Taking Stock of the Financial Sector Policy Response to COVID-19 around the World

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Abstract

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 154 jurisdictions. It documents that authorities around the world have taken a diverse array of measures to mitigate financial distress in markets and for borrowers, and to support the provision of critical financial services to the real economy. Measures that focus on the banking sector constitute the majority of policies taken and aim to take advantage of the flexibility embedded in the international standards. However, emerging markets and developing economies tend to rely more on prudential measures that go beyond this embedded flexibility compared with advanced economies, which may reduce bank balance sheet transparency and increase risks. 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 have typically been significantly more responsive and have taken more policy measures in emerging markets and developing economies that are richer and more populous. 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, and fiscal and containment policies appear to play a limited role. In a substantially smaller sample, the paper explores the role of banking characteristics and finds that emerging markets and developing economies with higher private credit levels and that have adopted Basel III features have taken fewer policy measures. Future work is necessary for better unerstanding the country determinants of the policy response as well as the effectiveness and potential unintended consequences of the measures.

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JEL Classifications: G18, G21, G23, G28, E58
Keywords: Financial Regulation, COVID-19 Pandemic, Financial Stability, Government Policy

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, financial resilience, and a globally coordinated response.

To date, 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, offering government guarantees and loans to affected sectors) 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 Basel III.

This paper makes three contributions. First, to support policy formulation and evaluation by policy makers and researchers, the paper introduces a new global database and a simple policy classification framework. Containing over 3,100 individually classified measures, the database provides a comprehensive, though not exhaustive, overview of the financial sector policy response to the COVID-19 crisis, based on publicly available information. Second, the paper documents patterns of the measures taken around the world and introduces the *COVID-19 Financial Policy Response Activity Index*, a simple country-level indicator that tracks the total number of measures taken. Third, as an initial step towards understanding the determinants of the policy response, the paper explores the association between relevant country characteristics (i.e., domestic exposure to COVID-19 and fiscal, economic, and financial fundamentals) and policy makers'

reaction time and financial sector policy making activity, respectively. An in-depth analysis of temporary policy measures (for example, the effectiveness and potential unintended consequences of policy interventions) 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, IDB Summary of Policy Measures, and OECD Policy Tracker); others focus exclusively on prudential regulatory measures (e.g. Institute of International Finance's Regulatory Measures) or containment and economic support measures (e.g. Oxford COVID-19 Government Response Tracker (OxCGRT)).

Compared to these projects, our database offers three distinctive features. First, it tracks the financial sector policy response with a focus on emerging markets and developing economies (EMDEs),[2] although it also covers several advanced economies. Second, the database adopts a tiered classification system which provides a typology of policy measures to facilitate analysis. Third, each measure is dated and accompanied by the relevant authority which implemented the measure. Where available, a link to the primary source is also provided as well as a termination or extension date, if applicable. 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.

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 drivers of the policy response and evaluates policy effectiveness.

Impact of COVID-19 on the financial sector. 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,

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[2] In this paper, we define EMDEs as all countries that are not in the high-income group according the World Bank country classification.

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 Global Financial Crisis. 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).

Determinants of the policy response. 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).

Effectiveness and impact of the policy response. 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. Finally, there is not much evidence on the effect of emergency prudential regulations and banks' internal policies on banks per se. Bergant and Kockerols (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 subdued 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.

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 paper, we present a new global database that collects financial sector policy measures that have been publicly announced by the governments, central banks, and financial sector authorities in 154 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.[3] Policy measures and guidance provided by a selected group of large advanced economies and

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[3] The COVID-19 Financial Policy Response Database is updated regularly and is publicly available at the following link: https://datacatalog.worldbank.org/dataset/covid-19-finance-sector-related-policy-responses.

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.[4]

2.1 Classification of measures

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 and 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.

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' resiliency (Drehmann et al., 2020). These measures seek to avoid a rise of insolvencies of cash-strapped, but otherwise viable businesses,[5] by providing direct support to borrowers in the form of, inter alia, public guarantees for bank loans, state

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[4] In addition to EMDEs, the following jurisdictions are tracked in the database: United States, United Kingdom, Japan, European Union/European Monetary Union (European Central Bank, Single Supervisory Mechanism and other European Union agencies), Standard Setting Bodies (SSBs), Australia, Canada, Germany, France, Italy, and Spain.

[5] 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).

subsidies, debt repayment moratoria, or encouraging loan restructuring.[6] 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,[7] the treatment 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). This category also includes 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).

Measures that focus on financial markets and non-bank financial institutions (NBFIs)

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 such as asset managers and insurance companies (NBFIs). 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.

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

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[6] See, for example, EBA (2020) for an overview of debt moratoria and public guarantee schemes in the European banking sector.

[7] The estimates by Lewrick et al. (2020) suggest that the release of capital buffers (countercyclical 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 countercyclical capital buffer release as well as ensure provision of credit to firms and households (Muñoz, 2020; Beck et al., 2020).

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.

2.2 Patterns of policy measures taken as of September 1, 2020

As of September 1, 2020, the database contains more than 3,100 individual financial policy response measures.[8] 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 30th (Appendix D provides a country-level summary overview). Most financial sector measures pertain to the banking sector, followed by liquidity and funding measures. In absolute terms, EMDEs account for 58% 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 8% 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 154 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 (54%), followed by *Liquidity and funding* (25%). 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 NBFIs* categories.

Figure 1 shows that of all measures taken by September 1, 2020, 39% were put in place by April 1st and 80% by June 1st (see Appendix B for charts by region). A similar pattern is observed for the *Banking Sector* category, where 37% and 80% of the measures in this group were undertaken by April 1st and by June 1st, respectively. For *Liquidity and funding* measures, relatively more measures were put in place early in the observation period with 46% of measures recorded by April 1st and 78% by June 1st. Similarly, most of the

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[8] As of September 1, the data comprised 3,166 individual measures taken in 154 jurisdictions. In this paper, we do not consider data for Micronesia and measures issued at the G20 level. We also do not consider unclassified measures (i.e., category "Other") or measures related to insolvency frameworks. Thus, the total number of policy measures summarized in this paper is 3,129 taken by 154 jurisdictions.

measures recorded in the *Payment Systems* category have been taken by June 1st (92%), and around 43% were implemented by March 1st. Lastly, relatively fewer *Financial Markets and NBFI* measures were put in place by April 1st (32%) and June 1st (75%).

The five most frequent focus areas (Level 2) represent 80% of all measures: *Prudential* (28%), *Borrower Support* (22%), *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 introducing repayment moratoria, supporting the restructuring of loans, providing flexibility in the treatment of non-performing loans, releasing 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.

The database shows differences in the policy mix for high-income countries (HICs) and EMDEs:

- HICs have made greater use of measures targeting the banking sector (62% of measures versus 48% in EMDEs), prudential measures in particular. For the other sub-categories (direct support to borrowers, crisis management, and financial integrity) there are no substantial differences.

- HICs and EMDEs show a similar prevalence of measures aimed at ensuring the functioning of markets (14% of measures versus 12% in EMDEs), with a (slightly) higher prevalence in HICs of targeting non-bank financial institutions.

- EMDEs have made wider use of liquidity measures, including foreign currency liquidity (28% of measures versus 22% in HICs). HICs have a higher relative incidence of asset purchases measures, while EMDEs have adjusted policy rates more often.

- EMDEs have implemented relatively more payment measures (12% of measures versus 3% in HICs), mostly to promote and ensure the availability of digital payment mechanisms (e.g. suspension of fees and commissions at ATM and digital payment options; increased thresholds for allowed maximum transfers through mobile channels).

Although an in-depth analysis of the prudential regulatory response is beyond the paper's scope, preliminary analysis of the measures in the *Banking Sector* category shows several differences between HICs and EMEs:

- HICs and EMDEs have encouraged the release of capital buffers to a similar extent. However, many EMDEs, especially low-income economies (LICs), have mostly refrained from banning or discouraging discretionary capital distributions.

- Some EMDEs, especially middle-income economies (MICs), have eased macroprudential tools other than countercyclical capital buffers (e.g. limits on loan-to-value or debt-to-income ratios) to support the flow of credit.

- Whereas both HICs and EMDEs have allowed some credit restructuring for loans with a public guarantee, a significant number of LICs and MICs have also encouraged credit restructuring without public guarantees.

- Compared with HICs, EMDEs show a lower prevalence of measures to underpin market discipline by preserving transparency through risk reporting.

- EMDEs have relied comparatively more than HICs on debt moratoria. Low-income and middle-income EMDEs show a high incidence of non-mandatory moratoria.

- EMDEs show a higher reliance on measures that run counter to the principles of global standards, including through the relaxation in the classification and provisioning of non-performing loans (NPL) or reduced risk weights even without a public guarantee. In many cases, this relaxation was not accompanied by measures aimed at preserving balance sheet transparency and proper underwriting standards, which could threaten the sector's soundness in the medium term. International organizations have provided guiding recommendations for prudential regulators to navigate through the flexibility embedded in the global standards, pointing out that prudential policies that aim at stabilizing and stimulating short-term economic growth should not compromise medium-term stability and transparency of the financial sector (e.g., Borio and Restoy (2020); IMF, 2020; IMF and WB, 2020).

Figure 1: Cumulative Number Financial Sector Policy Measures Around the World (up to September 1st, 2020)
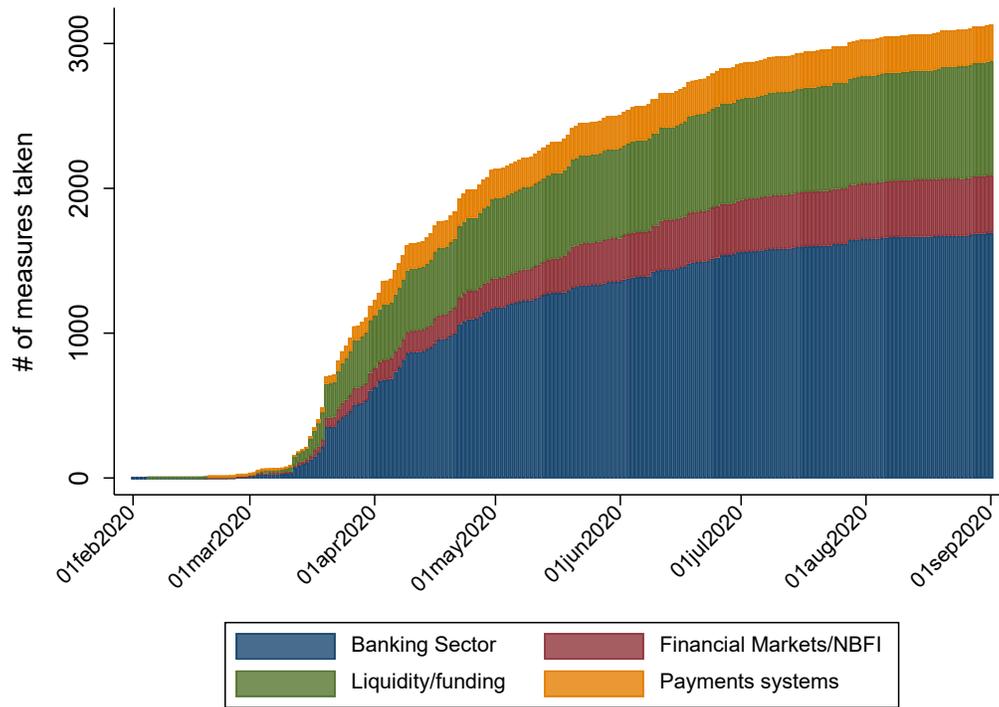
Source: World Bank COVID-19 Financial Sector Policy Response Database.

Table 1: Classification of the Financial Sector Policy Response to COVID-19

Panel A. Cumulative number of measures taken (up to September 1ˢᵗ, 2020)

Category	Focus	All countries	High Inc.	EAP	ECA	LAC	MENA	SAR	SSA
Banking Sector		*1694*	*811*	*116*	*228*	*187*	*53*	*157*	*142*
	Prudential	861	486	42	121	70	17	59	66
	Support borrowers	703	270	60	91	97	35	83	67
	Integrity	63	28	5	7	12	0	7	4
	Operational continuity	53	23	6	4	7	1	8	4
	Crisis management	14	4	3	5	1	0	0	1
Financial Markets and NBFIs		*399*	*177*	*38*	*43*	*57*	*2*	*45*	*37*
	Market functioning	215	93	17	24	33	2	32	14
	Non-bank financial institutions	134	75	8	15	13	0	9	14
	Public debt management	50	9	13	4	11	0	4	9
Liquidity and funding		*788*	*281*	*71*	*88*	*138*	*17*	*66*	*127*
	Liquidity support	483	173	37	52	92	8	46	75
	Easing of policy rates	232	49	33	35	42	9	17	47
	Asset purchases	73	59	1	1	4	0	3	5
Payments Systems		*248*	*36*	*17*	*24*	*25*	*22*	*29*	*95*
	Digital payments	194	26	15	16	20	16	21	80
	Relaxation of compliance requirements	19	3	0	3	2	0	2	9
	Cash / Cheque usage restrictions	18	2	0	2	1	4	4	5
	Cash acceptance	17	5	2	3	2	2	2	1
TOTAL		*3129*	*1305*	*242*	*383*	*407*	*94*	*297*	*401*

Panel B. Number of countries that took at least one measure (up to September 1st, 2020)

Category	Focus	All countries	High Inc.	EAP	ECA	LAC	MENA	SAR	SSA
Total # of countries		*154*	*37*	*14*	*19*	*25*	*11*	*8*	*40*
Banking Sector		**150**	**37**	**14**	**19**	**25**	**11**	**8**	**36**
	Prudential	117	32	11	18	20	4	7	25
	Support borrowers	141	37	14	19	24	11	8	28
	Integrity	48	24	3	7	7	0	4	3
	Operational continuity	41	18	6	4	5	1	3	4
	Crisis management	11	3	3	3	1	0	0	1
Financial Markets and NBFIs		**85**	**28**	**7**	**12**	**9**	**1**	**4**	**24**
	Market functioning	65	23	7	10	8	1	4	12
	Non-bank financial institutions	50	26	4	6	7	0	2	5
	Public debt management	28	6	3	4	4	0	2	9
Liquidity and funding		**143**	**36**	**13**	**18**	**22**	**7**	**8**	**39**
	Liquidity support	125	33	12	13	20	5	8	34
	Easing of policy rates	106	25	12	15	18	5	5	26
	Asset purchases	30	18	1	1	3	0	2	5
Payments Systems		**90**	**21**	**6**	**10**	**12**	**7**	**6**	**28**
	Digital payments	82	17	6	9	11	7	6	26
	Relaxation of compliance requirements	17	3	0	2	1	0	2	9
	Cash / Cheque usage restrictions	14	2	0	2	1	2	2	5
	Cash acceptance	15	4	2	3	2	2	1	1

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

Note: World Bank regional classification. High Inc. = High income; EAP = East Asia Pacific; ECA = Europe & Central Asia; LAC = Latin America & Caribbean; SAR = South Asia; MENA = Middle East & North Africa; and SSA = Sub-Saharan Africa. WBG regions exclude high income countries.

2.3   Financial Policy Response Activity Index

This section introduces the *Financial Policy Response Activity Index* (FPRAI), a simple, transparent proxy that can be used to compare financial sector policy activity across countries. FPRAI 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 NBFIs*, *Liquidity and Funding*, and *Payments Systems*.[9] As such, it is important to keep in mind that the FPRAI is silent on the *scale* and *effectiveness* of the financial policy response. Figure 2 displays the FPRAI and shows that most financial sector policy makers around the world have been active, although to a lesser extent in Sub-Saharan Africa (see Table A3 in Appendix A for the descriptive statistics of FPRAI by country groupings).

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[9] Alternative, less transparent approaches, such as min-max transformations and averaging across categories produce similar results.

As of September 1, 2020 the mean FPRAI stood at around 20 measures, but the variability is relatively high (standard deviation equals approximately 21 measures). The box plot in Figure 3 offers a closer look at the distribution of the FPRAI across country groupings. High income and SAR are the country groupings that exhibit the highest group median FPRAI (around 32 measures). The group median FPRAI is under 10 in LAC, MENA, and SSA. The box plot further shows that variability within regions is significant in several groups.

Figure 4 presents scatter plots of the FPRAI against selected country characteristics. While these simple correlations show considerable noise, they suggest a positive association between the FPRAI and the cumulative number of COVID-19 cases per capita, population size, and economic development. The correlation between the FPRAI and the stringency of containment measures such as lockdown restrictions and restrictions on internal and external mobility appears limited. We will explore these correlations more closely using Poisson regression in Section 4.3.

Figure 2. Financial Policy Response Activity Index (September 1st, 2020)
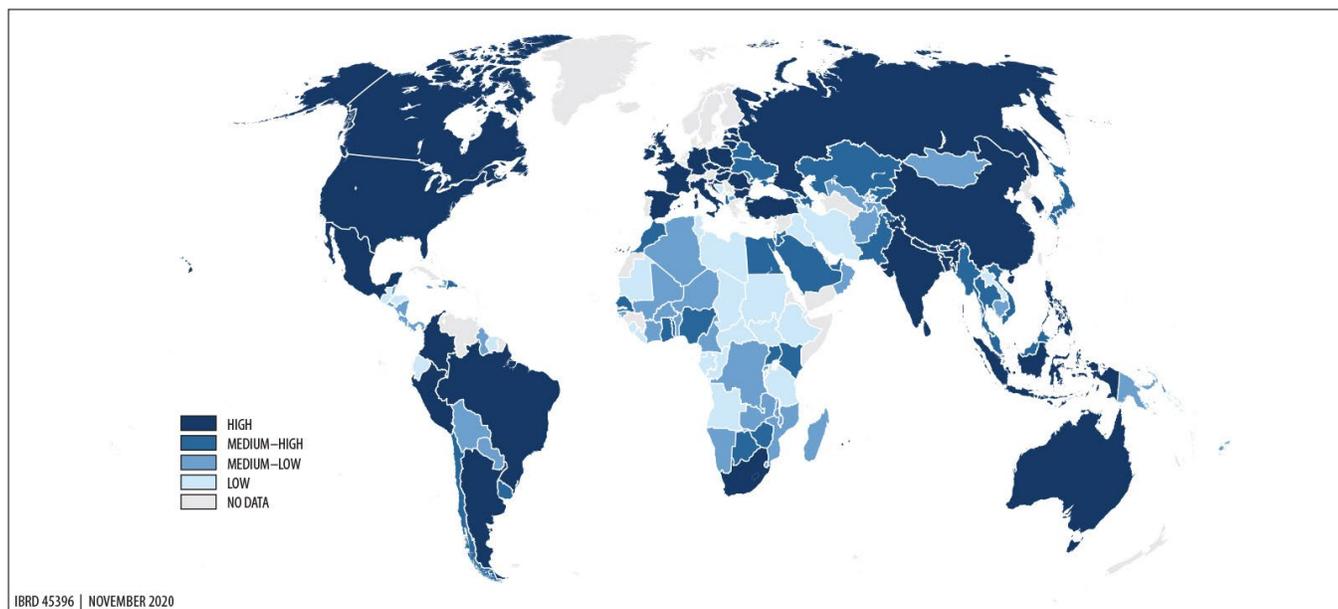
Source: World Bank COVID-19 Financial Sector Policy Response Database.
Note: Colors in the map reflect the sorting of countries into quartiles of the distribution of FPRAI: from the highest activity (the darkest blue) to the lowest activity (the lighter blue).

Figure 3. Financial Policy Response Activity Index Across Regions (September 1st, 2020)
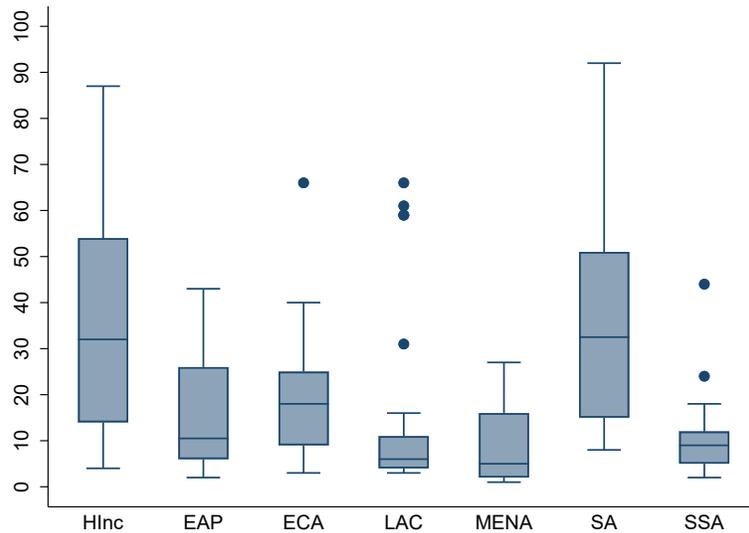
Source: World Bank COVID-19 Financial Sector Policy Response Database.

Note: Boxes show the median and the interquartile range. Dots show outliers.

Note: World Bank regional classification. High Inc. = High income; EAP = East Asia Pacific; ECA = Europe & Central Asia; LAC = Latin America & Caribbean; SAR = South Asia; MENA = Middle East & North Africa; and SSA = Sub-Saharan Africa. WBG regions exclude high-income countries.

Figure 4. Financial Policy Response Activity Index and Selected Country Characteristics (September 1st, 2020)

Panel A. Log cumulative COVID-19 cases per 100,000 people
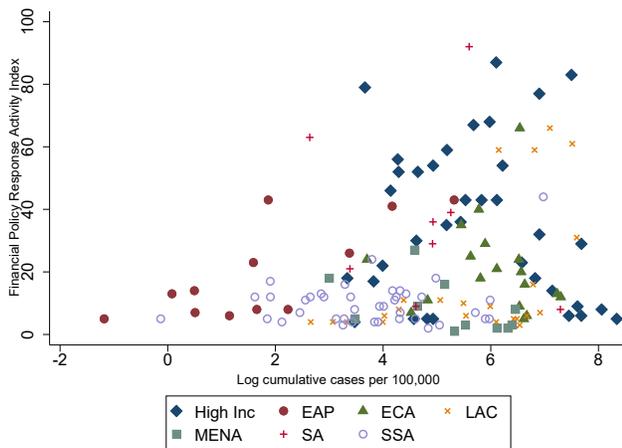
Panel B. Log population size
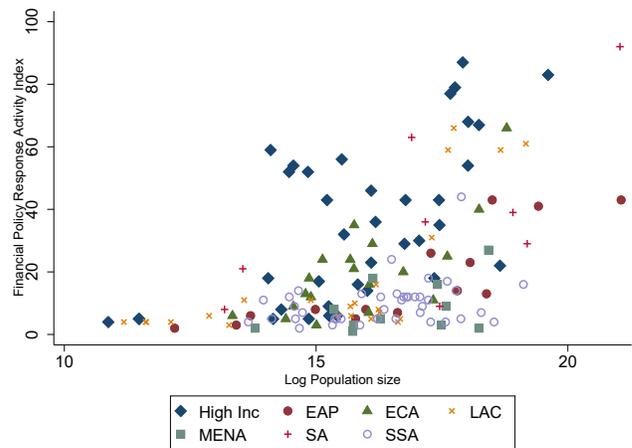
Panel C. Log GDP per capita
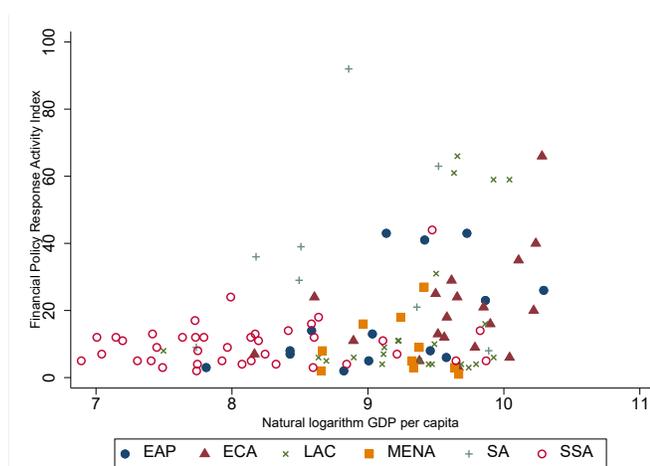
Panel D. COVID-19 Policy Stringency Index
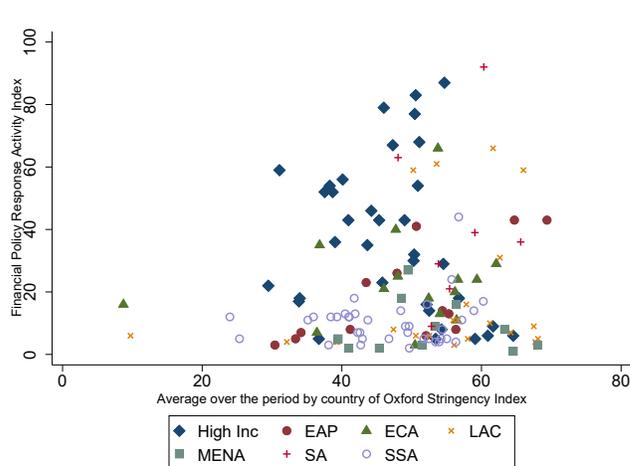
Source: World Bank COVID-19 Financial Sector Policy Response Database, Hale et al. (2020); World Health Organization (WHO) and World Bank World Development Indicators; authors' calculations.

Note: For the Policy Stringency Index (Panel D), the chart shows the average between January 30th and September 1st, 2020.

3   Determinants of the Financial Sector Policy Response to COVID-19: Methodological Framework

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).[10] 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 September 1, 2020, the end of the study period. Countries that have not (yet) implemented a policy in a specific category as of September 1, 2020 are right-censored.[11]

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[10] 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 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.

[11] In econometric models that model durations, right censoring arises when the specific event under analysis has not transpired during the study period (but it could occur at a later point in time). Other useful concepts for our analyses are "state", that is whether a country has already taken an action or otherwise; "transition" or moving from no action to implementing a specific policy; and "duration" (also known as "spell length" or "lifetime") or the time taken to implement a policy.

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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 $\lambda_0(t)$ that only depends on time. In our case, the unit of time t is a day.

$$\lambda_c(t|X_c, \beta) = \lambda_0(t) \times \exp(\beta X_c) \tag{1}$$

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 $\lambda_0(t)$. The multiplicative term $\exp(\beta X_c)$ (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 characteristics

In this section, we describe four 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; and banking sector characteristics.

Domestic exposure to COVID-19. Higher exposures to COVID-19 call 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 as a relative measure of exposure to COVID-19. The data are taken from the World Health Organization.[12]

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[12] A description of the data and the methodological underpinnings can be found here: https://covid19.who.int/.

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).

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 in their policy response as highlighted by Benmelech and Tzur-Ilan (2020). The notable exception could be the policy response on the *Payments Systems* category. As more developed economies have more developed payment systems,[13] 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. The data are taken from the World Bank's World Development Indicators.

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. We use four 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); and 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.

Banking sector characteristics. The initial state of the banking sector may also influence the reaction function of financial sector authorities. 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) domestic credit to the

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private sector as a percent of GDP (World Bank FinStats, end-2019), and iv) adoption of the capital requirements of the Basel III framework (which include the creation of new buffers and the need for more and higher-quality capital) (World Bank Bank Regulation and Supervision Survey, 2016). However, the country sample size 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.[14] 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 NBFIs* and *Payments Systems* categories.

Table 2. Descriptive Statistics: Time Until First Policy Measure by Category (in days)

Category	Countries	Mean	Std. Dev.	Min	Median	Max
Banking Sector	154	56.5	31.8	2	50	216
Financial Markets and NBFIs	154	128.6	80.7	20	97	216
Liquidity and Funding	154	63.6	46.7	6	50	216
Payments Systems	154	128.7	77.2	21	101	216

Note: Standard deviation, minimum, median, mean, and max of the distribution of the number of days taken to put in place a policy in the four categories described in section 2.1.

The panels in Figure 5 each display two Kaplan-Meier survival curve estimates corresponding to a group of lower- and higher-income countries, respectively.[15] In doing so, we split the country sample on median

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[14] 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.

[15] 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.

GDP per capita. For the *Banking Sector*, *Financial Markets and NBFIs*, 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 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 = 0.25).[16]

Figure 5. Kaplan-Meier (KM) Survival Curve Estimates by Category: Countries Grouped by GDP per Capita

Panel A. Banking Sector

P-value: 0.000.
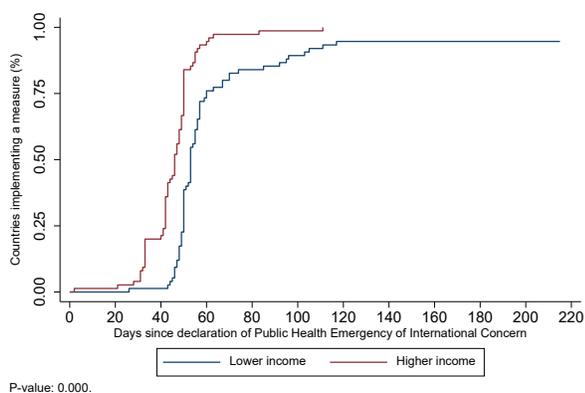
Panel B. Financial Markets and NBFIs

P-value: 0.000.

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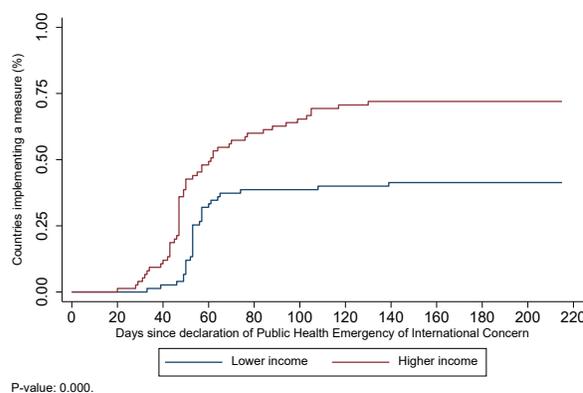
[16] For brevity, we just report results of the log-rank test of equality. As robustness, we also performed the Wilcoxon-Breslow-Gehan test (Breslow, 1970; Gehan, 1965), which gives more weight to events occurred at early time points; and the Peto–Peto–Prentice test (Peto and Peto, 1972; Prentice, 1978)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

Panel C. Liquidity and Funding　　　　　　　　**Panel D. Payments Systems**
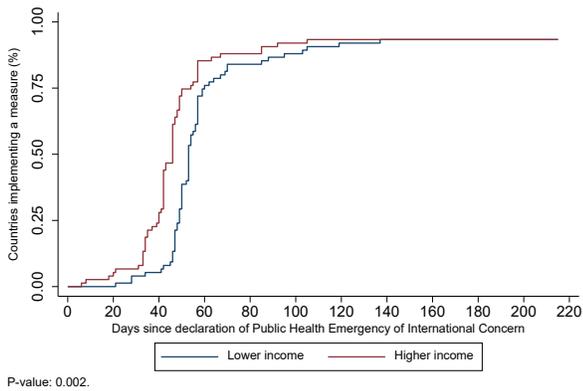
P-value: 0.002.　　　　　　　　　　　　　　　　　　　P-value: 0.246.
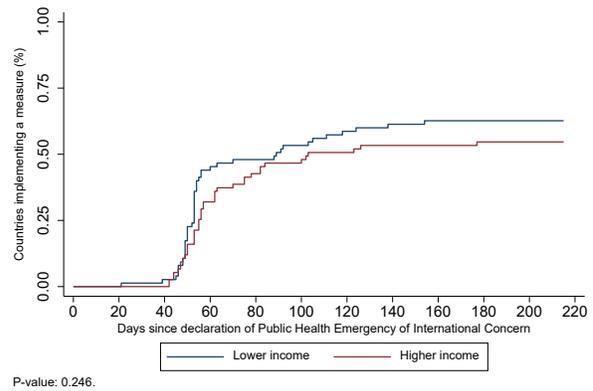
Note: This figure reports the Kaplan-Meier survival curve estimates for two groups of countries: higher-income and lower-income groups based on a sample split on median GDP per capita. P-value refers to the statistic chi-squared of the log-rank test for equality of survivor functions.

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 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, inter alia, larger policy space, more resources, and stronger institutional frameworks compared to developing countries. We also find some 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 associated with faster implementation in the *Banking Sector* and *Payment Systems* categories, although the relationships become statistically insignificant after additional country characteristics are controlled for (Table 3, columns 2, 4, 6, and 8). 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 higher fiscal deficit (Fiscal balance (% of GDP)) where faster in implementing *Payments Systems* measures (Table 3, column 8). Countries with lower public debt levels were more likely to respond earlier with *Liquidity and Funding* measures, potentially because their public debt markets are shallower (Table 3, column 6). Finally, we do not find evidence of the current account playing a significant role 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 0.29 percent in the *Financial Markets and NBFIs* 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 0.35 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 (0.4 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 1.5 percent (Table 3, column 2).

Table 3. Cox Regression: Time Until the First Policy Response by Category in EMDEs (days since January 30th, 2020)

VARIABLES	(1) Banking Sector	(2) Banking Sector	(3) Financial Markets and NBFIs	(4) Financial Markets and NBFIs	(5) Liquidity and Funding	(6) Liquidity and Funding	(7) Payments Systems	(8) Payments Systems
Log GDP per capita (USD)	1.762***	1.495***	1.381***	1.334**	1.502***	1.353**	0.820**	0.936
	(0.199)	(0.203)	(0.164)	(0.192)	(0.190)	(0.195)	(0.082)	(0.109)
Log population size	1.120*	1.099	1.256***	1.306***	1.384***	1.424***	1.134**	1.217***
	(0.073)	(0.081)	(0.080)	(0.095)	(0.103)	(0.116)	(0.067)	(0.073)
Days until 100th COVID-19 case	0.996*	0.996	1.000	1.002	1.002	1.004	0.997**	0.998
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Government debt (% GDP)		0.997		0.997		0.992**		0.998
		(0.003)		(0.003)		(0.003)		(0.003)
Private debt (% GDP)		1.015***		1.005		1.009**		0.993**
		(0.004)		(0.004)		(0.004)		(0.003)
Current account (% of GDP)		0.993		0.997		0.996		0.988
		(0.010)		(0.008)		(0.011)		(0.008)
Fiscal balance (% of GDP)		1.001		1.005		0.994		0.947**
		(0.030)		(0.019)		(0.024)		(0.020)
Observations (countries)	113	105	113	105	113	105	113	105
Pseudo R^2	0.035	0.054	0.016	0.019	0.025	0.038	0.017	0.027

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 3 (p-value 0.01), 4 (p-value 0.02), 5 (p-value 0.03), and 7 (p-value 0.07); and the log GDP per capita in column 3 (p-value = 0.04), and 5 (p-value = 0.06). *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.

In ancillary regressions reported in Appendix C, Table C1, 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 care. 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 measures in all policy categories. However, regulatory Tier 1 capital is positively associated with a faster response in the *Banking Sector* and *Liquidity and Funding* categories. Private bank credit (as % of GDP) is also associated with a faster response in the *Banking Sector* category, while countries which have adopted the capital requirements of the Basel III framework are slower in adopting *Financial Markets and NBFIs* measures.

4.3 Financial Policy Response Activity Index in EMDEs

Table 4 shows Poisson regressions with the FPRAI as the dependent variable. Model 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 4, column 4, a one-percent increase in GDP per capita increases the mean value of the total policies by 0.56 percent. Similarly, a one-percent increase in population size increases the mean value of total policies by 0.35 percent. In contrast, the spread of COVID-19 does not appear to be a significant factor. Model 2 indicates that macro-financial factors do not play a significant role either. Further, Model 3 shows there is no significant association between financial policy activity and COVID-19 containment and fiscal support policies. Model 4 confirms these findings.

Table 4. Poisson Regression: Financial Policy Response Activity Index in EMDEs (September 1st, 2020)

VARIABLES	(1)	(2)	(3)	(4)
	Financial Policy Response Activity Index			
Log GDP per capita (USD)	0.450***	0.533***	0.467***	0.560***
	(0.062)	(0.072)	(0.064)	(0.077)
Log population size	0.318***	0.353***	0.308***	0.347***
	(0.044)	(0.046)	(0.049)	(0.052)
Days to record 100 Covid-19 cases	0.000	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Fiscal balance (% of GDP)		-0.013		-0.013
		(0.020)		(0.020)
Current account (% of GDP)		-0.011		-0.015*
		(0.007)		(0.008)
Government debt (% GDP)		-0.002		-0.003
		(0.003)		(0.003)
Private debt (% GDP)		-0.002		-0.003
		(0.002)		(0.002)
Oxford fiscal support (% of GDP)			-0.003	0.806
			(0.603)	(0.696)
Oxford government response stringency index			0.246	0.169
			(0.528)	(0.540)
Constant	-6.626***	-7.877***	-6.759***	-8.104***
	(1.059)	(1.219)	(1.144)	(1.352)
Observations (countries)	113	105	102	94
Pseudo R^2	0.446	0.474	0.435	0.465

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 (FPRAI). Robust standard errors. *, **, 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 C, Table C2, 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 contains over 3,100 individual measures and captures in detail the unprecedented policy response by authorities in over 150 countries to mitigate the macro-financial impact of COVID-19 and the spillovers to the real sector in their jurisdictions. 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, including credit and payments. 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 and macro-financial fundamentals appear to have limited influence on policy makers' responsiveness. 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 responsive. 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, but the results are not robustly statistically significant. Asset quality does not appear to play a significant role.

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. As discussed in Section 2, some countries, particularly low- and middle-income EMDEs, have resorted to policy measures (e.g., lowering certain risk weights without adequate public guarantees, 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)). These countries have adopted such measures perhaps because they have fewer options at their disposal due to limited policy buffers, less diversified financial systems, weaker implementation capacity, and less sophisticated regulatory and supervisory frameworks (e.g., countercyclical capital buffer frameworks are typically not in place). This may have created some respite in the short term but may also generate 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. Furthermore, some of these measures may jeopardize hard-won gains in upgrading regulatory and supervisory frameworks to align them with global standards and longer-term policy credibility. 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.

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APPENDIX A: Description of Variables

Table A1. Variables

Policy Database denotes the World Bank COVID-19 Financial Sector Policy Response Database. WHO indicates the World Health Organization. IMF WEO stands for the International Monetary Fund's World Economic Outlook; IMF IFS refers to the International Monetary Fund's International Financial Statistics; IMF FSI indicates the International Monetary Fund's Financial Soundness Indicators. WB WDI denotes the World Bank's World Development Indicators; BRSS refers to the World Bank – Bank Regulation and Supervision Survey. IMF WB Global Debt Database denotes the IMF and World Bank global debt database. Oxford indicates information from the Oxford COVID-19 Government Response Tracker, Blavatnik School of Government.

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 NBFIs* 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 Policy Response 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 WB Global Debt Database
Government debt (% GDP)	Amount of total public debt to GDP.	IMF WB 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 (% of 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
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 has adopted the Basel III framework, and 0 otherwise.	BRSS

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 2.

Panel A. Descriptive statistics

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
Log GDP per capita (USD)	105	8.976	0.876	6.892	10.383
Log population size	105	16.184	1.894	11.182	21.058
Days to record 100 Covid-19 cases	105	80.476	45.706	0.000	215.000
Government debt (% GDP)	105	55.072	27.210	7.079	163.210
Private debt (% GDP)	105	40.885	31.891	3.288	204.107
Current account (% of GDP)	105	-4.628	9.175	-42.200	24.700
Fiscal balance (% of GDP)	105	-2.777	3.523	-10.800	8.800
Oxford Gov. Response Stringency Index	94	56.944	12.619	11.034	77.226
Oxford Fiscal support (% of GDP)	105	4.564	8.796	0.000	62.868
Regulatory Tier 1 capital to risk-weighted assets	76	16.634	5.637	7.975	38.813
Non-performing loans to total gross loans	75	8.273	8.552	1.553	48.359
Private bank credit (% of GDP)	91	39.440	28.945	5.564	162.220
Basel III adoption	83	0.434	0.499	0.000	1.000

Panel B. Pairwise Pearson correlations

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[9]	[10]	[11]
Log GDP per capita (USD)	[1]	1											
Log population size	[2]	-0.124	1										
Days to record 100 Covid-19 cases	[3]	-0.147	-0.636*	1									
Government debt (% GDP)	[4]	0.043	-0.116	0.194*	1								
Private debt (% GDP)	[5]	0.465*	0.118	-0.187*	0.037	1							
Current account (% of GDP)	[6]	0.129	0.259*	-0.206*	-0.300*	0.035	1						
Fiscal balance (% of GDP)	[7]	0.015	-0.190*	0.070	-0.120	-0.156	0.207*	1					
Oxford Gov. Response String. Index	[8]	0.247*	0.181*	-0.190*	0.049	0.120	0.044	-0.004	1				
Oxford Fiscal support (% of GDP)	[9]	0.091	0.076	-0.087	0.093	0.256*	0.214*	0.091	0.124	1			
Reg. Tier 1 capital to RWA	[9]	-0.250*	-0.372*	0.284*	-0.036	-0.336*	-0.132	0.151	-0.267*	-0.105	1		
Non-perf. loans to total gross loans	[10]	-0.172	-0.047	0.083	0.088	-0.355*	-0.012	0.212*	-0.159	-0.201*	0.245*	1	
Private bank credit (% of GDP)	[11]	0.443*	0.190*	-0.261*	0.006	0.965*	0.096	-0.095	0.185*	0.263*	-0.368*	-0.397*	1
Basel III adoption	[12]	-0.316*	-0.245*	0.194*	-0.057	-0.356*	-0.110	0.136	-0.028	-0.134	0.243*	-0.045	-0.326*

Table A3: Descriptive Statistics Financial Policy Response Activity Index (FPRAI) by region (per September 1ˢᵗ, 2020)

World Bank Region	Countries	Mean	Std. Dev.	Min	Max
EAP	19	22.158	19.403	2	79
ECA	34	35.676	22.950	3	87
LAC	31	15.258	19.223	3	66
MENA	18	9.833	7.748	1	27
North America	2	63.000	28.284	43	83
SAR	8	37.125	28.412	8	92
SSA	42	10.095	7.341	2	44
Global	154	20.331	20.781	1	92

APPENDIX B: Charts by World Bank Group Regions

Figure B1. Cumulative Number of Financial Sector Policy Measures by Category (Level 1) (as of September 1st, 2020)

East Asia Pacific (EAP)
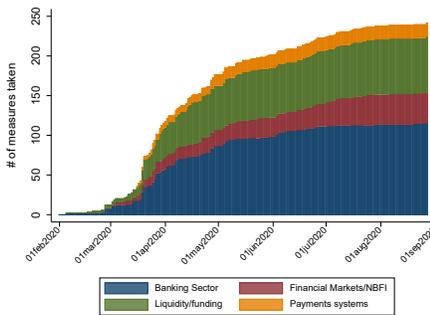
Europe & Central Asia (ECA)
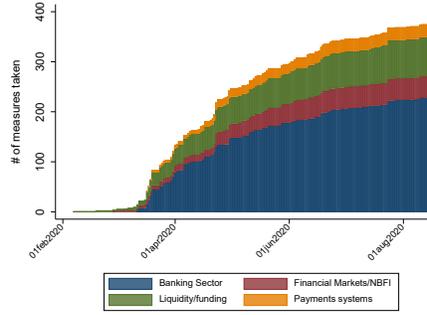
Latin America & Caribbean (LAC)
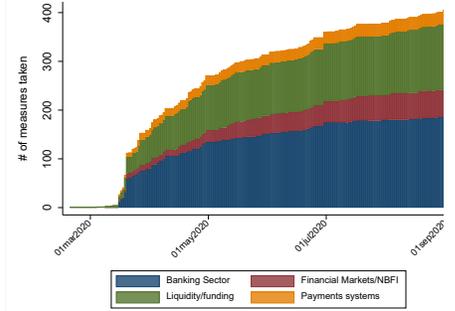
Middle East & North Africa (MENA)
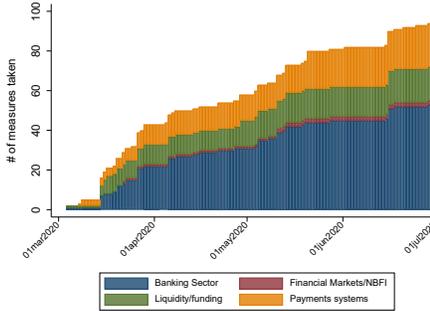
South Asia (SAR)
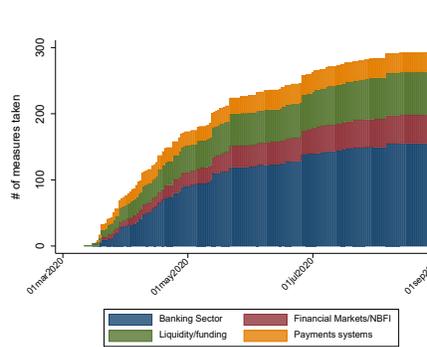
Sub-Saharan Africa (SSA)
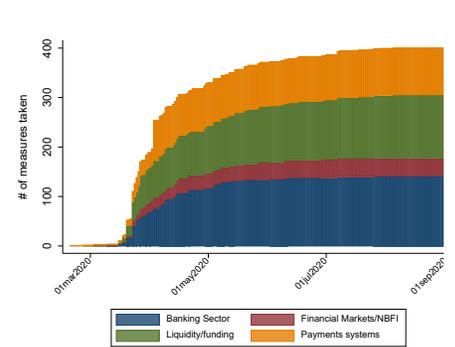
Source: World Bank COVID-19 Financial Sector Policy Response Database. World Bank regions exclude high-income countries. See Appendix 4 for country classification into groups.

Figure B2. Distribution of Cumulative Number of Financial Policy Measures Taken by Countries Across World Bank Regions by Category (September 1st, 2020)

Banking Sector
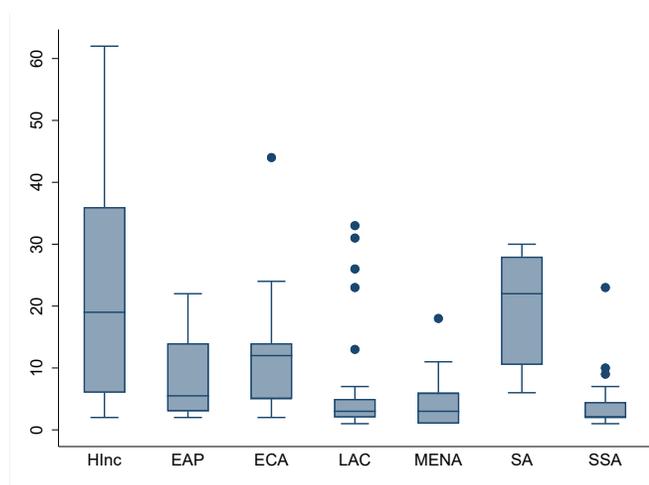
Financial Markets & NBFI
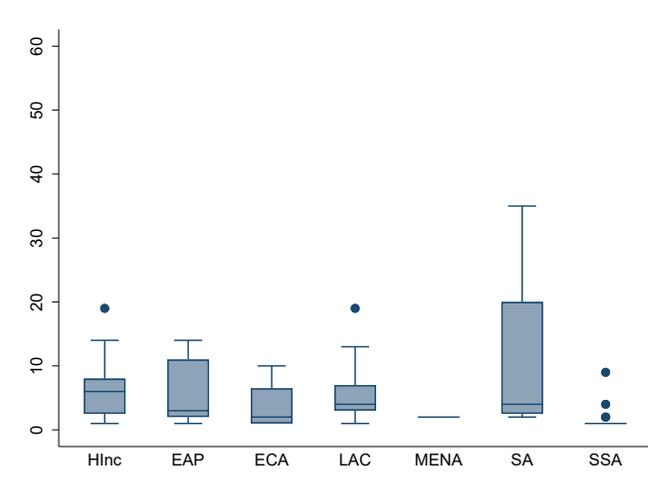
Liquidity and Funding
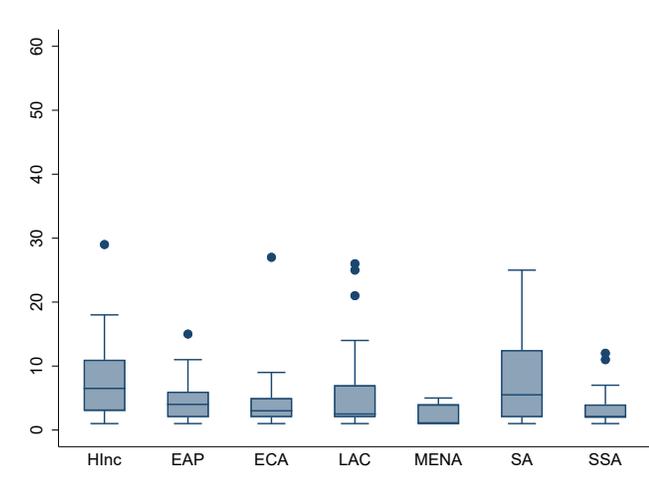
Payments Systems
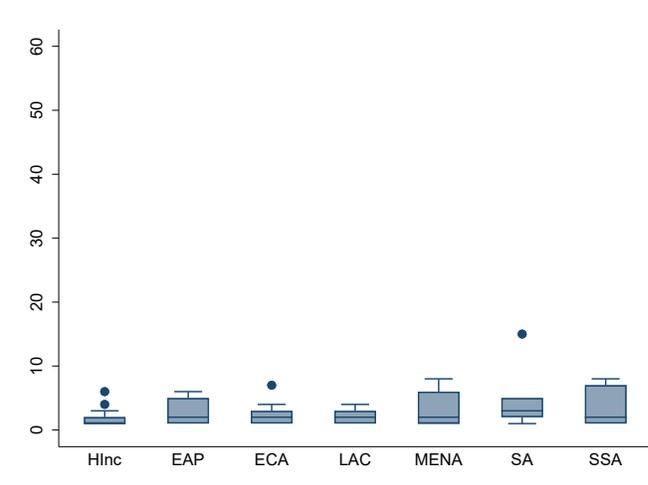
Source: World Bank COVID-19 Financial Sector Policy Response Database.

Note: World Bank regional classification. Hinc = High income; EAP = East Asia Pacific; ECA = Europe & Central Asia; LAC = Latin America & Caribbean; SAR = South Asia; MENA = Middle East & North Africa; and SSA = Sub-Saharan Africa.

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Appendix C: Additional regression results with banking sector characteristics

Table C1. 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 to 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 NBFIs	(3) Liquidity and Funding	(4) Payment Systems
Log GDP per capita (USD)	2.257***	1.929***	1.527*	0.809
	(0.516)	(0.480)	(0.343)	(0.182)
Log population size	1.169	1.462***	1.418***	1.170*
	(0.114)	(0.146)	(0.146)	(0.104)
Days to record 100 Covid-19 cases	0.992*	1.001	0.999	0.997
	(0.004)	(0.004)	(0.004)	(0.004)
Regulatory Tier 1 capital to risk-weighted assets	1.059**	1.033	1.053*	0.977
	(0.029)	(0.027)	(0.033)	(0.028)
Non-performing loans to total gross loans	0.989	1.004	0.994	1.018
	(0.024)	(0.025)	(0.023)	(0.023)
Private bank credit (% of GDP)	1.012*	1.006	1.007	0.994
	(0.006)	(0.007)	(0.006)	(0.005)
Basel III adoption	0.910	0.599*	0.607	0.897
	(0.301)	(0.185)	(0.191)	(0.263)
Observations	60	60	60	60
Pseudo R^2	0.099	0.066	0.064	0.025

Table C2. Poisson Regression: Financial Policy Response Activity Index (September 1st, 2020)

In this table, we present the results of ancillary regressions to Table 4. 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 (FPRAI). Robust standard errors. *, **, and *** represent statistical significance at 10%, 5%, and 1% two-tailed level, respectively.

VARIABLES	(1)	(2)
	Financial Policy Response Activity Index	
Log GDP per capita (USD)	0.406***	0.442***
	(0.094)	(0.092)
Log population size	0.267***	0.226***
	(0.045)	(0.051)
Days to record 100 Covid-19 cases	0.000	0.000
	(0.002)	(0.002)
Regulatory Tier 1 capital to risk-weighted assets	-0.011	-0.007
	(0.014)	(0.014)
Non-performing loans to total gross loans	-0.009*	-0.007
	(0.005)	(0.005)
Private bank credit (% of GDP)	-0.005**	-0.006**
	(0.002)	(0.003)
Basel III adoption	-0.724***	-0.901***
	(0.170)	(0.195)
Oxford Fiscal support (% of GDP)		0.425
		(0.853)
Oxford Government Response Stringency Index		1.339***
		(0.499)
Constant	-4.619***	-5.014***
	(1.447)	(1.530)
Observations	60	56
Pseudo R^2	0.550	0.564

Appendix D: Country-level Summary of Measures in the COVID-19 Financial Sector Policy Response Database (up to September 1st, 2020)

Country	Grouping	Banking Sector	Financial Markets and NBFIs	Liquidity and Funding	Payment systems	Financial Policy Response Activity Index
Cambodia	EAP	5		2		7
China	EAP	14	14	15		43
Fiji	EAP	3	1	2		6
Indonesia	EAP	14	11	11	5	41
Lao PDR	EAP	3		2		5
Malaysia	EAP	16	3	5	2	26
Mongolia	EAP	4		4		8
Myanmar	EAP	8		5	1	14
Papua New Guinea	EAP	2		6		8
Philippines	EAP	22	4	11	6	43
Samoa	EAP	2				2
Solomon Islands	EAP	2		1		3
Thailand	EAP	15	3	4	1	23
Vietnam	EAP	6	2	3	2	13
Albania	ECA	12	1	3	2	18
Armenia	ECA	8		3	1	12
Azerbaijan	ECA	14	10	2	3	29
Belarus	ECA	12	1	3		16
Bosnia and Herzegovina	ECA	3				3
Bulgaria	ECA	24	9	2		35
Georgia	ECA	15	2	5	2	24
Kazakhstan	ECA	14	2	3	1	20
Kosovo	ECA	4		1		5
Kyrgyz Republic	ECA	21	1	2		24
Moldova	ECA	6		5	2	13
Montenegro	ECA	5		1		6
North Macedonia	ECA	5		4		9
Russian Federation	ECA	44	8	7	7	66
Serbia	ECA	8	2	9	2	21
Tajikistan	ECA	2	1	3	1	7
Turkey	ECA	12	1	27		40
Ukraine	ECA	12	5	4	4	25
Uzbekistan	ECA	7		4		11
Anguilla	LAC	2		2		4
Argentina	LAC	33	19	3	4	59
Belize	LAC	5		1		6
Bolivia	LAC	2		2	3	7
Brazil	LAC	31	6	21	3	61
Colombia	LAC	23	13	26	4	66
Costa Rica	LAC	2		3	1	6
Dominica	LAC	2		2		4

Country	Grouping	Banking Sector	Financial Markets and NBFIs	Liquidity and Funding	Payment systems	Financial Policy Response Activity Index
Dominican Republic	LAC	5	3	7	1	16
Ecuador	LAC	5				5
El Salvador	LAC	7		1	1	9
Grenada	LAC	2		2		4
Guatemala	LAC	2		2		4
Guyana	LAC	5	4		2	11
Haiti	LAC	4		2	2	8
Honduras	LAC	1		4		5
Jamaica	LAC	4	1	4	2	11
Mexico	LAC	26	7	25	1	59
Montserrat	LAC	2		2		4
Nicaragua	LAC	3		3		6
Paraguay	LAC	2		8		10
Peru	LAC	13	3	14	1	31
St. Lucia	LAC	2		2		4
St. Vincent and the Grenadines	LAC	2		2		4
Suriname	LAC	2	1			3
Algeria	MENA	4		5		9
Djibouti	MENA	1		1		2
Egypt, Arab Rep.	MENA	18	2	1	6	27
Iran, Islamic Rep.	MENA	1			1	2
Iraq	MENA	1		1	1	3
Jordan	MENA	6		4	8	18
Lebanon	MENA	3				3
Libya	MENA	1				1
Morocco	MENA	11		4	1	16
Tunisia	MENA	2		1	2	5
West Bank and Gaza	MENA	5			3	8
Afghanistan	SA	6		1	2	9
Bangladesh	SA	25		9	5	39
Bhutan	SA	19		2		21
India	SA	30	35	25	2	92
Maldives	SA	6		2		8
Nepal	SA	29	2	4	1	36
Pakistan	SA	15	3	7	4	29
Sri Lanka	SA	27	5	16	15	63
Angola	SSA	3		1		4
Benin	SSA	2	1	2	7	12
Botswana	SSA	6	1	6	1	14
Burkina Faso	SSA	2	1	2	7	12
Cameroon	SSA	2	1	2	2	7
Central African Republic	SSA	2	1	2		5
Chad	SSA	2	1	2		5
Comoros	SSA	2		1	1	4

Country	Grouping	Banking Sector	Financial Markets and NBFIs	Liquidity and Funding	Payment systems	Financial Policy Response Activity Index
Congo, Dem. Rep.	SSA			3	4	7
Congo, Rep.	SSA	2	1	2		5
Côte d'Ivoire	SSA	2	1	2	7	12
Equatorial Guinea	SSA	2	1	2		5
Eswatini	SSA	4		7		11
Ethiopia	SSA	2		1	1	4
Gabon	SSA	2	1	2		5
Gambia, The	SSA			2		2
Ghana	SSA	6	1	7	4	18
Guinea-Bissau	SSA	2	1	2	7	12
Kenya	SSA	6	1	4	3	14
Lesotho	SSA	3	1	4	1	9
Liberia	SSA	2		1	2	5
Madagascar	SSA	6		2	1	9
Malawi	SSA	5		3	4	12
Mali	SSA	2	1	2	7	12
Mauritania	SSA			3		3
Mozambique	SSA	3		6	2	11
Namibia	SSA	4		3		7
Niger	SSA	2	1	2	7	12
Nigeria	SSA	7	4	3	2	16
Rwanda	SSA	3		4	1	8
Senegal	SSA	2	1	2	8	13
Sierra Leone	SSA		1	2		3
South Africa	SSA	23	9	12		44
South Sudan	SSA	2		2	1	5
Sudan	SSA	2			2	4
Tanzania	SSA	1		3	1	5
Togo	SSA	3	1	2	7	13
Uganda	SSA	9	1	5	2	17
Zambia	SSA	4	2	3	2	11
Zimbabwe	SSA	10	2	11	1	24
Antigua and Barbuda	High Inc.	3		2		5
Australia	High Inc.	15	7	6	2	30
Bahrain	High Inc.	3		4	1	8
Canada	High Inc.	19	6	18		43
Chile	High Inc.	14	3	12		29
Croatia	High Inc.	26	10	4	3	43
Czech Republic	High Inc.	25	7	4		36
Estonia	High Inc.	41	7	11		59
France	High Inc.	46	10	12		68
Germany	High Inc.	49	7	11		67
Hong Kong SAR, China	High Inc.	12	1	3		16
Hungary	High Inc.	26	9	10	1	46

Country	Grouping	Banking Sector	Financial Markets and NBFIs	Liquidity and Funding	Payment systems	Financial Policy Response Activity Index
Israel	High Inc.	7	2	4	1	14
Italy	High Inc.	62	14	11		87
Japan	High Inc.	6	2	13	1	22
Korea, Rep.	High Inc.	44	19	14	2	79
Kuwait	High Inc.	6		2	1	9
Latvia	High Inc.	35	6	11		52
Lithuania	High Inc.	34	6	12		52
Mauritius	High Inc.	8	1	5	4	18
Oman	High Inc.	3		1	2	6
Panama	High Inc.	5			1	6
Poland	High Inc.	22	6	7		35
Qatar	High Inc.	2		2	1	5
Romania	High Inc.	25	7	10	1	43
Saudi Arabia	High Inc.	7	2	3	6	18
Seychelles	High Inc.	3		1	1	5
Singapore	High Inc.	19	8	3	2	32
Slovak Republic	High Inc.	39	6	11		56
Slovenia	High Inc.	36	6	11	1	54
Spain	High Inc.	57	8	11	1	77
St. Kitts and Nevis	High Inc.	2		2		4
Trinidad and Tobago	High Inc.	3		2		5
United Arab Emirates	High Inc.	15	2	5	1	23
United Kingdom	High Inc.	36	3	13	2	54
United States	High Inc.	43	11	29		83
Uruguay	High Inc.	13	1	1	2	17

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