reserve and strong capital positions prior to the crisis. Third, with regards to the influence of stabilization policies on the banking sector, Aldasoro et al. (2020) suggest that policy measures have favored banks with higher profitability and healthier balance sheets, while less profitable banks saw their long-term rating outlooks revised to negative and their CDS spreads continued increasing. Using the database presented in this paper, Demirgüç-Kunt et al. (2020) show that measures of liquidity support, borrower assistance, and monetary easing moderated the adverse impact of the pandemic on banks’ stock prices. However, the effect is heterogeneous across banks and countries. Banks that were already undercapitalized and/or operated in countries with little fiscal space were adversely affected by borrower assistance and prudential measures. Beck and Keil (2021) show that government-guaranteed loans are key to explain increases in US bank lending to corporates, especially small businesses, in the proximity of the areas hit hardest by the pandemic and subject to lockdown measures. Finally, there is not much evidence on the effect of emer-
ergency prudential regulations and banks’ internal policies on banks per se. Bergant and Kockers (2020) show that for the case of Ireland the most common measure taken by banks, that is an increase in drawdown limits of credit lines, was effective in the short run, but no other measure (e.g., suspension of installment payments, the extension of loan maturity, credit rollover, and decrease in interest rates) significantly reduced the probability of default in the long run. Moreover, forbearance and new lending are interlinked, as new lending is subduced because capital and other resources within the bank are allocated to forborne loans. On the contrary, for a sample of European banks, Altavilla et al. (2020) argue that in the absence of funding and capital relief, banks’ ability to supply credit to the real economy would have been severely affected.

We add to these studies by analyzing the determinants of the speed and magnitude of the policy response to the negative macroeconomic effects of the spread of COVID-19. Past research has demonstrated how early intervention can be more effective in containing financial crises contributing to lowering government fiscal costs. For example, Laeven and Valencia (2010) argue that effective and fast crisis resolution has contributed to lowering the direct fiscal outlays of government intervention in the wake of the GFC. Homar and van Wijnenberg (2017) posit that early recapitalization of banks diminishes significantly the negative macroeconomic impact of financial crises. Thus, we seek to uncover the country characteristics associated with a faster and more active response to COVID-19 though we do not assess whether the speed and magnitude of response are associated with better outcomes in terms of mitigating the negative effects of the spread of COVID-19 on the economy and the financial sector.

Our results indicate that policy makers in richer and more populous countries have been significantly more responsive and have taken more policy measures. Countries that belong to a monetary union were also faster and more active in introducing new policy measures. Banking sector and liquidity and funding measures were introduced earlier in countries with high private debt levels. At the same time, the spread of COVID-19, macro-financial fundamentals, fiscal and containment policies, pressure on foreign exchange markets, and political and institutional settings played a limited role in determining policy response. Further, the paper finds that countries with higher private credit to GDP as well as countries that have adopted Basel III reforms have taken fewer policy measures.

The remainder of the paper is structured as follows. Section 2 introduces the COVID-19 Financial Policy Response Database and the policy classification framework. Section 3 describes the methodological approach to analyze the determinants of the policy response and Section 4 documents the empirical results. Section 5 concludes.

2. COVID-19 Financial Policy Response Database

In this section, we present the new global database that collects financial sector policy measures that have been publicly announced by the governments, central banks, and financial sector authorities in 155 jurisdictions since the outbreak of the COVID-19 pandemic (see Appendix C for the list of countries). The database offers a regularly updated repository of emergency measures, adopted by domestic authorities with a focus on EMDEs. Policy measures and guidance provided by a selected group of large advanced economies and relevant supranational authorities (central banks in regional monetary unions) are also included in the database given their role as benchmarks to ensure a globally coordinated policy response.9

We classify policy measures according to five broad categories: liquidity and funding; banking sector; payments and financial market infrastructures; financial markets and non-bank financial intermediaries; and insolvency. The fifth category, insolvency, has represented hitherto a residual category hence we discuss below the four main policy categories for which information is available for most countries in the sample.

2.1. Classification of measures

2.2.1. Measures that focus on liquidity and funding conditions

In the first phase of the pandemic, in many countries market liquidity evaporated, and funding markets were severely strained. Large capital outflows from many emerging markets amplified market moves and eclipsed the outflows seen during the 2007-2009 Global Financial Crisis. Many central banks reacted by easing monetary conditions and injecting domestic currency liquidity through banks. In some cases, exceptional measures were taken, and liquidity was also provided through standing credit facilities to non-bank financial institutions and corporates in affected sectors, offering lending on favorable terms and longer tenors. The primary objectives of these measures were safeguarding liquidity conditions and ensuring the smooth flow of credit from banks to the real economy (Cavallino and De Fiore, 2020; Lane, 2020). Central banks in advanced, and for the first time in several emerging markets, have relied on local government bond purchases to ease financial conditions and restore liquidity in local capital markets (Benigno et al., 2020). Moreover, confronted with outflows that caused currency depreciation and volatility and US dollar shortages, several monetary authorities in EMDEs intervened in foreign exchange markets and established temporary swap lines with other central banks, notably the US Federal Reserve.

2.2.2. Measures that focus on the banking sector

Many authorities around the world implemented temporary relief measures in support of borrowers and to ensure the flow of credit to the real economy while safeguarding banks’ resilience (Drehmann et al., 2020). These measures seek to avoid a rise of insolvencies of cash-strapped, but otherwise viable businesses,10 by providing direct support to borrowers in the form of, inter alia, public guarantees for bank loans, state subsidies, debt repayment moratoria, or encouraging loan restructuring.11 This category also includes all prudential measures seeking to support and encourage the use of the flexibility embedded in global prudential standards (e.g. the use of capital and liquidity buffers,12 the treatment

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9 In addition to EMDEs, the following jurisdictions are tracked in the database: United States, United Kingdom, Japan, European Union/European Monetary Union, Standard Setting Bodies (SSBs, such as the Financial Stability Board), Australia, Canada, Germany, France, Italy, and Spain.

10 Around 50 percent of firms do not have sufficient cash buffers to cover their debt servicing and operating costs as a result of the COVID-19 shock (Banerjee et al., 2020). Moreover, a simple balance sheet stress test based on pre-COVID-19 data suggests that non-financial companies in EMDEs may be vulnerable to liquidity and earnings shocks (Feyen et al., 2020).

11 See, for example, EBA (2020) for an overview of debt moratoria and public guarantee schemes in the European banking sector. In addition, Yaman and Aizawa (2021) show that the introduction of a public credit guarantee system in Japan eliminated guarantee fees and interest costs, resulting in an explosive rise in credit guarantee use from May 2020 onwards. This enabled SMEs to borrow despite the significant decline of the macroeconomy.

12 The estimates by Levrick et al. (2020) suggest that the release of capital buffers (counter-cyclical capital buffers and other supervisory and management buffers) could unlock about US$5 trillion of additional loans, or 6% of total outstanding loans. In addition, restrictions on dividends can improve the effectiveness of the counter-cyclical capital buffer release as well as ensure provision of credit to firms and households (Muñoz, 2020; Beck et al., 2020).
of restructured loans, the treatment of non-performing exposures) while setting supervisory expectations about the use of such flexibility, for example by introducing payout restrictions to ensure that released buffers are used to maintain the flow of credit) and transparency requirements. This category also includes measures aimed at bringing prudent flexibility to financial integrity requirements to help address COVID-19 related challenges (e.g., supporting digital onboarding, simplified due diligence). In addition, under this group there are crisis management measures, but few have been taken thus far (mainly introducing or modifying resolution tools and deposit guarantee funds so that they are fit for purpose in case of need).

2.2.3. Measures that focus on financial markets and non-bank financial institutions (NBFI$s)

Several countries banned short selling to curtail market volatility and some even decided to temporarily close their financial markets when circuit breakers were triggered. Market authorities also issued prudential and conduct measures to ensure the proper functioning of financial markets amid the crisis and to give guidance and support to market players other than banks as asset managers and insurance companies (NBFI$s). This category also includes public debt management actions, although few have been taken so far. However, strains in capital markets may prompt policy makers to adjust their debt management strategies including identifying funding from other sources to reduce pressure on traditional wholesale market borrowing.

2.2.4. Measures that focus on payments and financial market infrastructures

Several countries took measures to ensure the smooth functioning of market infrastructures, notably the payment systems, including the relaxation of non-essential compliance requirements. Most importantly, financial authorities ensured the availability and acceptance of cash and digital payment methods. Among other reasons, this has been essential to disburse relief payments from governments to firms and individuals (e.g., through digital financial services) and to mitigate the shock to remittances flows, especially in low-income countries.

2.3. Patterns of policy measures taken as of April 15, 2021

As of April 15, 2021, the database contains more than 3,700 individual financial policy response measures. Table 1 shows the measures by category (Level 1) and focus area within each Level 1 category (Level 2). Figure 1 presents the evolution of the cumulative number of measures taken since the World Health Organization (WHO) declared the COVID-19 a public health emergency of international concern on January 30\textsuperscript{th}, 2020. Most financial sector measures pertain to the banking sector, followed by liquidity and funding measures. In absolute terms, EMDEs account for 56% of the total number of measures tracked. By region (ignoring that some regions comprise more countries than others), Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA), and Europe and Central Asia (ECA) each account for approximately 13%; the East Asia and Pacific (EAP) region and the South Asia Region (SAR) account for 7% and 9% of the global total respectively, and the Middle East and North Africa (MENA) region for 3%, the lowest overall tracked activity.

All of the 155 countries covered in the database issued at least one measure, 95% put in place at least two, and 71% at least three. Globally, most measures fall into the Banking Sector category (55%), followed by Liquidity and Funding (24%). In both categories, almost all countries have taken at least one policy action. Conversely, less than 60% of countries have adopted at least one measure in the Payment Systems or Financial Markets and NBFI$s categories.

Figure 1 shows that of all measures taken by April 15, 2021, 35% were put in place by April 1\textsuperscript{st} and 71% by June 1\textsuperscript{st}. A similar pattern is observed for the Banking Sector category, where 33% and 71% of the measures in this group were undertaken by April 1\textsuperscript{st} and by June 1\textsuperscript{st}, respectively. For Liquidity and funding measures, relatively more measures were put in place early in the observation period with 41% of measures recorded by April 1\textsuperscript{st} and 70% by June 1\textsuperscript{st}. Similarly, most of the measures recorded in the Payment Systems category have been taken by June 1\textsuperscript{st} (85%). Lastly, relatively fewer Financial Markets and NBFI measures were put in place by June 1\textsuperscript{st} (64%).

The five most frequent focus areas (Level 2) represent 80% of all measures: Prudential (29%), Borrower Support (23%), Liquidity Support (15%), Policy Rates (7%), and Digital Payments (6%). Within the set of Prudential measures, over two-thirds aim to facilitate the banks’ role to maintain lending. These measures aim, inter alia, at providing flexibility in the treatment of non-performing loans, re-leasing or deferring capital buffers, and offering guidance on supervisory expectations, for example regarding the distribution of payouts or the treatment of loans covered by debt repayment moratoria.

2.4. Financial Sector Policy Activity Index

This section introduces the Financial Sector Policy Activity Index (FSPIAI), a simple, transparent proxy that can be used to compare financial sector policy activity across countries. FSPIAI is computed by summing up all the policy measures implemented up to time (t) in country (c) across the four categories: Banking Sector, Financial Markets and NBFI$s, Liquidity and Funding, and Payments Systems.\textsuperscript{16} As such, it is important to keep in mind that the FSPIAI is silent on the scale and effectiveness of the financial policy response.\textsuperscript{17} Figure 2 displays the FSPIAI and shows that most financial sector policy makers around the world have been active, although to a lesser extent in Middle East and North Africa (see Table A3 in Appendix A for the descriptive statistics of FSPIAI by country groupings).

As of April 15, 2021, the mean FSPIAI stood at around 24 measures, but the variability is relatively high (standard deviation equals approximately 27 measures). The box plot in Figure 3 offers a closer look at the distribution of the FSPIAI across country groupings. High income and SAR are the country groupings that exhibit the highest group median FSPIAI (around 40 and 33 measures respectively). The group median FSPIAI is under 10 in LAC,
3. Determinants of the Financial Sector Policy Response to COVID-19: Empirical approach

3.1. Modeling the time until the first policy measure is taken in each category

The variable of interest is the time elapsed (in days) between the date when a country undertook its first policy measure in a specific category (e.g., Banking Sector) and January 30, 2020, the date when WHO declared COVID-19 to be a Public Health Emergency of International Concern (PHEIC). An “event” is recorded the first time a country takes a policy measure in one of the four categories described in Section 2.1. Thus, we are analyzing four separate events by following each country during the period between January 30, 2020, and April 15, 2021, the end of the study period. Countries that have not (yet) implemented a policy in a specific category as of April 15, 2021, are right-censored.\(^\text{19}\)

\(^{18}\) The timing of the spread of the virus was uneven across different regions and, therefore, advanced economies that were affected by the pandemic first might have also been the first to respond. At the same time, many countries had very few or no cases at all, but their economies and financial systems were exposed through cross-border financial and economic linkages with the rest of the world (i.e., spillovers from other economies under lockdowns). Therefore, we chose to use January 30, 2020 as a starting point, the date the WHO declared the COVID-19 outbreak to be a Public Health Emergency of International Concern, and many countries started responding (often preemptively) to the health and economic crisis.

\(^{19}\) In econometric analyses that model durations, right censoring arises when the specific event under study has not transpired during the observation period (but
We employ two widely used methodologies in the survival analysis literature: Kaplan-Meier (KM) survival curve estimates and Cox Proportional Hazards regression. The KM estimator provides the unconditional probability of the occurrence of an event – in this case, the first time a policy measure in a specific category is taken – during a certain interval (Kaplan and Meier, 1958). This non-parametric approach allows us to estimate and compare separate survival curves for country groups with different characteristics (e.g. high versus low income).

One limitation of KM estimates is that they do not allow for multivariate analysis. We, therefore, employ Cox proportional hazards regression (Cox, 1972; 1975), a semi-parametric approach. A key assumption underlying Cox regression is that the independent variables scale a baseline hazard function \( λ_0(t) \) that only depends on time. In our case, the unit of time \( t \) is a day.

\[
λ_c(t|X_c, β) = λ_0(t) \times \exp(βX_c)
\]

where the subscript \( c \) denotes a country and \( λ_c \) is the conditional hazard rate. The Cox model does not impose any functional form on \( λ_0(t) \). The multiplicative term \( \exp(βX_c) \) (also known as scale factor) comprises a vector of country characteristics \( X_c \) that affects the hazard function \( λ_c \). The relevant country characteristics are described in the next section.

### 3.2. Country determinants of policy response

In this section, we describe six groups of country characteristics that may help explain the policy response to COVID-19 for which there are sufficient data across countries: domestic exposure to COVID-19; COVID-19 containment and economic support policies; economic development; macro-fiscal fundamentals; political settings; and banking sector characteristics. In addition to these covariates, we also include in the estimations variables that capture spillover effects from neighboring countries. In detail, we compute for each dependent variable, a regressor that captures the response of neighboring countries in a specific category.\(^{20}\)

#### 3.2.1. Domestic exposure to COVID-19

Higher exposures to COVID-19 call in principle for a stronger policy response. We compute the number of days elapsed since the WHO declaration, for the cumulative COVID-19 cases to exceed 100 people as a proxy for the sense of urgency to respond to the spread. We also test the sensitivity of our estimates using the cumulative number of confirmed COVID-19 cases per 100,000 people and the time taken to reach 100 COVID-19 death cases as relative measures of exposure to COVID-19.\(^{21}\) The data are taken from the World Health Organization.\(^{22}\)

#### 3.2.2. COVID-19 containment and economic support policies

Policies that aim to restrict community mobility to stem the spread of COVID-19 have also impeded economic activity and revenue mobilization which puts pressure on public, private, and financial balance sheets. Many countries have adopted fiscal stimulus measures to stimulate the economy. Some of these measures directly support the financial sector through guarantees and may therefore necessitate or complement a financial sector policy response. The data are taken from the Oxford Government Policy Response Tracker (see Appendix A for more detail).

#### 3.2.3. Economic development

The level of economic development can be interpreted as a broad proxy of available economic resources and buffers to respond to COVID-19, as well as differences in economic structure, financial development, and institutional frameworks. We expect countries with higher economic development to be more active

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\( ^{20} \) For each country, we construct this variable by taking the average time of response in each category of countries sharing a border. If a country does not share a border or information on neighbors is not available, we consider the regional average.

\( ^{21} \) As the results are very similar to those already presented in the paper, we do not report the estimates with these alternative measures of exposure to COVID-19 (the results are available upon request).

\( ^{22} \) A description of the data and the methodological underpinnings can be found here: [https://covid19.who.int/](https://covid19.who.int/).
in their policy response as highlighted by Benmelech and Tzurllan (2020). The notable exception could be the policy response on the Payments Systems category. As more developed economies have more developed payment systems, additional policy measures in this category could be less needed. Therefore, the observed correlation between economic development and policy response might be negative. We use GDP per capita (expressed in current international dollars converted by purchasing power parity (PPP)) as per the end of the year 2019 as a measure of economic development. Data is taken from the World Bank’s World Development Indicators.

3.2.4. Macro-financial fundamentals

On the one hand, the current account, fiscal deficits, and high levels of public and private debt may limit the capacity to mount an effective policy response. On the other hand, external and debt sustainability vulnerabilities as well as crowding out effects could amplify the economic shock of the COVID-19 prompting authorities to respond faster and at a larger scale. As shown in March-April 2020, market gyrations could be severe in EMDEs putting domestic financial authorities under pressure. We use five indicators: the 2019 current account balance from the IMF World Economic Outlook (April 2020); the 2019 general government net lending (borrowing) taken from the IMF World Economic Outlook (April 2020); the 2018 total private-sector debt and total public sector debt as a percentage of GDP sourced through the World Bank and IMF Global Debt databases; and an external pressure index measured via developments in the domestic exchange rate vis-à-vis the US dollar and foreign reserves (see Table A1 for an in-detail explanation).

3.2.5. Political arrangements

Another set of explanatory variables relates to the political arrangements and quality of institutions. Namely, we check whether countries that have presidential systems are faster in implementing financial sector policies in response to COVID-19 assuming that presidential systems are associated with more flexibility and faster decision-making processes relative to their majoritarian counterparts. In addition, the literature suggests that democracies have higher GDP per capita (Acemoglu et al., 2019) as well as lower cost of credit (Delis et al., 2020) and yield spreads (Qi et al., 2010). Therefore, we explore whether countries that are electoral democracies have a different appetite for magnitude and speed of the fi-
nancial policy response. We also check whether the level of institutional quality as measured by the functioning of government matters for policy responses, since stronger institutions enhance the credibility of the government and facilitate the effectiveness of the adopted measures (Qian and Strahan, 2007). Finally, we include a dichotomous variable to capture whether a country is a member of an economic or monetary union. The coordination of monetary, economic, and fiscal policies may be related to a faster and more frequent financial sector response by member countries.

3.2.6. Banking sector characteristics

The initial state of the banking sector may also influence the reaction function of financial sector authorities, depending on the availability of capital buffers, quality of bank assets, and the relative size. We explore the role of the following variables: regulatory Tier 1 capital to risk-weighted assets (IMF Financial Soundness Indicators, end-2019), ii) non-performing loans as a percent of total gross loans (IMF Financial Soundness Indicators, end-2019), iii) bank credit to the private sector as a percent of GDP (World Bank WDI, end-2019), and iv) adoption of the capital requirements of the Basel III framework (which includes the creation of new buffers and the need for more and higher-quality capital; data is taken from the Bank Regulation and Supervision Survey, 2016). However, the sample size for estimation decreases significantly, so we report regression results in Appendix C as they need to be interpreted with more care.

4. Determinants of the Financial Sector Policy Response to COVID-19: Empirical Results

4.1. Time until the first policy response is taken: Kaplan-Meier survival estimates

Table 2 reports the descriptive statistics on the time taken (measured in days) to implement the first policy measure by category. With a median of 50 days, Banking Sector and Liquidity and Funding measures were implemented faster compared to other categories. By the end of March 2020, around 21 percent of countries had taken their first measure in the Banking Sector and Liquidity and Funding categories. In contrast, by that time, around 10 percent of countries had implemented measures in the Financial Markets and NBFS and Payments Systems categories.

The panels in Figure 5 each display two Kaplan-Meier survival curve estimates corresponding to a group of lower- and higher-income countries, respectively. In doing so, we split the country sample on median GDP per capita. For the Banking Sector, Financial Markets and NBFS, and Liquidity and Funding categories, the curves appear to show that financial sector policy makers in more developed countries responded faster compared to less developed economies. For example, in the Banking Sector category, almost all higher-income countries had taken at least one measure after 60 days since the WHO declaration - for lower-income countries, it took around 120 days. In contrast, in the Payments Systems category, less developed countries were faster in implementing payment systems measures. The log-rank test of the equality of the survival curves shows there is a significant difference (p-value < 0.01) in the policy reaction time between higher and lower-income countries, except for the Payments Systems category (p-value = 0.28).25

While illustrative, these univariate results should be interpreted with caution. For example, some advanced countries experienced a COVID-19 outbreak before some developing economies did. As such, the level of economic development could be correlated with COVID-19 exposure. We, therefore, explore these results in more detail using Cox regression in the next section focusing on EMDEs countries only.

4.2. Time until the first policy response is taken in EMDEs: Cox proportional hazards regression

Table 3 presents the hazard ratios of the Cox multivariate regressions. Broadly speaking, a hazard ratio greater than one indicates that the hazard of a policy being implemented for the first time is higher for countries with a higher value compared to countries with a lower value (e.g., a hazard ratio of 1.5 means that the proportional change of the baseline hazard is 1.5 for a 1-unit increase in the independent variable). In other words, these countries are more likely to take their first policy response sooner. For each category, Table 3 displays a baseline model which includes economic development (log GDP per capita (USD)), size of population (log population size), and domestic exposure to COVID-19 (Days until the 100th COVID-19 case). We also include a set of macro-fiscal fundamentals to explore other relevant predictors of the speed of implementation of financial policies (Total private sector debt (% GDP); Total public sector debt (% GDP); Current account (% of GDP); Fiscal balance (% of GDP)).

Economic development and population size are the most statistically significant predictors in the regressions across the different categories. EMDEs with higher GDP per capita were faster in putting in place financial policies in the Banking Sector, Financial Markets and NBFI, and Liquidity and Funding categories (Table 3, columns 1 to 6), presumably because of, among other factors, larger policy space, more resources, and stronger institutional frameworks compared to developing countries. We also find some

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23 The descriptive statistics in Table 2 reflect the fact that countries are right-censored, i.e. we assign to these countries the maximum value (216) to the time until the first policy measure was implemented. In ancillary regressions not shown in the paper we drop from the sample those countries that did not implement a measure in a specific category over the period in analysis. Results, available from the authors upon request, remain qualitatively the same.

24 For the sake of brevity, we just report the KM survival curve estimated for GDP per capita as this variable shows the strongest univariate relationship with the time of implementation of the first policy. Results for the other determinants are available from the authors upon request.

25 For brevity, we just report results of the log-rank test of equality. As robustness, we also performed the Wilcoxon-Breslow-Gehan test (Breslow, 1970; Gehan, 1965), which gives more weight to events occurred at early time points; and the Peto-Peto-Prentice test (Peto and Peto, 1972; Prentice, 1978) to account for higher ratio of hazards earlier in the time period. These produce qualitatively similar results.
**Table 3**

Cox Regression: Time Until the First Policy Response in EMDEs by Category (days since January 30th, 2020).

| VARIABLES                          | (1) Banking Sector | (2) Financial Markets and NBFIs | (3) Liquidity and Funding | (4) Payments Systems |
|------------------------------------|--------------------|---------------------------------|---------------------------|---------------------|
| Log GDP per capita (USD)           | 1.730***           | 1.497***                        | 1.339***                  | 1.285***            |
|                                    | (0.195)            | (0.200)                         | (0.149)                   | (0.176)             |
| Log population size                | 1.118*             | 1.092                           | 1.307***                  | 1.374***            |
|                                    | (0.067)            | (0.077)                         | (0.069)                   | (0.084)             |
| Days until 100th COVID-19 case     | 0.999              | 0.999                           | 1.001                     | 1.001               |
|                                    | (0.001)            | (0.001)                         | (0.001)                   | (0.001)             |
| Government debt (% GDP)            | 0.995*             | 0.999                           | 0.993**                   | 0.997               |
|                                    | (0.003)            | (0.002)                         | (0.003)                   | (0.002)             |
| Private debt (% GDP)               | 1.018***           | 1.007**                         | 1.006                     | 0.995***            |
|                                    | (0.005)            | (0.004)                         | (0.004)                   | (0.003)             |
| Current account (% of GDP)         | 0.992              | 1.003                           | 0.993                     | 0.987               |
|                                    | (0.009)            | (0.009)                         | (0.011)                   | (0.008)             |
| Fiscal balance (% of GDP)          | 1.002              | 1.005                           | 0.988                     | 0.949**             |
|                                    | (0.029)            | (0.019)                         | (0.024)                   | (0.020)             |
| Dependent var. - Neighbor countries| 1.007              | 0.995**                         | 0.996                     | 1.001               |
|                                    | (0.004)            | (0.002)                         | (0.006)                   | (0.002)             |

Observations | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 117 |

Pseudo R²       | 0.0306 | 0.056 | 0.0153 | 0.0255 | 0.0272 | 0.0398 | 0.018 | 0.0271 |

Note: The sample consists of EMDEs countries only (i.e., upper-middle, lower-middle, and low-income countries). The dependent variable is the time until 1st response for each policy category. Hazard ratios and robust standard errors are reported. For each specification, we test the proportional-hazards assumption separately for each covariate. The row "Neighbor countries" reports the hazard ratios for the average days taken by countries sharing a border to implement the first banking sector measure (column 2), financial markets and NBFIs measure (column 4), liquidity and funding measure (column 6), and payments systems measure (column 8). We cannot reject the null hypothesis at the 10% level for all variables except the log of GDP per capita in columns 1 (p-value 0.07), and 3 (p-value 0.05); the log of population size in columns 3 (p-value 0.01), 4 (p-value 0.08), and 7 (p-value 0.02). *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.
evidence that EMDEs with higher economic development were slower in implementing policies in the Payments Systems category (Table 3, column 7).

Authorities in more populous countries have reacted faster than authorities in less populated countries, especially in the Financial Markets and NBFI, Liquidity and Funding, and Payments Systems categories, perhaps because of scale economies related to regulation and supervision. Moreover, higher domestic exposure to COVID-19 is not associated with the speed of implementation of policies, except for the Payment Systems category (Table 3, column 7). In addition to the basic set of predictors, we also find statistically significant relationships between the level of private-sector debt and the time of implementation of Banking Sector, Liquidity and Funding, and Payments Systems policies, possibly indicating that countries with deeper financial sectors and/or higher financial risks have responded differently. For the Banking Sector and Liquidity and Funding measures, they were more likely to respond earlier. The opposite appears to be the case for Payment Systems. Similarly, economies with a higher fiscal deficit (Fiscal balance (% of GDP)) were faster in implementing Payments Systems measures (Table 3, column 8). Countries with lower public debt levels were more likely to respond earlier with Banking Sector and Liquidity and Funding measures, potentially because their public debt markets are shallower (Table 3, columns 2 and 6). We also include a variable capturing the average speed of response in each category of countries sharing borders (denoted as “Neighbor countries” in Table 3) to control for spillover effects from neighboring countries. We find that faster response by neighbors is associated with later response in the Financial Markets and NBFI category (Table 3, column 4). Finally, we do not find evidence of the current account playing a significant role in the speed of policy intervention in any policy category.

In terms of the magnitude of the estimated associations, a one-percent increase in GDP per capita increases the baseline hazard by at least 0.25 percent in the Financial Markets and NBFI category (Table 3, column 4), holding all the other predictors constant. Population size shows the largest effect for measures in the Liquidity and Funding category: a one-percent increase in population size is associated with a 0.33 percent increase in the hazard (Table 3, column 6). In contrast, EMDEs countries where the domestic exposure to COVID-19 measure is lower have a lower hazard (0.1 percent as reported in Table 3, column 1). In terms of total private sector debt (as % of GDP), a 1-percentage point increase is associated with an increase in the hazard of 1.8 percent (Table 3, column 2).

Table 4 presents the results for the Cox regressions that include additional predictors such as External pressure as well as variables related to the political setting and quality of institutions (Electoral democracy; Functioning of government; and Presidential system). The results suggest that countries with high external pressure implemented measures related to Financial Markets and NBFI faster. As financial markets were the first to react to the spillover effects coming from the other countries, it is not surprising that authorities responded to the external pressure by imposing measures to calm down the financial markets and ensure their smooth functioning. Further, we observe that countries with presidential systems reacted faster with imposing Liquidity and Funding measures. In addition, countries with a better functioning government were the first ones to respond by imposing Banking sector, Liquidity and Funding and Payment systems measures.

In ancillary regressions reported in Appendix B, Table B1, we explore the role of additional banking sector characteristics at the start of the pandemic. By including these variables, the sample size decreases substantially, so the results should be interpreted with caution. First, the baseline results presented in Table 3 hold after including these additional explanatory variables. Second, none of these additional variables are consistently and significantly associated with the speed of implementation of the measures in all policy categories. However, regulatory Tier 1 capital is positively associated with a faster response in the Banking Sector category. Private bank credit (as % of GDP) is also associated with a faster response in the Banking Sector category, while countries that have adopted the capital requirements of the Basel III framework are slower in adopting Financial Markets and NBFI measures.

4.3. Financial Sector Policy Activity Index in EMDEs

Table 5 shows Poisson regressions with the FSPAI as the dependent variable. Column 1 documents that EMDEs with higher GDP per capita implemented more financial policy measures. This perhaps suggests that financial supervisors in more developed countries may have more resources to do so. The statistical significance of population size suggests that scale economies may also matter for financial supervisors. These results appear economically meaningful. For example, using the estimated coefficients in Table 5, column 4, a one-percent increase in GDP per capita increases the mean value of the total policies by 0.63 percent. Similarly, a one-percent increase in population size increases the mean value of total policies by 0.34 percent. In contrast, the spread of COVID-19 and the average number of policies taken by neighboring countries do not appear to be a significant factor. Column 2 indicates that macro-financial factors do not play a significant role either. Further, Column 3 shows there is no significant association between financial policy activity and COVID-19 containment and fiscal support policies. Column 4 confirms these findings. We also find a negative association between the number of implemented financial sector policies and the amount of private debt to GDP.

Table 6 reports the results for Poisson regressions with disaggregated indexes (Banking Sector, Financial Markets and NBFI, Liquidity and Funding, and Payment Systems) as dependent variables. Further, we include additional explanatory variables, namely External pressure, Private bank credit to GDP, and a dummy capturing whether a country belongs to an economic and/or monetary union (The Economic and Monetary Community of Central Africa, The European Union, The Organisation of Eastern Caribbean States, and The West African Economic and Monetary Union). In the regressions, we also account for variables related to political arrangements and quality of institutions (Electoral democracy; Functioning of government; and Presidential system). In line with the results for the aggregated index FSPAI, we document that countries with larger populations and higher per capita income were more active in implementing Banking Sector, Financial Markets and NBFI, and Liquidity and Funding measures.26 At the same time, the spread of COVID-19, macro-financial fundamentals, and fiscal and containment policies appear to play a limited role in policy activity. Countries with more stringent containment measures were less active in implementing Payment Systems measures. Further, higher external pressure is associated with more active use of Liquidity and Funding measures, probably reflecting the urgency of stemming exchange rate volatility using monetary policy instruments. Finally, there is no clear-cut pattern in the association of political setting variables with financial sector policy activity. There is some indication that countries that are electoral democracies were more active in the implementation of policies related to financial markets, while presidential systems were less active with imposing new policies in Banking Sector and Financial Markets and NBFI.

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26 Table 6 contains information for countries for which policy intervention in a specific category is not observed. Specifically, we assign a value of 0 if a country does not have a record in a specific policy area. As a robustness test, for each of the sub-components of the Financial Sector Policy Activity Index, we drop countries for which policy intervention is not observed in a specific category. Because results are qualitatively the same and to save space, we do not report these estimates in the main text (the results are available upon request).
### Table 4
Cox Regression: Time Until the First Policy Response in EMDEs by Category (days since January 30th, 2020).

| VARIABLES                      | (1) Banking Sector | (2) Financial Markets and NBFI | (3) Liquidity and Funding | (4) Payments Systems |
|--------------------------------|--------------------|--------------------------------|---------------------------|---------------------|
| Log GDP per capita (USD)       | 1.843***           | 1.545**                        | 1.685***                  | 1.741***            |
|                               | (0.316)            | (0.279)                        | (0.210)                   | (0.223)             |
| Log population size            | 1.143              | 1.137                          | 1.489***                  | 1.664***            |
|                               | (0.118)            | (0.126)                        | (0.119)                   | (0.165)             |
| Days until 100th COVID-19 case| 0.998              | 0.991                          | 1.003***                  | 1.005***            |
|                               | (0.001)            | (0.006)                        | (0.001)                   | (0.007)             |
| Government debt (% GDP)        | 0.996              | 0.997                          | 0.996                     | 0.997               |
|                               | (0.004)            | (0.010)                        | (0.003)                   | (0.004)             |
| Private debt (% GDP)           | 1.013***           | 1.012**                        | 1.007*                    | 1.005               |
|                               | (0.005)            | (0.005)                        | (0.004)                   | (0.004)             |
| Current account (% of GDP)     | 0.994              | 1.000                          | 0.995                     | 0.999               |
|                               | (0.017)            | (0.016)                        | (0.011)                   | (0.012)             |
| Fiscal balance (% of GDP)      | 0.974              | 1.012                          | 1.004                     | 0.993               |
|                               | (0.037)            | (0.046)                        | (0.022)                   | (0.031)             |
| Monetary union                 | 2.198***           | 2.277***                       | 10.037***                 | 6.867***            |
|                               | (0.690)            | (0.713)                        | (3.244)                   | (1.850)             |
| External pressure              | 1.001              | 1.103**                        | 1.026                     | 1.001               |
|                               | (0.027)            | (0.031)                        | (0.025)                   | (0.025)             |
| Electoral democracy            | 1.234              | 1.485                          | 0.672                     | 0.833               |
|                               | (0.377)            | (0.435)                        | (0.188)                   | (0.240)             |
| Functioning of government      | 1.152              | 0.936                          | 1.157***                  | 1.201**             |
|                               | (0.088)            | (0.069)                        | (0.085)                   | (0.102)             |
| Presidential system            | 0.624              | 1.041                          | 1.878***                  | 0.972               |
|                               | (0.223)            | (0.327)                        | (0.533)                   | (0.262)             |
| Observations                   | 84                 | 88                             | 84                        | 88                  |
| Pseudo R²                      | 0.0642             | 0.0831                         | 0.0663                    | 0.0561              |

Note: The sample consists of EMDEs countries only (i.e., upper-middle, lower-middle, and low-income countries). The dependent variable is the time until 1st response for each policy category. Hazard ratios and robust standard errors are reported. For each specification, we test the proportional-hazards assumption separately for each covariate. We cannot reject the null hypothesis at the 10% level for all variables except the log of population size in column 4 (p-value 0.04). *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.

### Table 5
Poisson Regression: Financial Sector Policy Activity Index in EMDEs (up to April 15th, 2021).

| VARIABLES                      | (1) Financial Sector Policy Activity Index |
|--------------------------------|--------------------------------------------|
| Log GDP per capita (USD)       | 0.515***                                   |
|                               | (0.075)                                    |
| Log population size            | 0.323***                                   |
|                               | (0.044)                                    |
| Days to record 100 Covid-19 cases | -0.001                                    |
|                               | (0.001)                                    |
| FSPAI - neighbor countries    | -0.000                                     |
|                               | (0.001)                                    |
| Fiscal balance (% of GDP)      | -0.012                                     |
|                               | (0.026)                                    |
| Current account (% of GDP)     | -0.007                                     |
|                               | (0.010)                                    |
| Government debt (% GDP)        | -0.002                                     |
|                               | (0.003)                                    |
| Private debt (% GDP)           | -0.003*                                    |
|                               | (0.002)                                    |
| Oxford Fiscal support (% of GDP)| -0.348                                    |
|                               | (0.645)                                    |
| Oxford Government Response Stringency Index | 0.798 |
|                               | (0.573)                                    |
| Constant                       | -7.076***                                  |
|                               | (1.043)                                    |
| Observations                   | 115                                        |
| Pseudo R²                      | 0.48                                       |

Note: The sample consists of EMDEs countries only (i.e., upper-middle, lower-middle, and low-income countries). The dependent variable is the number of financial sector policy measures taken (FSPAI). The row “FSPAI neighbor countries” reports the estimates for a variable computed for each country as the sum of financial sector policies taken by countries sharing a border. For countries that do not share a border or of which information was not available for neighbors’ countries, we use the regional average. Robust standard errors appear in parentheses. *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.
In ancillary regressions, we explore the role of additional banking sector characteristics described in Section 3.2. As noted, the sample size decreases substantially, so the analysis should be interpreted with care. The results, reported in Appendix B, Table B2, show that economic development and population remain positively and strongly correlated with the total number of financial policies implemented. Of the banking characteristics, private bank credit (as % of GDP) and operating on Basel III capital requirements are associated with fewer financial policy measures.

5. Conclusions and future work

The database presented in this paper captures in detail the unprecedented policy response by authorities in over 150 countries to mitigate the macro-economic and financial impacts of COVID-19. The objective of these policies is to safeguard financial stability, preserve core financial market functions, support vulnerable borrowers, and maintain the provision of critical financial services to the real economy. The paper also introduces a simple Financial Sector Policy Activity Index (FSPAI) — the sum of all financial policy measures taken in a country, which does not account for the scale or effectiveness of policies — and documents that the large majority of financial sector authorities has taken action, although the number of policies implemented is discernibly higher in most advanced economies and larger EMDEs compared to Sub-Saharan African countries.

This paper also offers initial analytical steps to help to understand the determinants of the policy response in terms of responsiveness and overall activity in EMDEs. Cox proportional hazards regressions suggest that EMDEs that are richer, more populous, and have higher private debt levels were significantly more likely to issue their first policy response faster in the Banking Sector and Liquidity and Funding categories. However, richer countries and countries with higher private debt levels responded more slowly regarding Payments Systems measures. The spread of COVID-19, macro-financial fundamentals, as well as political settings, appear to have limited influence on policy makers’ responsiveness and activity. We also explore the role of pre-pandemic banking sector characteristics, but these results need to be interpreted with care since the sample size is substantially smaller. For Banking Sector measures, we find that countries with higher bank capitalization and higher levels of private credit are significantly more re-

| Table 6 | Poisson Regression: Additional Determinants of Financial Sector Policy Activity Indexes in EMDEs by Category (up to April 15th, 2021). |
|----------------|--------------------------------------------------------------------------------------------------|
| VARIABLES | Financial Policy Response Activity Index |
| | Banking Sector Activity Index | Financial Markets and NBFI S Activity Index | Liquidity and Funding Activity Index | Payments Systems Activity Index |
| Log GDP per capita (USD) | 0.731*** 0.679*** 0.800*** 0.771*** 0.562*** 0.344** 0.012 0.052 |
| | (0.133) (0.172) (0.170) (0.166) (0.113) (0.139) (0.202) (0.258) |
| Log population size | 0.300*** 0.278*** 0.567*** 0.548*** 0.315*** 0.272*** 0.256** 0.339** |
| | (0.055) (0.051) (0.152) (0.083) (0.051) (0.051) (0.105) (0.139) |
| Days to record 100 Covid-19 cases | 0.001 -0.000 -0.001 -0.001 0.001 0.001 -0.017** -0.007 |
| | (0.002) (0.001) (0.007) (0.004) (0.001) (0.001) (0.006) (0.006) |
| Fiscal balance (% of GDP) | 0.025 0.069** 0.063 0.167** -0.040 -0.035 0.034 0.075 |
| | (0.027) (0.030) (0.067) (0.058) (0.028) (0.031) (0.055) (0.052) |
| Current account (% of GDP) | -0.011 0.000 0.010 0.022 -0.003 -0.001 -0.014 0.002 |
| | (0.011) (0.011) (0.046) (0.039) (0.014) (0.015) (0.015) (0.018) |
| Government debt (% GDP) | 0.000 0.005 0.008 0.018 -0.001 -0.002 0.009 0.021** |
| | (0.004) (0.006) (0.007) (0.012) (0.004) (0.004) (0.006) (0.008) |
| Private debt (% GDP) | 0.005 0.007 0.013 0.016** 0.010 0.010 -0.040** -0.042** |
| | (0.011) (0.008) (0.012) (0.006) (0.010) (0.010) (0.016) (0.017) |
| Oxford Fiscal support (% of GDP) | -0.146 -1.290 -1.130 -3.136 0.765* 0.552 -3.943** -5.111** |
| | (0.849) (1.533) (1.739) (3.238) (0.431) (0.694) (1.855) (2.795) |
| Oxford Gov. Response Strin. Index | 1.279* 1.329** 2.782* 2.081 1.428* 1.255* -0.598 -0.459 |
| | (0.685) (0.588) (1.677) (1.371) (0.790) (0.646) (1.226) (1.362) |
| Private bank credit (% of GDP) | -0.008 -0.013 -0.024* -0.024* -0.018 -0.014 0.041** 0.040** |
| | (0.012) (0.010) (0.014) (0.010) (0.012) (0.012) (0.017) (0.018) |
| Monetary union | 0.049 0.358 0.869*** 1.038*** -0.325* -0.355 0.718** 0.846** |
| | (0.218) (0.226) (0.322) (0.327) (0.184) (0.345) (0.329) (0.357) |
| External pressure | 0.015 -0.003 0.042** 0.042** 0.0028 -0.0176 |
| | (0.017) (0.017) (0.033) (0.014) (0.028) |
| Electoral democracy | 0.129 0.634*** 0.104 -0.167 |
| | (0.207) (0.243) (0.203) (0.252) |
| Functioning of government | 0.045 0.068 0.140*** 0.151 |
| | (0.047) (0.086) (0.049) (0.100) |
| Presidential system | -0.524*** -0.862*** 0.267 0.400 |
| | (0.203) (0.424) (0.186) (0.377) |
| Constant | -10.065*** -9.009*** -17.658*** 16.731*** -9.422*** -7.748*** -2.542 -6.501* |
| | (1.682) (1.991) (3.747) (2.596) (1.475) (1.522) (2.961) (3.916) |
| Observations | 86 69 86 69 86 69 86 69 |
| Pseudo R² | 0.437 0.45 0.463 0.523 0.392 0.46 0.237 0.277 |

Note: The sample consists of EMDEs countries only (i.e., upper-middle, lower-middle, and low-income countries). The dependent variable is the number of financial sector policy measures taken in the banking sector (BSRAI, columns 1 and 2); financial markets and NBFI S (FMNRAI, columns 3 and 4); liquidity and funding (LFRAI, columns 5 and 6); payments systems (PSRAI, columns 7 and 8). Robust standard errors appear in parentheses, *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.
sponsive. After controlling for these factors, the adoption of capital requirement features of Basel III which cover certain buffers and higher-quality capital is associated with a slower response across all policy categories, though these results are less statistically significant. Bank asset quality does not appear to play a significant role in determining policy response.

Consistent with the findings on policy responsiveness, Poisson regressions suggest that EMDEs that implemented more measures (i.e., have a higher FSPAI) tend to be significantly more economically developed and have larger populations. The spread of COVID-19, macro-financial fundamentals, the size of fiscal packages, and lockdown policies appear to play a limited role. We also find evidence that, after controlling for other bank characteristics, the adoption of Basel III features (which include new buffers and the need for higher-quality capital) and higher levels of private credit exhibit a significantly lower FSPAI. However, as noted, the sample size is substantially smaller, so these results also need to be interpreted with more care.

Taken together, these findings call for future work to better understand the country determinants of the policy response. Further, the global database can support policy makers and researchers in evaluating policies in terms of their effectiveness and potential unintended consequences. For certain measures, authorities should continue to balance the relevant trade-offs between keeping temporary measures in place to support the real sector and maintaining prudent credit risk and liquidity management standards. Some countries have resorted to policy measures (e.g., relaxing the classification and treatment of non-performing loans) that are not consistent with the principles that underpin international financial standards and recent guidance by standard-setting bodies and the IMF and the World Bank (see for example IMF and World Bank (2020)). This may have created some respite in the short term but may have also generated new risks since such policies may weaken bank buffers, reduce bank balance sheet transparency, induce moral hazard, and contribute to market fragmentation. These risks could undermine the medium-term resilience and stability of the financial system and compound the economic impact of the pandemic. Such risks should be weighed against the development of the global health crisis and the pace of the economic recovery, particularly if a timely economic rebound does not materialize and insolvency pressures surge. In this regard, the database could be used to analyze how policy interventions have affected economic growth, and which policies were more efficient in insulating economies from the negative spillovers of the pandemic, or, otherwise, sown the seeds for future financial instability.
Appendix A

Description of the Variables

Table A1

| VARIABLES                                | Description                                                                                                                                                                                                 | Source                  |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| **Dependent variables**                  |                                                                                                                                                                                                            |                         |
| Banking sector                           | Days elapsed since the WHO declaration on January 30, 2020, until the first Banking Sector measure.                                                                                                       | Policy Database         |
| Financial markets/ NBFI                  | Days elapsed since the WHO declaration on January 30, 2020, until the first Financial Markets and NBFI measure.                                                                                         | Policy Database         |
| Monetary and liquidity                   | Days elapsed since the WHO declaration on January 30, 2020, until the first Monetary and Liquidity measure.                                                                                              | Policy Database         |
| Payments systems                         | Days elapsed since the WHO declaration on January 30, 2020, until the first Payment Systems measure.                                                                                                      | Policy Database         |
| Financial Sector Policy Activity Index(t)| The sum of all financial sector policy measures taken by a country up to time t to mitigate the impact of COVID-19                                                                                       | Policy Database         |
| **Independent variables**                |                                                                                                                                                                                                            |                         |
| Log GDP per capita (USD)                 | Natural logarithm of the per capita values for the gross domestic product (GDP) expressed in current international dollars converted by purchasing power parity (PPP) conversion factor.                                      | WB WDI                  |
| Log population size                      | Natural logarithm of the midyear estimates of a country total population.                                                                                                                                  | WB WDI                  |
| Days to 100th COVID-19 case              | Number of days taken to reach 100 confirmed COVID-19 cases since the WHO declaration on January 30, 2020.                                                                                                   | WHO                     |
| Private debt (% GDP)                     | Amount of total private debt to GDP.                                                                                                                                                                        | IMF WBG Global Debt Database |
| Government debt (% GDP)                  | Amount of total public debt to GDP.                                                                                                                                                                        | IMF WBG Global Debt Database |
| Current account (% of GDP)               | Transactions in the balance of payments recording the import and export of goods and services, payments of income, and current transfers between residents of a country and nonresidents as a percentage of a country GDP.                       | IMF WEO                 |
| Fiscal balance (% GDP)                   | Government revenues minus expenses as a percentage of a country GDP.                                                                                                                                      | IMF WEO                 |
| Oxford government response stringency index | Composite index computed using 9 indicators capturing containment and closure policies and the presence of public information campaigns.                                                               | Oxford                  |
| Oxford fiscal support (% of GDP)         | Indicator capturing the fiscal spending (as % of GDP) to support an economy.                                                                                                                                | Oxford                  |
| Monetary union                           | A dummy taking value of 1 if the country is a member of Communauté économique et monétaire de l’Afrique centrale (CEMAC), European Union (EU), The Organisation of Eastern Caribbean States (OECS), and West African Economic and Monetary Union (WAEMU). | -                      |
| External Pressure Index                  | Following Eichengreen, Rose, and Wyplosz (1995, pp.278), we compute an index using the information on the exchange rates and foreign currency reserves. We do not consider information on interest rates as data is sparsely available for EMDEs. The index is obtained as a weighted average of the monthly changes in exchange rates (vis-a-vis the US dollar) and foreign currency reserves. Weights are computed as the inverse of the standard deviation of each series. | IMF IFS                |
| Electoral democracy                      | A dummy taking value of 1 if the country has a score of 7 or better in the electoral process subcategory, an overall political rights score of 20 or better, and an overall civil liberties score of 30 or better. | FH                     |
| Functioning of government                | Indicator score that captures the well-functioning of government. It ranges between 0 and 10. Higher values indicate better functioning.                                                                 | EIU                     |
| Presidential system                      | A dummy taking value of 1 if the country is a presidential system.                                                                                                                                              | IDEA                   |
| Regulatory Tier 1 capital to risk-weighted assets | Banking system regulatory Tier 1 capital to risk-weighted assets.                                                                                                                                      | IMF FSI                |
| Non-performing loans to total gross loans | Banking system non-performing loans to total gross loans.                                                                                                                                                      | IMF FSI                |
| Private bank credit (% of GDP)           | Amount of outstanding domestic private debt securities to GDP.                                                                                                                                               | WB WDI                 |
| Basel III adoption                      | A dummy taking value of 1 if a country adopts the Basel III capital framework, 0 otherwise.                                                                                                                                 | BRSS                   |
| Neighbor countries                      | (i) The average time of response in each policy category by countries sharing a border with the given country (for Table 3). If a country does not share a border or information on neighbors is not available, we consider the regional average. (ii) The average number of policies implemented by neighbors (for Table 3). | GeoDataSource          |
Table A2
Descriptive Statistics of Independent Variables
Panel A reports descriptive statistics and Panel B reports Pearson correlations. * denotes significance at the 10% level. We compute the summary statistics for the countries included in the estimations in Table 3, column 1.

| VARIABLES | Obs | Mean | Std. Dev. | Min | Max |
|-----------|-----|------|-----------|-----|-----|
| Log GDP per capita (USD) | 116 | 8.908 | 0.886 | 6.892 | 10.383 |
| Log population size | 116 | 16.101 | 1.915 | 11.182 | 21.058 |
| Days to record 100 Covid-19 cases | 116 | 95.733 | 86.020 | 0.000 | 441.000 |
| Government debt (% GDP) | 116 | 54.652 | 27.008 | 7.079 | 163.210 |
| Private debt (% GDP) | 108 | 40.722 | 31.531 | 3.288 | 204.107 |
| Current account (% of GDP) | 114 | -4.811 | 9.082 | -42.200 | 24.700 |
| Fiscal balance (% of GDP) | 114 | -2.749 | 3.473 | -10.800 | 8.800 |
| Monetary union | 116 | 0.172 | 0.379 | 0.000 | 1.000 |
| Oxford Gov. Response Stringency Index | 103 | 55.764 | 12.994 | 12.603 | 79.397 |
| Oxford Fiscal support (% of GDP) | 116 | 4.783 | 10.604 | 0.000 | 84.978 |
| External Pressure Index | 89 | 1.947 | 4.004 | -3.365 | 16.897 |
| Electoral democracy | 102 | 0.471 | 0.502 | 0.000 | 1.000 |
| Functioning of government | 97 | 4.116 | 1.987 | 0.000 | 8.210 |
| Presidential system | 99 | 0.077 | 0.470 | 0.000 | 1.000 |
| Regulatory Tier 1 capital to risk-weighted assets | 81 | 16.819 | 5.788 | 7.975 | 38.813 |
| Non-performing loans to total gross loans | 80 | 7.860 | 8.370 | 1.475 | 48.359 |
| Private bank credit (% of GDP) | 93 | 39.347 | 28.702 | 5.564 | 162.220 |
| Basel III adoption | 89 | 0.416 | 0.496 | 0.000 | 1.000 |

Panel B. Pairwise Pearson correlations

| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] | [13] | [14] | [15] | [16] |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Log GDP per capita (USD) | 1.00 | -0.11 | -0.07 | -0.07 | -0.03 | -0.09 | -0.16 | -0.16 | -0.14 | -0.14 | -0.13 | -0.10 | -0.09 | -0.13 | -0.11 |
| Log population size | -0.11 | 1.00 | -0.24 | -0.40 | -0.34 | -0.28 | -0.31 | -0.28 | -0.26 | -0.26 | -0.24 | -0.24 | -0.23 | -0.22 | -0.21 |
| Days to record 100 Covid-19 cases | -0.07 | -0.24 | 1.00 | -0.24 | -0.20 | -0.22 | -0.20 | -0.21 | -0.19 | -0.19 | -0.20 | -0.19 | -0.18 | -0.19 | -0.19 |
| Government debt (% GDP) | -0.03 | -0.34 | -0.20 | 1.00 | -0.19 | -0.21 | -0.19 | -0.20 | -0.18 | -0.18 | -0.20 | -0.18 | -0.17 | -0.19 | -0.19 |
| Private debt (% GDP) | -0.09 | -0.28 | -0.22 | -0.20 | 1.00 | -0.17 | -0.18 | -0.17 | -0.16 | -0.16 | -0.17 | -0.16 | -0.15 | -0.16 | -0.16 |
| Current account (% of GDP) | -0.16 | -0.31 | -0.20 | -0.19 | -0.17 | 1.00 | -0.14 | -0.14 | -0.12 | -0.12 | -0.13 | -0.12 | -0.11 | -0.12 | -0.12 |
| Fiscal balance (% of GDP) | -0.16 | -0.26 | -0.19 | -0.18 | -0.17 | -0.14 | 1.00 | -0.08 | -0.08 | -0.07 | -0.07 | -0.07 | -0.06 | -0.07 | -0.06 |
| Monetary union | -0.14 | -0.24 | -0.20 | -0.18 | -0.16 | -0.14 | -0.08 | 1.00 | -0.05 | -0.05 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 |
| Oxford Gov. Response Stringency Index | -0.13 | -0.22 | -0.19 | -0.17 | -0.16 | -0.13 | -0.07 | -0.05 | 1.00 | -0.03 | -0.03 | -0.02 | -0.02 | -0.02 | -0.02 |
| Oxford Fiscal support (% of GDP) | -0.10 | -0.20 | -0.17 | -0.15 | -0.14 | -0.12 | -0.07 | -0.05 | -0.03 | 1.00 | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 |
| External Pressure Index | -0.09 | -0.19 | -0.16 | -0.14 | -0.13 | -0.11 | -0.05 | -0.03 | -0.01 | -0.01 | 1.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| Electoral democracy | -0.08 | -0.17 | -0.14 | -0.12 | -0.11 | -0.09 | -0.04 | -0.02 | -0.01 | -0.01 | -0.00 | 1.00 | -0.00 | -0.00 | -0.00 |
| Functioning of government | -0.07 | -0.16 | -0.13 | -0.11 | -0.10 | -0.08 | -0.03 | -0.01 | -0.00 | -0.00 | -0.00 | -0.00 | 1.00 | -0.00 | -0.00 |
| Presidential system | -0.06 | -0.14 | -0.11 | -0.09 | -0.07 | -0.05 | -0.02 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | 1.00 | -0.00 |
| Reg. Tier 1 capital to RWA | -0.05 | -0.13 | -0.10 | -0.08 | -0.07 | -0.05 | -0.02 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | 1.00 |
| Non-perf. loans to total gross loans | -0.04 | -0.12 | -0.09 | -0.07 | -0.06 | -0.04 | -0.01 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | 1.00 |
| Private bank credit (% of GDP) | -0.03 | -0.11 | -0.09 | -0.07 | -0.06 | -0.04 | -0.01 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | 1.00 |
| Basel III adoption | -0.02 | -0.09 | -0.07 | -0.05 | -0.04 | -0.02 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | 1.00 |
Table A3
Descriptive Statistics Financial Sector Policy Activity Index (FSPAI) and sub-components by region (per April 15th, 2021)
The tables below report the descriptive statistics of the Financial Policy Response Activity Index (FSPAI) and its sub-components: the Banking Sector Activity Index (BSAI), the Financial Markets and NBFIs Activity Index (FMNAI), the Liquidity and Funding Activity Index (LFAI), and the Payments Systems Activity Index (PSAI). The sample is restricted to EMDEs only. In panels B through E, if a country does not have a record for a specific policy category, it is not included in the summary statistics.

Panel A: Financial Sector Policy Activity Index (FSPAI)

| World Bank Region | Obs | Mean  | Std. Dev. | Min | Max |
|-------------------|-----|-------|-----------|-----|-----|
| EAP               | 14  | 18.929| 18.028    | 2   | 55  |
| ECA               | 19  | 25.526| 21.162    | 4   | 78  |
| LAC               | 25  | 18.880| 25.295    | 4   | 79  |
| MENA              | 11  | 8.727 | 10.081    | 1   | 34  |
| SAR               | 8   | 42.250| 36.966    | 7   | 108 |
| SSA               | 41  | 10.585| 7.394     | 2   | 45  |
| EMDEs             | 118 | 17.712| 20.601    | 1   | 108 |

Panel B: Banking Sector Activity Index (BSAI)

| World Bank Region | Obs | Mean  | Std. Dev. | Min | Max |
|-------------------|-----|-------|-----------|-----|-----|
| EAP               | 14  | 9.500 | 8.591     | 2   | 29  |
| ECA               | 19  | 15.474| 11.904    | 2   | 43  |
| LAC               | 25  | 9.000 | 12.024    | 1   | 44  |
| MENA              | 10  | 4.900 | 5.801     | 1   | 19  |
| SAR               | 8   | 22.500| 13.836    | 5   | 41  |
| SSA               | 37  | 4.324 | 4.130     | 2   | 24  |
| EMDEs             | 113 | 9.212 | 10.550    | 1   | 44  |

Panel C: Financial Markets and NBFIs Activity Index (FMNAI)

| World Bank Region | Obs | Mean  | Std. Dev. | Min | Max |
|-------------------|-----|-------|-----------|-----|-----|
| EAP               | 7   | 5.143 | 4.670     | 1   | 14  |
| ECA               | 12  | 5.000 | 5.444     | 1   | 18  |
| LAC               | 8   | 7.500 | 5.880     | 1   | 18  |
| MENA              | 1   | 3.000 | .         | 3   | 3   |
| SAR               | 4   | 14.500| 16.299    | 2   | 37  |
| SSA               | 24  | 1.500 | 1.668     | 1   | 9   |
| EMDEs             | 56  | 4.518 | 6.405     | 1   | 37  |

Panel D: Liquidity and Funding Activity Index (LFAI)

| World Bank Region | Obs | Mean  | Std. Dev. | Min | Max |
|-------------------|-----|-------|-----------|-----|-----|
| EAP               | 13  | 5.846 | 4.741     | 1   | 15  |
| ECA               | 18  | 5.611 | 7.484     | 1   | 34  |
| LAC               | 23  | 6.739 | 9.416     | 1   | 34  |
| MENA              | 7   | 2.714 | 1.704     | 1   | 5   |
| SAR               | 8   | 8.750 | 9.377     | 1   | 28  |
| SSA               | 40  | 3.400 | 2.610     | 1   | 12  |
| EMDEs             | 109 | 5.110 | 6.388     | 1   | 34  |

Panel E: Payments Systems Activity Index (PSAI)

| World Bank Region | Obs | Mean  | Std. Dev. | Min | Max |
|-------------------|-----|-------|-----------|-----|-----|
| EAP               | 6   | 3.333 | 3.141     | 1   | 9   |
| ECA               | 10  | 3.000 | 2.357     | 1   | 8   |
| LAC               | 12  | 2.667 | 2.498     | 1   | 10  |
| MENA              | 7   | 3.571 | 3.457     | 1   | 9   |
| SAR               | 6   | 5.000 | 5.099     | 1   | 15  |
| SSA               | 28  | 3.643 | 2.628     | 1   | 8   |
| EMDEs             | 69  | 3.464 | 2.923     | 1   | 15  |
Appendix B

Additional regression results with banking sector characteristics

Table B1
Time Until the First Policy Response by Category in EMDEs (days since January 30th, 2020)
In this table, we present the results of ancillary regressions in Table 3. The sample consists of EMDEs countries only (i.e., upper-middle, lower-middle, and low-income countries). The dependent variable is the time until 1st response for each policy category. Hazard ratios and robust standard errors are reported. *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.

| VARIABLES                                                      | (1) Banking Sector | (2) Financial Markets and NBFI | (3) Liquidity and Funding | (4) Payment Systems |
|---------------------------------------------------------------|--------------------|--------------------------------|--------------------------|---------------------|
| Log GDP per capita (USD)                                     | 2.337***           | 2.081***                       | 1.571**                  | 0.845               |
|                                                               | (0.504)            | (0.523)                        | (0.348)                  | (0.184)             |
| Log population size                                           | 1.223**            | 1.514***                       | 1.449**                  | 1.191**             |
|                                                               | (0.115)            | (0.152)                        | (0.148)                  | (0.104)             |
| Days to record 100 Covid-19 cases                            | 0.997              | 1.002                          | 1.000                    | 0.999               |
|                                                               | (0.003)            | (0.002)                        | (0.002)                  | (0.002)             |
| Regulatory Tier 1 capital to risk-weighted assets             | 1.056**            | 1.036                          | 1.049                    | 0.973               |
|                                                               | (0.028)            | (0.026)                        | (0.033)                  | (0.027)             |
| Non-performing loans to total gross loans                     | 0.991              | 1.002                          | 0.995                    | 1.017               |
|                                                               | (0.022)            | (0.025)                        | (0.023)                  | (0.022)             |
| Private bank credit (% of GDP)                                | 1.014***           | 1.007                          | 1.007                    | 0.995               |
|                                                               | (0.006)            | (0.006)                        | (0.006)                  | (0.005)             |
| Basel III adoption                                            | 0.912              | 0.601*                         | 0.615                    | 0.894               |
|                                                               | (0.296)            | (0.182)                        | (0.193)                  | (0.259)             |
| Observations                                                  | 61                 | 61                             | 61                       | 61                  |
| Pseudo $R^2$                                                   | 0.0961             | 0.0703                         | 0.0691                   | 0.0242              |

Table B2
Poisson Regression: Financial Sector Policy Activity Index (up to April 15th, 2021)
In this table, we present the results of ancillary regressions in Table 5. The sample consists of EMDEs countries only (i.e., upper-middle, lower-middle, and low-income countries). The dependent variable is the number of financial sector policy measures taken (FSPAN). Robust standard errors, *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.

| VARIABLES                                      | (1) Financial Policy Response Activity Index |
|------------------------------------------------|---------------------------------------------|
| Log GDP per capita (USD)                      | 0.512***                                    |
|                                                | (0.095)                                     |
| Log population size                           | 0.281***                                    |
|                                                | (0.046)                                     |
| Days to record 100 Covid-19 cases             | -0.001                                      |
|                                                | (0.001)                                     |
| Regulatory Tier 1 capital to risk-weighted assets | -0.009                                    |
|                                                | (0.014)                                     |
| Non-performing loans to total gross loans     | -0.010**                                    |
|                                                | (0.005)                                     |
| Private bank credit (% of GDP)                | -0.006***                                   |
|                                                | (0.002)                                     |
| Basel III adoption                            | -0.759***                                   |
|                                                | (0.166)                                     |
| Oxford Fiscal support (% of GDP)              | 0.250                                       |
|                                                | (0.627)                                     |
| Oxford Government Response Stringency Index   | 1.730***                                    |
|                                                | (0.563)                                     |
| Constant                                      | -5.617***                                   |
|                                                | (1.429)                                     |
| Observations                                  | 61                                           |
| Pseudo $R^2$                                   | 0.600                                       |
|                                                | 0.610                                       |
## Appendix C

### Country-level Summary of Measures in the COVID-19 Financial Sector Policy Response Database (up to April 15th, 2021)

| Country                      | Grouping | Banking Sector | Financial Markets and NIBFs | Liquidity and Funding | Payment systems | Financial Policy Response Activity Index |
|------------------------------|----------|----------------|-----------------------------|-----------------------|-----------------|------------------------------------------|
| Cambodia                     | EAP      | 5              | 2                           |                       |                 | 7                                        |
| China                        | EAP      | 15             | 14                          | 15                    |                 | 44                                       |
| Fiji                         | EAP      | 3              | 1                           | 2                     |                 | 6                                        |
| Indonesia                    | EAP      | 21             | 9                           | 13                    | 5               | 48                                       |
| Lao PDR                      | EAP      | 3              |                             | 2                     |                 | 5                                        |
| Malaysia                     | EAP      | 17             | 3                           | 6                     | 2               | 28                                       |
| Mongolia                     | EAP      | 4              |                             | 4                     |                 | 8                                        |
| Myanmar                      | EAP      | 8              |                             | 5                     | 1               | 14                                       |
| Papua New Guinea             | EAP      | 2              |                             | 6                     |                 | 8                                        |
| Philippines                  | EAP      | 29             | 4                           | 13                    | 9               | 55                                       |
| Samoa                        | EAP      | 2              |                             |                       |                 | 2                                        |
| Solomon Islands              | EAP      | 2              |                             |                       |                 | 3                                        |
| Thailand                     | EAP      | 16             | 3                           | 4                     | 1               | 24                                       |
| Vietnam                      | EAP      | 6              | 2                           | 3                     | 2               | 13                                       |
| Albania                      | ECA      | 12             | 1                           | 3                     | 2               | 18                                       |
| Armenia                      | ECA      | 9              |                             | 3                     | 1               | 13                                       |
| Azerbaijan                   | ECA      | 29             | 18                          | 3                     | 6               | 56                                       |
| Belarus                      | ECA      | 12             |                             | 3                     |                 | 16                                       |
| Bosnia and Herzegovina       | ECA      | 4              |                             |                       |                 | 4                                        |
| Bulgaria                     | ECA      | 33             | 12                          | 2                     |                 | 47                                       |
| Georgia                      | ECA      | 16             | 2                           | 6                     | 3               | 27                                       |
| Kazakhstan                   | ECA      | 17             |                             | 3                     | 1               | 23                                       |
| Kosovo                       | ECA      | 8              |                             | 1                     |                 | 9                                        |
| Kyrgyz Republic              | ECA      | 16             | 1                           | 2                     |                 | 19                                       |
| Moldova                      | ECA      | 6              |                             | 6                     |                 | 14                                       |
| Montenegro                   | ECA      | 6              |                             | 1                     |                 | 7                                        |
| North Macedonia              | ECA      | 8              |                             | 5                     |                 | 13                                       |
| Russian Federation           | ECA      | 43             | 9                           | 7                     | 8               | 67                                       |
| Serbia                       | ECA      | 8              | 2                           | 11                    | 2               | 23                                       |
| Tajikistan                   | ECA      | 2              | 1                           | 3                     | 1               | 7                                        |
| Turkey                       | ECA      | 39             | 5                           | 34                    |                 | 78                                       |
| Ukraine                      | ECA      | 15             | 6                           | 4                     |                 | 29                                       |
| Uzbekistan                   | ECA      | 11             |                             | 4                     |                 | 15                                       |
| Anguilla                     | LAC      | 2              |                             | 2                     |                 | 4                                        |
| Argentina                    | LAC      | 44             | 18                          | 3                     | 10              | 75                                       |
| Belize                       | LAC      | 5              |                             | 1                     |                 | 6                                        |
| Bolivia                      | LAC      | 2              |                             | 2                     | 3               | 7                                        |
| Brazil                       | LAC      | 31             | 6                           | 25                    | 3               | 65                                       |
| Colombia                     | LAC      | 27             | 13                          | 29                    | 4               | 73                                       |
| Costa Rica                   | LAC      | 3              |                             | 3                     | 1               | 7                                        |
| Dominic Republic             | LAC      | 2              |                             | 2                     |                 | 4                                        |
| Dominican Republic           | LAC      | 6              | 3                           | 8                     | 1               | 18                                       |
| Ecuador                      | LAC      | 5              |                             |                       |                 | 5                                        |
| El Salvador                  | LAC      | 7              |                             | 1                     |                 | 9                                        |
| Grenada                      | LAC      | 2              |                             | 2                     |                 | 4                                        |
| Guatemala                    | LAC      | 5              |                             | 2                     |                 | 7                                        |
| Guyana                       | LAC      | 6              | 4                           | 2                     | 2               | 12                                       |
| Haiti                        | LAC      | 3              |                             | 2                     | 2               | 7                                        |
| Honduras                     | LAC      | 1              |                             | 4                     |                 | 5                                        |
| Jamaica                      | LAC      | 6              | 1                           | 4                     | 2               | 13                                       |
| Mexico                       | LAC      | 33             | 11                          | 34                    | 1               | 79                                       |
| Montserrat                   | LAC      | 2              |                             | 2                     |                 | 4                                        |
| Nicaragua                    | LAC      | 3              |                             | 3                     |                 | 6                                        |
| Paraguay                     | LAC      | 2              |                             | 8                     |                 | 10                                       |
| Peru                         | LAC      | 22             | 4                           | 12                    | 2               | 40                                       |
| St. Lucia                    | LAC      | 2              |                             | 2                     |                 | 4                                        |
| St. Vincent and the Grenadines | LAC | 2              |                             | 2                     |                 | 4                                        |

(continued on next page)
| Country                  | Grouping     | Banking Sector | Financial Markets and NBFIs | Liquidity and Funding | Payment systems | Financial Policy Response Activity Index |
|-------------------------|--------------|----------------|-----------------------------|-----------------------|----------------|------------------------------------------|
| Nepal                   | SAR          | 28             | 2                           | 4                     | 1              | 35                                       |
| Pakistan                | SAR          | 17             | 3                           | 7                     | 4              | 31                                       |
| Sri Lanka               | SAR          | 41             | 16                          | 17                    | 15             | 89                                       |
| Angola                  | SSA          | 4              | 1                           | 1                     | 5              |                                          |
| Benin                   | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Botswana                | SSA          | 7              | 1                           | 6                     | 1              | 15                                       |
| Burkina Faso            | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Cameroon                | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Central African Republic| SSA          | 2              | 1                           | 2                     | 5              |                                          |
| Chad                    | SSA          | 2              | 1                           | 2                     | 5              |                                          |
| Comoros                 | SSA          | 3              | 1                           | 1                     | 5              |                                          |
| Congo, Dem. Rep.        | SSA          | 3              | 1                           | 2                     | 4              | 7                                        |
| Congo, Rep.             | SSA          | 2              | 1                           | 2                     | 5              |                                          |
| Cote d'Ivoire           | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Equatorial Guinea       | SSA          | 2              | 1                           | 2                     | 5              |                                          |
| Eswatini                | SSA          | 5              | 2                           | 7                     | 12             |                                          |
| Ethiopia                | SSA          | 6              | 1                           | 1                     | 8              |                                          |
| Gabon                   | SSA          | 2              | 1                           | 2                     | 5              |                                          |
| Gambia, The             | SSA          | 2              | 2                           | 2                     | 5              |                                          |
| Ghana                   | SSA          | 6              | 1                           | 7                     | 4              | 18                                       |
| Guinea-Bissau           | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Kenya                   | SSA          | 6              | 1                           | 6                     | 6              | 19                                       |
| Lesotho                 | SSA          | 3              | 1                           | 4                     | 1              | 9                                        |
| Liberia                 | SSA          | 2              | 1                           | 2                     | 5              |                                          |
| Madagascar              | SSA          | 5              | 2                           | 1                     | 8              |                                          |
| Malawi                  | SSA          | 10             | 6                           | 5                     | 21             |                                          |
| Mali                    | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Mauritania              | SSA          | 3              | 3                           | 3                     | 5              |                                          |
| Mozambique              | SSA          | 4              | 6                           | 5                     | 15             |                                          |
| Namibia                 | SSA          | 4              | 3                           | 7                     | 3              |                                          |
| Niger                   | SSA          | 2              | 1                           | 2                     | 7              | 12                                       |
| Nigeria                 | SSA          | 7              | 3                           | 4                     | 2              | 16                                       |
| Rwanda                  | SSA          | 3              | 4                           | 1                     | 8              |                                          |
| Sao Tome and Principe   | SSA          | 2              | 2                           | 4                     | 3              |                                          |
| Senegal                 | SSA          | 2              | 1                           | 2                     | 8              | 13                                       |
| Sierra Leone            | SSA          | 2              | 1                           | 2                     | 3              |                                          |
| South Africa            | SSA          | 24             | 9                           | 12                    | 45             |                                          |
| South Sudan             | SSA          | 2              | 2                           | 1                     | 5              |                                          |
| Sudan                   | SSA          | 2              | 2                           | 4                     | 5              |                                          |
| Tanzania                | SSA          | 2              | 3                           | 6                     | 2              |                                          |
| Togo                    | SSA          | 3              | 1                           | 2                     | 7              | 13                                       |
| Uganda                  | SSA          | 9              | 1                           | 5                     | 2              | 17                                       |
| Zambia                  | SSA          | 4              | 2                           | 3                     | 2              | 11                                       |
| Zimbabwe                | SSA          | 11             | 2                           | 12                    | 1              | 26                                       |
| Antigua and Barbuda     | High Inc.    | 3              | 2                           | 2                     | 5              |                                          |
| Australia               | High Inc.    | 19             | 8                           | 11                    | 2              | 40                                       |
| Bahrain                 | High Inc.    | 3              | 4                           | 1                     | 8              |                                          |
| Canada                  | High Inc.    | 32             | 8                           | 20                    | 28             | 60                                       |
| Chile                   | High Inc.    | 12             | 2                           | 13                    | 13             | 27                                       |
| Croatia                 | High Inc.    | 35             | 13                          | 4                     | 3              | 55                                       |
| Czech Republic          | High Inc.    | 32             | 10                          | 4                     | 46             |                                          |
| Estonia                 | High Inc.    | 53             | 10                          | 16                    | 79             |                                          |
| France                  | High Inc.    | 57             | 13                          | 17                    | 87             |                                          |
| Germany                 | High Inc.    | 61             | 10                          | 16                    | 87             |                                          |
| Hong Kong SAR, China    | High Inc.    | 17             | 4                           | 4                     | 25             |                                          |
| Hungary                 | High Inc.    | 36             | 12                          | 11                    | 1              | 60                                       |
| Israel                  | High Inc.    | 7              | 1                           | 5                     | 1              | 14                                       |
| Italy                   | High Inc.    | 75             | 23                          | 16                    | 114            |                                          |
| Japan                   | High Inc.    | 6              | 1                           | 16                    | 1              | 24                                       |
| Korea, Rep.             | High Inc.    | 62             | 20                          | 16                    | 2              | 100                                      |
| Kuwait                  | High Inc.    | 6              | 2                           | 1                     | 9              |                                          |
| Latvia                  | High Inc.    | 47             | 9                           | 16                    | 72             |                                          |
| Lithuania               | High Inc.    | 46             | 9                           | 17                    | 72             |                                          |
| Mauritius               | High Inc.    | 9              | 1                           | 5                     | 4              | 19                                       |
| Oman                    | High Inc.    | 5              | 1                           | 2                     | 8              |                                          |
| Panama                  | High Inc.    | 6              | 1                           | 1                     | 7              |                                          |
| Poland                  | High Inc.    | 30             | 9                           | 7                     | 46             |                                          |
| Qatar                   | High Inc.    | 3              | 2                           | 1                     | 6              |                                          |
| Romania                 | High Inc.    | 32             | 10                          | 10                    | 1              | 53                                       |
| Saudi Arabia            | High Inc.    | 8              | 2                           | 3                     | 6              | 19                                       |
| Seychelles              | High Inc.    | 3              | 1                           | 1                     | 5              |                                          |
| Singapore               | High Inc.    | 22             | 8                           | 5                     | 2              | 37                                       |
| Slovak Republic         | High Inc.    | 51             | 9                           | 16                    | 76             |                                          |
| Slovenia                | High Inc.    | 48             | 9                           | 16                    | 1              | 74                                       |
| Spain                   | High Inc.    | 69             | 11                          | 16                    | 1              | 97                                       |
| St. Kitts and Nevis     | High Inc.    | 2              | 2                           | 2                     | 4              |                                          |
| Trinidad and Tobago     | High Inc.    | 3              | 2                           | 2                     | 5              |                                          |
| United Arab Emirates    | High Inc.    | 15             | 2                           | 5                     | 1              | 23                                       |
| United Kingdom          | High Inc.    | 46             | 5                           | 13                    | 4              | 68                                       |
| United States           | High Inc.    | 51             | 12                          | 35                    | 98             |                                          |
| Uruguay                 | High Inc.    | 15             | 1                           | 1                     | 2              | 19                                       |

Source: World Bank COVID–19 Financial Sector Policy Response Database.
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