## INTERNATIONAL MONETARY FUND

# Macro-Financial Policies and Vulnerabilities in IMF-Supported Programs

Yazan Al-Karablieh, José Marzluf, Hector Perez-Saiz, Azzam Santosa, and Fabián Valencia

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#### Macro-Financial Policies and Vulnerabilities in IMF-Supported Programs Prepared by Yazan Al-Karablieh, José Marzluf, Hector Perez-Saiz, Azzam Santosa, and Fabián Valencia<sup>\*</sup>

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ABSTRACT: We construct a unique dataset by collecting macro-financial commitments data using textual analysis of the Memorandum of Economic and Financial Policies (MEFPs), a document outlining, inter-alia, policy commitments by member countries, in the context of an IMF-supported program. We combine this data with information on structural conditionality. Using a staggered difference-in-differences methodology, we show that IMF-supported programs with macro-financial policy commitments are followed by periods of lower nonperforming loans and in some cases lower credit-to-GDP ratios, relative to IMF-supported programs without macro-financial commitments, mostly for the post global financial crisis (GFC) period before the COVID-19 pandemic. The NPL-to-loans ratio does not seem to decrease as a result of credit expansion. The results point to stronger and more abrupt declines in credit-to-GDP following ex-post macro-financial policies, those implemented after a crisis occurs (e.g., restructuring), and milder and more gradual declines following ex-ante policies, those implemented before risks materialize (e.g., regulatory requirements). The responses are also larger when countries have positive credit gaps at the start of the program than when credit gaps are negative. These results point to the importance of considering the country's position in the credit cycle in program design and in addressing vulnerabilities preemptively to reduce the need for abrupt corrections when risks materialize. Finally, macro-financial policies targeting financial inclusion tend to increase credit-to-GDP ratios in low creditto-GDP program countries.

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Author's E-Mail Address:	YAI-Karablieh@imf.org, JMarzluf@imf.org, HPerez-Saiz@imf.org, Azzam.Santosa@ugent.be, and FValencia@imf.org.

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## **1.Introduction**

The world experienced a crude awakening during the Global Financial Crisis (GFC), reminding policymakers of the importance of well-designed financial regulations and robust supervision to safeguard financial stability. Consequently, during the decade that followed the GFC, central banks, financial regulators, and supervisors dedicated their efforts to enacting reforms to strengthen financial sector resilience, including through the development of "macroprudential" policies. Reflecting the nature of the shock, the integration of macro-financial conditionality into the design of IMF-supported programs saw a significant uptick in the mid-2010s (Figure 1), with the subsequent two IMF's Reviews of Conditionality noting the importance of adequately reflecting macro-financial linkages in program design (IMF, 2012), and of non-performing loans (NPL) resolution (IMF, 2019a).

In this paper, we study the change in macro-financial outcomes, specifically the level of credit and nonperforming loans, following commitments to implement macro-financial policies in the context of IMF-supported programs.<sup>1</sup> These commitments capture macro-financial policies more broadly than policy actions whose intensive margin is directly measurable (e.g., increases in capital requirements vs. strengthening supervision). We study how those commitments affect the outcomes of interest, depending also on the initial position of the country in the credit cycle – measured through the credit gap. We also distinguish between ex-ante policies typically applied before a financial crisis, such as increasing capital requirements—and ex-post policies usually applied during or after a financial crisis, such as bank restructuring. Our study helps shed light on the effects of these policies in the context of a Fund program, which may ultimately help inform program design.<sup>2</sup>



Figure 1: Structural Benchmarks and MEFP Commitments in IMF-Supported Programs

Note: The chart on the left plots the percentage of macro-financial structural benchmarks over the total structural benchmarks across IMF-supported programs by year. The macro-financial structural benchmarks are SB13, SB14 and SB31 on the Financial Sector, Financial Sector Legal Reforms and Restructuring of Financial Institutions, respectively. Total SBs are macro-financial and non-macro-financial SBs. The chart on the left tracks the status of structural benchmarks (e.g. "met" or "implemented with delay"), and so includes both programs that begin in that year

<sup>1</sup> Macro-financial policies in our paper include: macroprudential policies, bank restructuring measures, resolution of NPLs, measures to strengthen financial supervision, bank capital and liquidity regulations, and in general any other policy or legislative action that aims at strengthening financial stability. Macro-financial policies do not include anti money laundering (AML-CFT) measures.
<sup>2</sup> Type of programs covered in our sample are Extended Credit Facility (ECF), Extended Fund Facility (EFF), Exogenous Shock Facility (ESF), Policy Coordination Instrument (PCI), Precautionary Credit Line (PCL), Precautionary Liquidity Line (PLL), Poverty Reduction and Growth Facility (PRGF), Policy Support Instrument (PSI), SBA (Stand-By Arrangement), Standby Credit Facility (SCF). We exclude precautionary programs with no ex-post conditionalities (e.g. FCL).

and include ongoing programs (i.e. programs that have started prior to the given year). The chart on the right plots the average MEFP commitments per IMF-supported program in each year broken down by type of MEFP commitment, and also includes commitments for all programs active in that year. Source: IMF MONA database, author's calculations.

We first construct a unique dataset collecting information on commitments on macro-financial policies using textual analysis of the Memorandum of Economic and Financial Policies (MEFPs). The MEFP is prepared by the member country and describes the policies it intends to implement in the context of its request for financial support from the IMF. We then supplement this dataset with data on structural benchmarks (SBs) from the Monitoring of Fund Arrangements (MONA, IMF 2024) database.<sup>3</sup> Using this panel dataset of 137 IMF-supported programs during the 2010-2023 period,<sup>4</sup> we employ a staggered difference-in-differences methodology.

We show that IMF-supported programs with macro-financial policy commitments, relative to those without them, are followed by periods of lower non-performing loans and lower credit-to-GDP levels. These results are relatively stronger in countries that have positive credit gaps and lower credit-to-GDP ratios in the years preceding program approval, thus helping tame credit-related vulnerabilities more so in countries with lower financial deepening. The results are stronger in the pre-Covid period (2010-2019) which coincided with greater prevalence of macro-financial commitments, particularly on strengthening financial regulation and supervision, following the Global Financial Crisis. When we consider the subsample of ex-post policies – those implemented after a crisis – we find stronger and more abrupt declines in credit-to-GDP following macro-financial policies. On the other hand, ex-ante policies – those implemented before risks materialize (e.g., regulatory requirements) – are followed by milder and more gradual declines in credit-to-GDP.

This paper contributes to the literature on the impact of IMF-supported programs which has found that a country's participation in an IMF-supported program can affect its sovereign creditworthiness (Gehring and Lang, 2020), unlock other financing if IMF financing is within an optimal mid-size lending range (Krahnke, 2023), and reduce the likelihood of experiencing a future banking crisis (Papi et al. 2015). A closely related paper, Carriere-Swallow and Marzluf (2023), study optimism in growth forecasts in IMF-supported programs to find that it increases with the rate of expansion of the credit-to-GDP gap in the years preceding a program. Complementary to their results, we find that macro-financial policy commitments in the context of an IMF-supported program are stronger when the program is preceded by a positive credit gap. Both studies point to the importance of considerations for the country's position in the credit cycle in program design. More broadly, our paper also contributes to the large literature examining the role of macro-financial policies in containing financial vulnerabilities and their non-linear effects (e.g., Araujo et al., 2024; Biljanovska et al. 2023, Brunnermeier et al., 2009; French et al., 2010; Hanson et al., 2011; Kashyap et al., 2008).

Methodologically, we look at specific policy commitments within an IMF-supported program, which distinguishes our paper from the wider literature on the effects of having or not an IMF-supported program.

<sup>&</sup>lt;sup>3</sup> According to the IMF, structural benchmarks are "reform measures that often cannot be quantified but are critical for achieving program goals and used as markers to assess program implementation" (see <u>IMF conditionality</u>). MEFP commitments include but are not limited to SBs. Our data collection process for MEFP commitments did not include SB conditionalities in the MEFPs and so we analyze MEFP commitments and SB conditionalities in isolation.

<sup>&</sup>lt;sup>4</sup> Since IMF-supported programs typically last a few years, it can be the case that some countries have more than one program during this time range. The MONA database tracks the performance of countries in terms of scheduled purchases and reviews, quantitative and structural conditionality, and macroeconomic indicators. It can be found at <u>MONA - Monitoring of Fund</u> Arrangements (imf.org).

Moreover, we use a staggered difference-in-difference approach, which allows for dynamic responses and relies on the proper choice of a control group, while the recent literature has used an instrumental variable approach that crucially relies on finding an appropriate instrument (e.g. Krahnke, 2023, Balima and Sokolova, 2021).<sup>5</sup>

The paper proceeds as follows: section II describes the main and secondary datasets used in our analysis and descriptive statistics, section III presents descriptive tends and stylized facts of macro-financial outcomes and commitments, section IV describes the empirical strategy, and section V presents the regression results. Finally, section VI concludes and presents policy implications.

### 2.Data

#### 2.1. IMF's Monitoring of Fund Arrangements (MONA)

We leverage the IMF's Monitoring of Fund Arrangements (MONA) database, utilizing data on IMF-supported programs approved between 2010 and 2023, to identify structural benchmarks (SBs) specifically related to the financial sector. There are three related broad categories in the MONA database: restructuring and privatization of financial institutions (abbreviated in our study as SB31); legal reforms and regulations (abbreviated in our study as SB31); legal reforms and regulations (abbreviated in our study as SB14); and one general category that encompasses any other macro-financial reform (abbreviated in our study as SB13).<sup>6</sup> The extracted SBs cover 148 programs corresponding to 76 countries, with an average number of 2.5 macro-financial structural benchmarks per program-country pair. Furthermore, the programs in our study have an average duration of 2.2 years, and an average of 5.3 reviews.<sup>7</sup>

#### 2.2. MEFP's Textual Analysis Data

In addition to collecting information on Structural Benchmarks, we use textual analysis to extract information on commitments on financial sector policies in the MEFP of each program review. MEFPs include policy commitments related to the implementation of SBs, as well as to other policy measures. While there is typically an MEFP for each program review, policy commitments in one MEFP can reiterate those from previous ones because some policies may take time to implement and/or be delayed.

<sup>&</sup>lt;sup>5</sup> Countries typically self-select into Fund program when facing a balance of payments need that could be the result of a financial crisis. Therefore, participation is a decision endogenous to the economic circumstances of the country.

<sup>&</sup>lt;sup>6</sup> Some specific examples of structural benchmarks include: a) Publish a public statement announcing the liquidation of a bank or its merger with another licensed commercial bank, and finalize the transfer of its deposit (SB31); b) select a buyer for a bank and initiate negotiations (SB31); c) develop and discuss with IMF staff an Action Plan for implementing the recommendations of the FSAP (SB14); d) present to the parliament an amended banking law to improve the supervisor's independence, in line with FSAP recommendations (SB14); e) establish and staff the credit reference bureau (SB13); and f) with the support of the World Bank, conduct a thorough assessment of the presence, nature and remedies for credit market imperfections (SB13). Not all Fund financial arrangements include ex-post conditionality in the form of structural benchmarks. Lending under the Fund's two emergency facilities (FCL and SLL) do not include structural benchmarks or other forms of ex-post conditionality.

<sup>&</sup>lt;sup>7</sup> A review is an assessment of the performance of the program up to an agreed date and the presence of sufficient commitments so that the program remains on track to meet its objectives. A review covers, inter alia, the country's reform progress, meeting of conditionality, the authorities' policy actions to correct for any slippages, and any additional policy commitments to ensure the program remains on track. A review can be bi-annual or quarterly, depending on IMF staff's assessment for the need for more frequent engagement with authorities.

We rely on a manual selection of text excerpts from the MEFPs with macro-financial content. We identify within these text excerpts phrases written in future tense signaling commitments to policy actions (see Figure A3). We classify these commitments by category (e.g., bank restructuring, resolution of NPLs, liquidity regulation, etc.) and by type of institution (banks and non-bank financial institutions (NBFIs)), as shown in Figure A4.<sup>8 9</sup> We count these commitments in each review independently and sum the number of commitments by review.<sup>10</sup> Also, we only include MEFP commitments that are not SBs as these are already extracted from the MONA database. For robustness we also ran regressions using the textual analysis method of Hassan et al. (2019) in table A4.

#### 2.3. Non-Performing Loans, Credit, and Macroeconomic Indicators

Data on non-performing loans, measured as percent over total gross loans, is sourced from the IMF's Financial Soundness Indicators (FSI) database (IMF, 2019b).<sup>11</sup> For countries not in the FSI database, we fill the gaps through manual data collection from IMF staff reports when available.<sup>12</sup> We observe some variation in the NPL ratio in our e.g. pre-Covid sample, with an average of 8.9 percent and a standard deviation of 7.6 percent. The credit gap series is estimated as the deviation of the credit-to-GDP ratio relative to a one-sided Hodrick– Prescott (HP) filter using a high smoothing parameter, as proposed by Borio and Lowe (2002).<sup>13</sup> Positive (negative) credit gap over the pre-program period. The pre-program period for each country is defined as the 3-year period prior to the first treatment year.

We classify countries as having a high or low credit-to-GDP ratio based on whether a country's median creditto-GDP ratio during the 3-year pre-program period is higher (lower) than the median of all 3-year pre-program observations for countries with at least one IMF-supported program between 2007 and 2023. Additionally, data on GDP, inflation, primary fiscal balance, and exchange rates are obtained from the World Economic Outlook (WEO) database (July-2024 vintage).

#### 2.4. IMF's Integrated Macroprudential Policy (iMaPP) Database

To confirm that commitments in MEFPs translate into actual policy actions, we rely on the IMF's integrated Macroprudential Policy (iMaPP) database (Alam et al. 2019). Using this database, we have manually identified the approval, enactment or passing of reforms related to macroprudential policies, a subset of the type of commitments we collect from MEFPs, by country and year.

<sup>&</sup>lt;sup>8</sup> We show a robustness table A5 in the appendix using a different selection method, from Hassan et al. (2019).

<sup>&</sup>lt;sup>9</sup> The nine categories can be found in Figure A4. For example, banking financial legislation commitments can be banking laws or laws on financial sector supervision. Another example includes commitments related to the prevention, detection, and resolution of NPLs which includes corporate debt restructuring, performing an asset quality review (AQR), or setting up a credit registry.

<sup>&</sup>lt;sup>10</sup> A program that has several reviews each year, where the same MEFP commitment is reiterated in each review, is calculated as the total of all commitments across the reviews, regardless of the repetitions.

<sup>&</sup>lt;sup>11</sup> The FSI defines NPLs as loans for which (1) payments of interest or principal are past due by 90 days or more; or (2) interest payments equal to 90 days or more have been capitalized (reinvested into the principal amount), refinanced, or rolled over (payment delayed by agreement); or (3) evidence exists to reclassify them as nonperforming even in the absence of a 90-day past due payment, such as when the debtor files for bankruptcy.

<sup>&</sup>lt;sup>12</sup> We exclude countries showing large jumps in their NPL series and with large differences with their available data in the FSI database: Haiti, St. Kitts and Nevis, Niger, Sao Tome and Principe, and Togo. NPL series are not available for Mongolia for most of the sample period.

<sup>&</sup>lt;sup>13</sup> The smoothing parameter—400,000 for quarterly data—is much larger than the one employed in the business cycle literature, better capturing low-frequency, cumulative deviations, and implicitly putting more weight on the mean reversion tendency of the processes (see Borio and Lowe, 2004).

Variable	$\mathbf{Obs}$	Mean	Std. dev.	Min	Max
Pre	-Covid	Sample	(2007-2019)		
NPL/Gross Loans	710	9.765	6.958	1.483	38.119
Credit-to-GDP	868	29.034	21.855	1.322	99.961
Real GDP Growth	868	3.838	3.813	-13.757	17.095
Fiscal Balance Change	868	-0.269	6.751	-111.966	107.422
Inflation	868	5.497	5.767	-2.325	48.684
ER Depreciation	868	3.580	9.821	-16.445	73.152
Pos	t-Covid	l Sample	(2020-2023)		
NPL/Gross Loans	304	7.919	6.111	1.483	31.069
Credit-to-GDP	322	34.548	25.718	4.603	160.588
Real GDP Growth	322	3.176	4.579	-13.757	17.095
Fiscal Balance Change	322	0.087	3.042	-15.680	10.968
Inflation	322	7.463	11.065	-2.325	53.231
ER Depreciation	322	5.854	15.128	-15.951	73.152

Table 1: Summary	y Statistics	of Main	Outcome	and Control	Variables

Note: NPLs-to-total gross loans, credit-to-GDP, inflation and exchange rate depreciation contain outliers and are winsorized at the 1 percent level for both tails of the distribution. GDP growth is winsorized at the 10 percent level. Fiscal balance change is the percentage change difference in the primary fiscal balance adjusted to GDP to control for the intensity of the fiscal consolidation and ER depreciation is the bilateral exchange rate of a country vis-a-vis the U.S. dollar. Pre-trends are estimated using observations three years before the treatment start. For the pre-Covid years, we include the years 2007-2009 to estimate pre-trends for treatments that start in 2010. The programs included in the pre-Covid sample span the years 2010-2019. For the post-Covid years, we include the years 2017-2019 to estimate pre-trends for treatments that start in 2020. The programs included in the pre-Covid sample span the years in sample size between NPLs and credit-to-GDP are due to countries missing NPLs in specific series.

## **3.Descriptive Trends**

#### 3.1 Stylized Facts

The evolution of conditionality in IMF-supported programs shows a sharp rise in the share of macro-financial SB conditionality relative to other policy areas in General Resources Account (GRA) programs following the GFC as shown in Figure 2.<sup>14</sup> During the period 2009-2015, most commitments fell under the legal reform category (SB14). However, the restructuring and privatization category (SB31) also held significant importance at the beginning of this period, though its relevance diminished towards the end. This period was followed by a new wave of macro financial conditionality around 2016-2018, in the aftermath of a global decline in commodity prices, which negatively affected oil-exporting countries.<sup>15</sup> As financial regulatory reform progressed and resilience of the banking sector strengthened following the post-GFC efforts in this area, macro-financial conditionality became more muted relative to other types of conditionality, including during and after the COVID-19 pandemic. This decline in the share of SB macro-financial conditionality results from the nature of the shock. COVID-19 started as a health crisis that, notwithstanding its severe social and economic impact, it

<sup>14</sup> The GRA account comprises a variety of lending programs with different disbursement schedules and maturities depending on the balance of payment needs of the member. PRGT programs provides concessional financial support to low-income countries.
<sup>15</sup> A relatively large proportion of the new IMF-supported programs in this period were with oil-exporting countries. did not originate in the financial sector; the financial sector confronted this shock from a position of strength owing to the post-GFC reforms; and an unprecedented and timely policy support in many areas to avert a financial meltdown (GFSR, 2020).

The evolution of macro-financial conditionality in the Memorandum of Economic and Financial Policies (MEFP) follows a different pattern compared to macro-financial SB conditionality. Using the newly compiled database of MEFPs with textual analysis (2010-2023), we observe two particularly noteworthy periods in terms of emphasis on macro-financial commitments: (1) increasing importance of MEFP macro-financial conditionality following the GFC and up to 2016, and (2) a decline in emphasis on macro-financial conditionality during the Covid period of 2021-2023 (Figure A8).

There are other notable trends in macro-financial conditionality and macro-financial outcomes. First, the distribution of macro-financial conditionality has been front-loaded (both SBs and MEFP commitments) across IMF-supported program reviews and this has largely remained the case over the sample period and type of commitments (appendix Figure A10 and Figure A11). Second, most of the SB conditionality is under the category of legal reforms across the sample years. Similarly, MEFP commitments is dominated by financial legislation, followed by commitments to resolve non-performing loans and bank supervision.

Relevant indicators of macro-financial vulnerabilities, NPLs (to-gross loans) and credit-to-GDP, varied significantly between 2010 and 2022 (appendix Figure A15 and A16). Separating the sample by the General Resources Account (GRA) and Poverty Reduction and Growth Trust (PRGT) program countries, NPLs and credit-to-GDP ratios rose sharply for GRA program countries following the GFC before declining in the second half of the 2010s (Figure A15 and Figure A16). In contrast, countries with no IMF-supported programs had relatively stable NPLs during the same period, and slightly rising credit-to-GDP ratios post-2014. Average NPLs surged in the PRGT countries group in 2015-17 coinciding with a period of higher demand for IMF-supported programs by low-income countries, and with dropping oil prices hurting commodity exporters. Throughout the sample period, credit-to-GDP ratios remained at a lower baseline in PRGT countries, relative to GRA countries, reflecting a slow progress towards greater financial deepening.



## Figure 2: Structural Benchmarks and MEFP Commitments in IMF-Supported Programs and Global Financial Conditions.

Source: IMF MONA database for IMF-supported program structural benchmark conditionality, authors' data collection of IMFsupported program MEFP commitments, Goldman Sachs, and author's calculations. Average for active programs by year.

We observe a relatively clear correlation between changes in macro-financial conditionality in IMF-supported programs and the observed evolution of some financial indicators (appendix Figure A18). The number of macro-financial SBs correlates strongly with the percentage of NPLs to total loans. The average number of macro-financial benchmarks per program responds almost immediately to average NPLs (appendix Figure A19) and Figure A20) and this holds true for the GRA and PRGT program countries. The decline in NPLs for GRA

countries, after peaking in 2013, is followed by a period of lower emphasis on macro-financial SB conditionality (relative to non-financial SBs), measured by the percentage of total SBs in active programs. The same is observed for PRGT countries after NPLs peaked in 2018. Yet the correlation between credit-to-GDP ratios and the number of structural benchmarks per program appears weaker, especially for PRGT program countries (appendix Figure A21).

## **4. Empirical Strategy**

#### 1.1..1. Staggered Difference-in-Differences Design

We estimate the response of non-performing loans and credit-to-GDP to macro-financial conditionality. . Our empirical analysis uses a staggered difference-in-differences (DiD) methodology, taking into consideration the different timing of IMF-supported programs across country observations. We estimate the following model where *i* denotes a program country in period *t*:

$$Y_{it} = \alpha_i + \beta_t + \sum_{t=E_i-4}^{E_i+4} \gamma_k \mathbf{1}\{K_{it} = k\} + \psi X_{it} + \varepsilon_{it}$$

- *Y<sub>it</sub>* denotes the main outcomes of interest.
- $\alpha_i$  denotes country fixed effects.
- $\beta_t$  denotes year fixed effects.
- $K_{it} = t E_i$  denotes dummies for the relative time to the event of the first year of a macro-financial SB conditionality or MEFP commitment introduction in an IMF-supported program in the country ( $E_i$ ).
- X<sub>it</sub> denotes a list of observable country characteristics. Unless otherwise indicated, we control for the fiscal balance, nominal bilateral exchange rate depreciation vis-à-vis the U.S. dollar, inflation, and a variable equal to 1 if a financial sector stability assessment under the Financial Sector Assessment Program (FSAP) was completed within the three-year period prior to the program.<sup>16</sup>
- $\gamma_k$  are the main coefficients of interests and corresponds to pre-trends for k < 0, and to dynamic effects for  $k \ge 0$ . They measure the change in the outcomes of program countries with macro-financial conditionality relative to the pre-program reference year, over and above the change observed for the control group of program countries with no macro-financial conditionality.<sup>17</sup>

Our sample includes only countries that had an IMF-supported program anytime during 2010-2023. Within this set, and for any year *t*, the treatment group includes those countries with IMF-supported programs with structural benchmarks or MEFPs containing macro-financial policy commitments in at least one program review during the treatment years.<sup>18</sup> Program countries are considered "treated" for year *t* and all years of the program

<sup>&</sup>lt;sup>16</sup> A financial sector stability assessment under the FSAP is an in-depth assessment that provides a diagnostic and policy recommendations that can be followed up in the context of Article IV surveillance and/or IMF-supported programs. The availability of one facilitates the identification of concrete and prioritized policy measures that could inform program negotiations.

<sup>&</sup>lt;sup>17</sup> We define program countries as countries that have had an IMF-supported program in our sample.

<sup>&</sup>lt;sup>18</sup> The first treatment year is the year of introduction of a macro-financial commitment within an IMF-supported program. Once a country is "treated" it is in the treatment group for the rest of the sample years. However, we only show the treatment coefficients up to the 4<sup>th</sup> year following the commitment or conditionality.

once macro-financial conditionality appears in a review. The main control group encompasses countries who have benefited from an IMF-supported program during the sample period, and that in the corresponding treatment years: (1) are in an ongoing program with no macro-financial structural benchmark conditionality or macro-financial MEFP commitments (the never-treated control group); or (2) do not have a program but in subsequent years will have one with financial structural benchmarks conditionality or macro-financial MEFP commitments (the not-yet-treated control group). The treatment group is a group of IMF-supported program countries with structural benchmarks or MEFPs containing macro-financial policy commitments in at least one program review during the treatment years. Program countries are considered "treated" for that year and the following years of the program once macro-financial conditionality appears in a review.<sup>19</sup> We also include a set of control variables such as change in fiscal balance, inflation, nominal exchange rate depreciation of the local currency vis-à-vis the U.S. dollar, and a dummy that takes the value of 1 if an FSAP was completed within the last three years. These controls help increase the precision of our estimates.<sup>20</sup>

While these plain two-way fixed effects specifications are popular in staggered difference-in-differences designs, recent studies have shown that these designs must be treated with care when thinking about causal interpretation of the aggregated parameters. We therefore use the staggered difference-in-differences estimator by De Chaisemartin and d'Haultfoeuille (2020), that solves several issues found in the plain two-way fixed effects specification, such as negative weighting.<sup>21</sup>

#### 4.2. Treatment and Control Groups

Tables A3 in the appendix show statistical differences between treatment and control groups for the sample years 2007-2023. Each cell in the table show coefficients and standard errors of a regression with a dependent variable list in column (1) on a treatment dummy indicator. The treatment group in Table A3 column (3) are IMF-supported program countries with any macro-financial MEFP commitments in at least one program review during that treatment year. The control group, explained in the previous subsection, serves as the best comparison to the "treated" countries while maintaining a large enough sample size for our econometric analysis.<sup>22</sup> Treatment and control groups are defined similarly in Table A3 column (2), but the treatment in this case refers only to general financial SB conditionality (abbreviated in our study as SB13). The control group in

<sup>&</sup>lt;sup>19</sup> For countries with multiple programs in the sample, we consider the first program as an absorbing state. For example, if a country falls in the treatment group in the first program, it will not return to the control group, as the country has already been treated with macro-financial conditionality and thus differs from the countries in the control group. We do not consider multiple treatments because of sample size restrictions. The difference-in-differences strategy relies on the parallel trends assumption - which we test in the regression tables to assess the fit of the treatment and control group - countries in the control and treatment should trend similarly on their outcomes prior to and absent IMF-supported programs with macro-financial conditionality.

<sup>&</sup>lt;sup>20</sup> When we define our sample, as above, to specific macro-financial policies or structural benchmarks, the control group may include country programs that involve other macro-financial policies. Therefore, in Table A7, we also present a small subset of results for a much more restricted sample of treatment and control, where the control group does not include other types of macro-financial policies. While this restriction provides the desired comparison between macro-financial policies and no policies, it restricts our sample size.

<sup>&</sup>lt;sup>21</sup> The two-way fixed effects estimates can be sensitive to the size of each group, the timing of treatment, and the total number of time periods. A number of other studies diagnose this problem and propose estimators to solve it, including Callaway and Sant'Anna (2021), Sun and Abraham (2020), and Imai and Kim (2020).

<sup>&</sup>lt;sup>22</sup> The tradeoff between sample size and control group choice is the following. If we aim for the largest sample possible then we'd include all countries with available data in the sample. By doing so, we will be including advanced economies that would not trend similarly to the "treated" countries in our sample. On the other hand, if we aim for the most similar control group, then we will only include countries also in a program that require a macro-financial conditionality but have not agreed to any commitments. In this case we would lose a large percentage of our sample and the analysis would not be possible.

column (2) is similar to column (3) but may include macro-financial conditionality other than SB13 (e.g. SB14 or SB31).<sup>23</sup>

Table A3 column (3) shows that all variables except credit-to-GDP, NPLs and the change in fiscal balance are statistically identical for control and treatment countries for the sample years 2007-2023. Table A3 column (2) shows inflation as the only variable that is statistically different for control and treatment countries for the sample years 2007-2023. These observed differences justify the use of certain control variables (such as inflation) in our regressions analysis, and the potential need to differentiate our analysis by splitting the sample depending on the level of credit-to-GDP in the pre-treatment period.

## **5.Results**

This section outlines the results of the paper. First, we aim to demonstrate the transmission channel by showing that MEFP commitments lead to actual policy implementations which in turn impact outcomes of interest such as NPLs and credit-to-GDP. Second, we analyze using the full sample how macro-financial conditionalities and commitments affect the asset quality in banks' portfolios and deleveraging proxied by NPLs and credit-to-GDP levels. Third, we delve deeper into heterogeneity, examining the distinction between ex-ante policies, those implemented before a crisis occurs (e.g., regulatory requirements) and ex-post policies, those implemented during or after a crisis (e.g., restructuring), as well as exploring outcomes on sub-samples based on the position in the credit cycle and the level of credit-to-GDP.

#### 5.1. Do Macro-Financial Commitments Translate into Policies?

To provide evidence that macro-financial commitments in IMF-supported programs translate into actual policy reforms, we show in Table 2 simple panel regressions of the number of policy reforms from the iMaPP database on contemporaneous macroprudential commitments in the MEFPs, a subset of our MEFP macro-financial commitments data. We do not expect a coefficient reflecting perfect correlation between commitments and policy actions for two reasons: (1) commitments are repeated across reviews, depending on their horizon of implementation and/or delays, with several related commitments, on average, for every policy implementation, and (2) some commitments may not materialize into implementation. However, we do expect a positive and statistically significant correlation reflecting that these commitments are taken seriously by the authorities as our descriptive analysis and case studies show.

The results of Table 2 show positive and statistically significant coefficients, and with and without including various controls and year and country fixed effects. Estimates show that for every MEFP commitment, between 0.09 to 0.12 macroprudential policies are implemented on average in the same year, depending on the specification used. To capture the correlation between MEFP macroprudential commitments and macroprudential commitments enacted in the iMaPP data, we also run a staggered difference-in-differences with dynamic effects regression in Table A5. Each additional macroprudential commitment is associated with 0.66 more policy implementations (iMaPP policies) in the same year as the commitments. Tables 2 and A6

<sup>&</sup>lt;sup>23</sup> In order to have more comparability across treatment and control groups, we also include a robustness analysis that restricts the control group to exclude any other macro-financial commitment and simply compare the treated countries with specific macro-financial commitments (such as SB13 or SB31) to a very small subset of countries with no macro-financial conditionality whatsoever.

show that MEFP commitments in IMF-supported programs are taken seriously from a policy perspective and translate into macroprudential policy actions.

	(1)	(2)	(3)
VARIABLES	Nr of Macroprud Pol. Implement.	Nr of Macroprud Pol. Implement.	Nr of Macroprud Pol. Implement.
Macroprud Pol. Committ	$0.107^{**}$ (0.0488)	$0.117^{**}$ (0.0493)	$0.0887^{*}$ ( $0.0507$ )
Observations	410	410	410
Controls	No	Yes	Yes
Year FE	No	No	Yes
Country FE	No	No	Yes
R-squared	0.012	0.029	0.250

 Table 2: Correlation Between Macro-Financial Commitments and Macro-Financial Policies Implemented (2007-2019).

Note: Panel regressions where the dependent variable is the number of macroprudential policies implemented in a given year and the independent variable of interest is the number of macroprudential MEFP commitments. Controls include real GDP growth, fiscal balance change, exchange rate depreciation and a dummy for that equals one if there was an FSAP in the last three years and zero otherwise. Sample runs from 2010-2019. Standard errors in parentheses.

#### 5.2. Full Sample Results

Our main empirical analysis based on staggered diff-in-diff regression is focused on estimating the change in two main outcomes following macro-financial commitments / conditionality: the NPL-to-gross loans ratio and the credit-to-GDP ratio.<sup>24</sup> We first present results using the full sample of countries and available years. We also present granular results for specific categories of macro-financial SBs conditionalities and MEFPs commitments in the full sample of program countries and years.

## 5.2.1 NPLs and Credit-to-GDP Following MEFP Commitments and SB Conditionality

Table 3 shows the results for the NPL-to-gross loans and credit-to-GDP ratios and the two types of macrofinancial conditionality (SBs and MEFPs commitments). For MEFP macro-financial commitments, the results show that in the pre-Covid period (2010-2019), credit-to GDP decreases by 1.5 percentage points (0.07 standard deviation, SD)<sup>25</sup> in the second year after the introduction of the MEFP commitments compared to the control group. NPLs to gross loans decrease by 1.6 percentage points (0.23 SD), at the 10 percent statistical significance level, and 2.2 percentage points (0.31 SD), at the 5 percent statistical significance level, in the second and third year, respectively, relative to the control group.

<sup>&</sup>lt;sup>24</sup> We also show some results on additional outcomes such as credit growth and GDP growth in the appendix tables A9 and A10 <sub>25</sub> We also report the standard deviation equivalent of the coefficient magnitudes in parentheses

For comparison with the broad MEFP category (any macro-financial commitment), we use the general structural benchmark category, SB13, despite not being the most prevalent structural benchmark.<sup>26</sup> For the general SB macro-financial conditionality (SB13), the pre-Covid results do not show statistically significant effects on the Credit-to-GDP ratio, while NPLs decrease by 5.4 percentage points by the third year (0.78 SD). Since structural benchmark conditionality can be implemented on time, delayed, or not implemented (i.e., countries may fail to implement policies within the pre-agreed timeframe), we present the regression in table 3 column (6) specification in the appendix (Table A9) for two samples: one where all structural benchmarks are implemented (100 percent) and another where they are implemented at a lower rate (<100 percent). In the 100 percent implemented sample, the results indicate a 2.3 percentage point decline in non-performing loans by the fourth year following commitments, with the parallel trends assumption holding.<sup>27</sup>

Both the SB and MEFP regressions show parallel trends between them, suggesting that the control and treatment groups are reasonably comparable before the first year of IMF-supported conditionalities/commitments (see for instance Figure 3 and Figure 4 where there are no significant changes from zero for the difference in trends between treatment and control in the pre-conditionality/commitment period).

The discrepancy in results on credit-to-GDP between the MEFP commitments and SB conditionality is possibly due to the differences in macro-financial policies emphasized in MEFP versus SB conditionalities, or due to changes in the emphasis on policies over time. For example, if MEFPs have more policies that emphasize bank restructuring or resolution, MEFP policies may result in larger drops in credit-to-GDP (deleveraging). To explore these results further, we show results by ex-post and ex-ante macro-financial policies and split the sample by the types of policies in the next sections.

Due to the lower sample size years in the post-Covid period estimation in our regressions (in columns 4 and 8), we are only able to estimate coefficients for the first treatment year and the second treatment year if we include all control variables used in the pre-Covid estimation. For this reason, we include only three control variables to estimate the coefficient for the third treatment year. Regardless of the control variables used in the post-Covid period, we find that both macro-financial SBs and MEFP policies are not associated with declines in NPLs in any of the treatment years. We explore heterogeneity for NPL estimation in later sections to try to explain why some country programs show declines in NPLs while others don't.

<sup>&</sup>lt;sup>26</sup> Later we focus on SB14 – financial legislation – which is the most used structural benchmark.

<sup>&</sup>lt;sup>27</sup> However, when structural benchmarks are not fully implemented, the results are not statistically significantly different from zero. In these cases, we observe an increasing trend in NPLs before policy implementation (though not statistically significant), followed by a subsequent decline after implementation. One possible explanation for increasing NPLs (in magnitude) in this sample is that some countries tend to "discover" NPLs right before the program or in the first year of the program. See for example Ari et al. (2021)'s results on NPLs for financial crises since the 1990s and up to the GFC.

	MEFP		MEFP		SB		SB	
	CR/GDP	NPL/Loans	CR/GDP	NPL/Loans	CR/GDP	NPL/Loans	CR/GDP	NPL/Loans
	2010-2019	2010-2019	2020-2023	2020-2023	2010-2019	2010-2019	2020-2023	2020-2023
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment		Any m	acrofin		(	General financ	ial SB (SB1	3)
Program year	-0.181	0.311	0.255	0.624	-0.75	-1.559	-0.683	0.651
	(0.397)	(0.49)	(1.362)	(0.933)	(0.555)	(1.649)	(0.742)	(0.524)
Program year+1	-0.957	-0.271	-0.908	-0.802	-0.104	-1.342	-2.811	0.141
	(0.705)	(0.738)	(1.428)	(0.845)	(1.625)	(2.428)	(1.859)	(0.574)
Program year+2	-1.513*	-1.634*	-2.651*	0.142	0.963	-3.783	-3.452	0.15
	(0.838)	(0.917)	(1.504)	(1.736)	(2.189)	(2.506)	(2.693)	(1.139)
Program year+3	-1.83	-2.196**	-3.748	0.526	3.066	-5.44**	0.095	0.419
	(1.191)	(0.997)	(2.442)	(1.588)	(2.6)	(2.416)	(1.261)	(1.009)
Program year-1	-0.223	0.413	0.12	0.172	-0.172	0.176	-0.34	0.647
	(0.465)	(0.626)	(0.599)	(0.734)	(0.446)	(0.624)	(1.193)	(0.52)
Program year-2	-0.024	0.974	1.414	-0.384	-1.5	-0.368	-0.306	$1.329^{*}$
	(0.916)	(1.109)	(0.964)	(0.698)	(1.226)	(0.966)	(2.647)	(0.738)
Program year-3	0.837	-1.803	8.064***	-2.171**	-1.291	-2.188	0.978	1.605
	(1.067)	(1.441)	(3.034)	(0.903)	(1.435)	(2.136)	(4.676)	(2.499)
Observations	868	710	322	304	868	710	322	304
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

## Table 3: NPLs and Credit-to-GDP Following General Macro-Financial MEFP Commitments and SB Conditionality in Pre-and Post-Covid Periods.

*Note:* We run staggered difference-in-differences regressions using country and year fixed effects with bootstrapped standard errors. Pre-covid Controls include GDP growth, fiscal balance change, inflation, exchange rate depreciation and an FSAP dummy. Post-covid controls are GDP growth, inflation and fiscal balance change. The years 2007-2009 and 2017-2019 are used to estimate the pre-trends in the pre- and post-Covid regressions, respectively. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.







## Figure 4: Credit-to-GDP Following General MEFP Commitments and SB Conditionality in the Pre-Covid and Post-Covid Periods.



**SB** Conditionality



Note: This figure shows the results from table 3 on credit-to-GDP. See Table 3 notes.

## 5.2.2. Case Studies: Evolution of NPLs and Credit-to-GDP in IMF-Supported Programs.



Note: The vertical dashed lines indicate the year 2013 when SB13 were introduced for Burkina Faso (which tends to increase to credit-to-GDP through increased access to finance see appendix figure A7.

In December 2013, the IMF approved a three-year Extended Credit Facility (ECF) arrangement for Burkina Faso. This program aimed to support the country's economic and financial reforms, focusing on maintaining macroeconomic stability, promoting sustainable growth, and reducing poverty. The ECF arrangement was designed to assist Burkina Faso in implementing its Accelerated Growth and Sustainable Development Strategy (SCADD), which emphasized structural reforms, fiscal consolidation, and enhanced public financial management. Throughout the program, the government committed to measures such as strengthening tax administration, improving expenditure quality, and bolstering the financial sector to foster inclusive economic development including through structural benchmarks (SB13) that aim to increase access to finance as shown in figure A7 and as seen in the evolution of credit-to-GDP.

Source: Staff Report Seventh Review ECF Burkina Faso (2014).



Note: The vertical dashed line indicates the year 2021 in which macro-financial MEFP commitments were first introduced.

In December 2021, the IMF approved a 36-month Extended Fund Facility (EFF) arrangement for Suriname. This program was designed to support Suriname's comprehensive economic reform agenda aimed at restoring fiscal sustainability, reducing public debt to manageable levels, and enhancing social safety nets to protect vulnerable populations. The EFF also emphasized structural reforms to improve governance and bolster the financial system's resilience. Macro-financial policies included roadmaps for bank resolution plans which could lead to a continued decline in credit-to-GDP levels in the immediate post-Covid period (2022-2023).

Source: Staff Report Request for EFF Suriname (2021).

#### 5.2.3. Policies Targeting NPLs and Credit-to-GDP

To dive deeper in the NPL and credit-to-GDP outcomes and assess specific policy effectiveness, we explore more granularly whether policies are followed by larger changes in outcomes in the treatment group in the next set of regressions in Table 4. We choose NPL-related policies and bank resolution policies due to two reasons. First, these policies are prevalent in the MEFP commitments compared to other policies (NPL policies are 19 percent of total MEFP commitments and bank resolution policies are 6 percent of total MEFP commitments in the 2010-2023 period). Second, NPL policies directly affect the outcome variable in question (NPLs) and would be expected to be followed by NPL declines if these policies are in fact effective. Similarly, bank resolution policies, often put in place once bank solvency has been affected by macro or financial developments, may have direct effects on the stock of credit in the economy.

We regress our main outcome variables on a subset of macro-financial conditionality-NPL policies or bank restructuring for MEFPs, and bank restructuring (SB31) or financial legislation (SB14) for SBs—where the country is considered treated from the first year it receives the first type of macro-financial SB conditionality or MEFP commitments. Table 4 (column 1) shows that MEFP commitments on bank resolution, related to the resolution of failed banks, is associated with larger declines in the credit-to-GDP ratio, relative to the control, than our main results in Table 3 in the pre-Covid sample. The credit-to-GDP ratio declines by 4.46 percentage points (0.2 SD) percentage points lower in the second year compared to the control group, with the magnitude of the decline almost three percentage points larger than estimated for a pooled measure of MEFP macrofinancial commitments in Table 3, column 1 (1.5 percent). In Table 4, column 5, we observe a similar result when we use SB31 from the structural benchmarks data as the main treatment variable. Credit-to-GDP declines by 4.09 percentage points (0.18 SD) by the third year of treatment, slightly lower than the decline in the MEFP commitments bank resolution (6.7 percentage point decline by the third year in column 1). The larger magnitude we observe for MEFP bank resolution commitments in the pre-Covid years compared with SB restructuring conditionality (SB31) is likely to be explained by the nature of the policies, not necessarily by the nature of the commitment (i.e., SB vs. a commitment in the MEFP). SB restructuring in the structural benchmarks data includes recapitalizing banks which can bolster the credit-to-GDP ratios in some IMFsupported programs, whereas MEFP bank resolutions tend to decrease the credit-to-GDP ratio as it often involves the closure of insolvent banks.<sup>28</sup>

When we consider MEFP commitments on NPL Policies (Table 4, column 2), where countries commit to tackle NPLs in the banking system, NPL-to-loan ratios decline by 4.43 percentage points (0.63 SD) by the third year in the pre-Covid years, on average. For the post-Covid period we do not obtain reliable estimates as our MEFP regressions on the credit-to-GDP and NPL ratio's show some pre-trends, reflecting a smaller sample size and a poorer fit of treatment-control comparison. Pre-Covid, column 6 of Table 4 considering SB14 as the treatment variable, does show a decline in NPL-to-loan ratios by the third year of treatment (magnitude of coefficient is - 2.8 percentage points). However, this decline is not significant at the 10 percent level, reflecting the wider nature of legislative policies in SB14—legislative macro-financial policies do include NPL resolution legislation but are diluted with other legislation. In appendix Table A6, we restrict the control sample and rerun column 6 of

<sup>&</sup>lt;sup>28</sup> Bank resolutions tend to aim to close banks. The lack of identical policies in MEFPs and SBs is admittedly a caveat in our analysis driven by limitations of the SB dataset. However, this is a main driver of our data collection process to include MEFPs to enrich our dataset beyond SBs.

Table 4 and this produces a similar coefficient in magnitude (-2.7 percentage points by the third year) with a 10 percent significance level.<sup>29</sup>

	ME	EFP	MI	EFP	5	SB	S	В
	CR/GDP 2010-2019 (1)	NPL/Loans 2010-2019 (2)	CR/GDP 2020-2023 (3)	NPL/Loans 2020-2023 (4)	CR/GDP 2010-2019 (5)	NPL/Loans 2010-2019 (6)	CR/GDP 2020-2023 (7)	NPL/Loans 2020-2023 (8)
Treatment	Bank Resol	NPL Pol	Bank Resol	NPL Pol	SB31	SB14	SB31	SB14
Program year	-0.4 (0.59)	-0.436 (0.561)	-0.084 (0.806)	0.203 (1.889)	-0.46 (0.919)	-0.824 (0.826)	0.236 (0.57)	0.14 (0.838)
Program year+1	-2.264 (1.379)	-1.225 (0.873)	$2.385^{**}$ (1.163)	-0.888 (2.203)	(1.202)	-1.147 (1.069)	0.965 (1.038)	3.154 (3.406)
Program year+2	$-4.462^{*}$ (2.613)	$-2.59^{**}$ (1.177)	1.194 (1.418)	-0.182 (0.767)	(1.513) (1.3)	-2.017 (1.476)	-0.828 (2.159)	-0.815 (2.619)
Program year+3	$-6.723^{*}$	$-4.434^{***}$ (1 454)	$-4.473^{***}$	-0.858 (1.123)	$-4.088^{*}$	-2.765	-0.37 (2.566)	0.88
Program year-1	0.361 (0.691)	$-0.824^{*}$ (0.429)	0.665 (0.599)	-0.346	0.051 (0.618)	0.18 (0.522)	0.837 (1.498)	-0.324 (0.551)
Program year-2	(1.031) (1.087)	(0.125) 0.07 (1.178)	(0.000) $3.676^{***}$ (1.378)	(1.001) (1.005) (1.339)	-0.481 (1.396)	-0.255 (0.901)	$3.171^{***}$ (0.758)	-0.922 (0.755)
Program year-3	1.339 (1.224)	-2.452 (1.543)	$5.68^{***}$ (1.971)	$-1.172^{*}$ (0.688)	-1.467 (2.016)	0.003 (1.43)	$3.806^{***}$ (1.34)	-0.012 (0.876)
Observations	<b>868</b>	710	322	304	868	710	322	304
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

## Table 4: NPLs and Credit-to-GDP Following Targeted Macro-Financial MEFP and SB Conditionality in Pre-and Post-Covid Periods.

*Note:* We estimate staggered difference-in-differences regressions using country and year fixed effects with bootstrapped standard errors. SB14, and SB31 is respectively shorthand for financial legislation, restructuring and privatization conditionalities. Pre-Covid controls include real GDP growth, fiscal balance change, inflation, exchange rate depreciation and an FSAP dummy. Post-covid control include real GDP growth, inflation and fiscal balance change. The years 2007-2009 and 2017-2019 are used to estimate the pre-trends in the preand post-Covid regressions, respectively. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

## 5.3. NPLs and Credit-to-GDP Following Ex-Post and Ex-Ante MEFP Commitments.

We split MEFP commitments into an ex-post and ex-ante macro-financial commitments and report these estimates in table 5.<sup>30</sup> Analyzing ex-ante commitments is of interest as successful ex-ante policies should lead to less adverse outcomes e.g., we would not expect large deleveraging after successful ex-ante policies. We refer to ex-ante policies to measures that, inter alia, aim to build up capital or liquidity buffers to increase resilience against possible future shocks affecting the financial or banking system. Similarly, ex-post MEFP commitments are oriented towards tackling the consequences of a shock that has materialized. For example, resolving or restructuring banks and resolving NPLs following adverse macro-financial developments. To obtain

<sup>&</sup>lt;sup>29</sup> Table A7 shows the results of imposing a smaller treatment indicator for SB14 on NPLs, where the control group is not treated by any other macro-financial SBs in the past and future, restricting the sample. Imposing this restriction produces a coefficient –2.7 percentage (-0.38 SD) for the decline in NPLs in the third year of treatment.

<sup>&</sup>lt;sup>30</sup> Ex-ante are commitments that may be pre-emptive or come before a crisis unfolds, while ex-post policies may be policies used to tackle an unfolding crisis, downturn, or rising macro-financial vulnerabilities.

ex-ante MEFP commitments we group MEFP policies related to bank capital requirements, stress-tests, liquidity, ex-ante NPL policies, financial legislation, bank supervision and macroprudential measures as these policies are typically employed to prepare for possible future adverse events, see also Acharya et al. (2014), Berger and Bouwman (2013), Diamond and Rajan (2005) and Ari (2020). Macroprudential measures are usually ex-ante in the sense that they are to be built-up in "good times." For example, countercyclical capital buffers are meant to be built up when financial imbalances are growing in order to help banks withstand losses in times of financial stress. Similarly, leverage ratios are intended to limit a bank's total exposure on and off-balance sheets in relation to the bank's equity. On the other hand, for ex-post MEFP commitments we group commitments related to bank restructuring, bank resolution, and ex-post NPL policies, see also Hanson, Kashyap and Stein (2011), Schoenmaker (2016) and Barth, Caprio and Levine (2004).<sup>31</sup>

Table 5, columns 5 and 7 show earlier and stronger contractions in credit-to-GDP for ex-post MEFP commitments. Credit-to-GDP contracts by -0.9 percentage points (0.04 SD) in the first year and 3.25 percentage points (-0.15 SD) by the third year of the commitment in the pre-Covid period as shown in column 5. In the post-Covid period, these coefficients are larger in magnitude and statistically significant, showing larger declines in credit-to-GDP following ex-post macro-financial policies, 5.3 (0.21 SD) and 10.9 (0.42 SD) percentage points in the first and second year respectively as shown in column 7. Ex-post policies have therefore led to large deleveraging, especially in the post-Covid period which coincided with a larger percentage of MEFP policies targeted at bank restructuring (see Figure 1).

Ex-ante policies are associated with similar NPL declines (coefficient of -2.49 in the 3<sup>rd</sup> year of the treatment) as the ex-post policies in the pre-Covid period (2010-2019). Interestingly, the second and third year of the treatment in the pre-Covid period with ex-ante macro-financial policies showed a more moderate decline (-2.7 percentage points by the third year of the treatment) in credit-to-GDP than with ex-post macro-financial policies (-3.3 percentage points by the third year of the treatment). This finding is consistent with the nature of ex-post policies, which imply abrupt and substantial changes in policy or larger corrections that tackle immediate vulnerabilities, and therefore are associated with larger deleveraging in the economy. In the post-Covid period, we see non-significant coefficients for NPL ratios from ex-ante policies (column 4). Ex-ante policies, such as macroprudential policies and some NPL policies, are more gradual and therefore act preemptively to reduce the need for more abrupt corrections. The ex-ante policies we consider worked hand in hand with larger legislation efforts in the pre-Covid period, such as Basel III, and this may explain the effects we find for these policies prior to 2020.

One potential explanation for the declining NPL-to-loan ratios is that it may be driven by substantial expansions in credit growth, thereby affecting the denominator.<sup>32</sup> To examine this, we run two separate regressions for credit growth—one for ex-ante policies and another for ex-post policies—reporting the results in Appendix Table A7. Our findings show no statistically significant coefficients for ex-ante policies, suggesting that these policies did not lead to increased credit growth. For ex-post policies, credit growth rises only in the fourth year following MEFP commitments, increasing by 4.2 percentage points (statistically significant at the 10 percent

<sup>&</sup>lt;sup>31</sup> Ex-ante NPL policies can be commitments to set up a credit registry and/or commitments to implement wider loan coverage and strengthening loan provisioning requirements. On the other hand, ex-post NPL policies are mainly commitments to loan recovery and/or commitments to speed up NPL restructuring.

<sup>&</sup>lt;sup>32</sup> For example, "evergreening" can cause a decline in NPL-to-loan ratios without resolving existing loans but by replacing them with more loans and credit expansion. See for example, Faria-e-Castro et al. (2024) on a possible mechanism for how lenders can more favorable lending terms to firms close to default to keep the firm alive.

level). However, as credit-to-GDP consistently declines each year following ex-post policies, this suggests that GDP growth rebounds more strongly than credit growth in these countries.

Table 5: NPLs and Credit-to-GDP Following Ex-Ante and Ex-Post Macro-Financial MEFP in Pre-and
Post-Covid Periods.

	MEFP		MEFP		MEFP		MEFP	
	CR/GDP	NPL/Loans	CR/GDP	NPL/Loans	CR/GDP	NPL/Loans	CR/GDP	NPL/Loans
	2010-2019	2010-2019	2020-2023	2020-2023	2010-2019	2010-2019	2020-2023	2020-2023
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment		Ex-	Ante			Ex-F	Post	
Program year	-0.406	-0.241	-0.117	0.284	-0.946**	0.761	-5.303**	1.582
	(0.423)	(0.483)	(0.812)	(0.86)	(0.464)	(0.601)	(2.697)	(1.196)
Program year+1	-1.309	-0.644	1.334	-0.268	-2.193***	-0.51	-10.954*	-0.588
	(0.813)	(0.718)	(2.114)	(0.887)	(0.826)	(0.824)	(5.678)	(2.1)
Program year+2	-1.895*	-1.618	-0.644	0.239	-3.143***	-1.38	-13.764**	-1.38
	(0.97)	(1.051)	(2.728)	(1.595)	(1.11)	(1.26)	(6.214)	(5.223)
Program year+3	-2.703**	-2.488**	-3.696**	1.41	-3.25**	-2.532*	-5.23***	-1.721
	(1.376)	(1.121)	(1.831)	(1.299)	(1.44)	(1.316)	(1.565)	(1.234)
Program year-1	-0.007	0.111	0.003	0.407	0.068	0.011	0.461	0.004
	(0.44)	(0.696)	(0.96)	(0.505)	(0.651)	(0.836)	(0.863)	(0.893)
Program year-2	0.538	1.719	2.497*	-1.903**	0.501	0.506	4.084***	-0.012
	(0.85)	(2.244)	(1.305)	(0.852)	(1.317)	(2.229)	(1.545)	(2.001)
Program year-3	1.741**	-1.408	4.704	-2.091**	1.448	-2.127	6.526***	0.514
	(0.882)	(2.573)	(3.187)	(1.02)	(1.23)	(2.05)	(2.168)	(1.403)
Observations	868	710	322	304	868	710	322	304
Country FE	Yes							
Year FE	Yes							
Controls	Yes							

Note: We estimate staggered difference-in-differences regressions using country and year fixed effects with bootstrapped standard errors. Pre-Covid controls include GDP growth, fiscal balance change, inflation, exchange rate depreciation and an FSAP dummy. Post-Covid controls include GDP growth, inflation and fiscal balance change. Ex-Ante MEFP commitments consists of commitments related to bank capital requirements, stress-tests, liquidity, Ex-Ante NPL policies, financial legislation, bank supervision, macro-prudential policy while Ex-Post MEFP commitments consists of bank restructuring, bank resolution and Ex-Post NPL policies. For a more elaborate list we refer to the appendix. The years 2007-2009 and 2017-2019 are used to estimate the pre-trends in the pre- and post-Covid regressions,

respectively. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

## 5.4. Heterogeneity: Results by Position in the Credit Cycle and Initial Level of Credit-to-GDP

#### 5.4.1. Positive Credit Gap Versus Negative Credit Gap Countries

We explore heterogeneity following the null results on NPLs for SB14 in Table 4 (columns 6 and 8), with results based on the position of the country in its own credit cycle; countries entering IMF-supported programs with a positive or negative credit gap may see different impacts of macro-financial policies owing in part to the nature of policies (see results on specific policies and ex-ante versus ex-post), and the policies' differential impacts based on the credit cycle. We classify countries into negative and positive credit gap groups by computing whether countries have a median positive or negative credit-to-GDP gap, using the pre-treatment period (the three years before the treatment begins that we show in our regression results). The credit gap is measured by the deviations of the credit-to-GDP ratio by applying a one-sided HP filter as described in the data section of the paper.

When we divide our sample into a positive and negative credit gap sample in Table 6, we find that countries with a positive credit-gap at the start of the treatment see a reduction in the NPL-to-gross loans ratio, following the inclusion of SBs on financial legislation (SB14), whereas negative credit gap countries do not seem to show a decline in NPLs as shown in table 6. While SB14 showed null results in Table 4 for the NPL estimations, splitting the sample based on the credit cycle shows that IMF-supported legislations are followed by a contraction in NPLs for positive credit gap countries; NPLs contract by 3.7 percentage points (-0.5 SD) in the third year relative to control whereas the same coefficient for the negative credit gap group is insignificant. Similarly, for the positive credit gap countries, credit-to-GDP is negative in the first year after the treatment, decreasing by 1.16 (0.06 SD) percentage points relative to control in the third year. These results are indicative of deleveraging for positive credit gap countries, while negative credit gap countries show null-results for credit-to-GDP as outcome variable.

	SB		SB		
	Credit-to-GDP	NPL/Loans	Credit-to-GDP	NPL/Loans	
	2010-2019	2010-2019	2010-2019	2010-2019	
	(1)	(2)	(3)	(4)	
	Positive Cr	edit Gap	Negative Cr	edit Gap	
Treatment	Fin. Leg.	SB14	Fin. Leg.	SB14	
Program year	-0.743	-1.689	0.748	0.587	
	(0.455)	(1.038)	(1.085)	(1.102)	
Program year t+1	-1.161*	-2.643**	1.49	2.982	
	(0.608)	(1.239)	(1.83)	(3.218)	
Program year t+2	-0.602	-3.207**	2.833	0.893	
	(1.084)	(1.583)	(2.131)	(3.709)	
Program year t+3	-0.217	-3.677**	3.313	-0.212	
	(1.34)	(1.657)	(3.319)	(4.186)	
Program year -1	0.1	-0.556	-1.151	1.011	
	(0.456)	(0.587)	(0.801)	(0.975)	
Program year -2	-0.144	-0.988	-2.012	0.192	
	(0.737)	(1.122)	(1.302)	(1.346)	
Program year -3	0.372	-0.027	1.499	1.396	
	(1.016)	(1.53)	(2.543)	(3.063)	
Observations	587	489	281	221	
Country FE	Yes	Yes	Yes	Yes	
Year FE	Yes	Yes	Yes	Yes	
Controls	Yes	Yes	Yes	Yes	

#### Table 6: NPLs and Credit-to-GDP Following Financial Legislation SB Conditionality Using Positive and Negative Credit Gap Samples for 2010-2019.

Note: We estimate staggered difference-in-differences regressions using country and year fixed effects with bootstrapped standard errors. Controls include GDP growth, fiscal balance change, inflation, and exchange rate depreciation. Columns 1 and 2 show results for the positive credit gap countries treated by financial legislation conditionalities, while column 3 and 4 show the results for the negative credit gap countries treated by the same types of conditionalities. The years 2007-2009 are used to estimate the pre-trends in the pre-Covid regression. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

#### 5.4.2. High Versus Low Initial Level of Credit-to-GDP Countries

After the null results (and positive magnitude on coefficients) for credit-to-GDP from the "general macrofinancial conditionality" category (SB13) in the structural benchmarks regressions in Table 3 (columns 5 and 7) and the null results for NPLs from "financial legislation" category (SB14) in the structural benchmarks regressions in Table 4 (columns 6 and 8), we also present heterogeneity results according to the median level of credit-to-GDP of the country to proxy for the level of financial deepening. The level of financial deepening of the country may have an impact on the ability of countries to deleverage. We therefore split the countries that are above or below the median of the distribution of credit-to-GDP in the 3 years prior to IMF-supported programs and re-run the main specification for the sub-groups.<sup>33</sup> In Table 7, we find evidence that financial legislation SBs operate differently for high and low credit-to-GDP countries.

The regressions for SB14 (columns 1-4) in Table 7 indicate that low credit-to-GDP countries typically see declines in credit-to-GDP, where following financial legislation SBs credit-to-GDP decreases by 0.5 (0.08 SD) percentage points in the year of treatment start and continues to decrease in the third year after treatment start by -1.2 (0.2 SD) percentage points. In comparison, high credit-to-GDP countries see null results for credit-to-GDP. For low credit-to-GDP countries, financial legislation SBs tend to be followed by a -7.42 (1.04 SD) percentage points decrease in the NPL/Gross loans ratio by the third treatment year compared to the control group. NPL ratios do not tend to differ for the high credit-to-GDP group relative to control. In comparison in Table 7 column 5, SB13 general macro-financial commitments are followed by an increase in credit-to-GDP in the third year following treatment start by 3.9 percentage points (0.58 SD), statistically significant at the 5 percent level. This can be explained by the nature of policies included in SB13, such as "improving access to financial services" as shown in Figure A7 in the appendix. Therefore, the level of financial development of a country can explain the nature of policies the IMF supports during treatment and the consequences of these policies on credit in the economy.

<sup>&</sup>lt;sup>33</sup> We use the median for the 3 years prior to IMF-supported program start. While this is an imperfect measure because some countries may have higher credit-to-GDP, because of a positive credit gap as explained through our previous results split by credit gap groups, it offers an indication of the deepening of financial institutions and financial markets.

	SB		SB		SB
	Credit-to-GDP 2010-2019	NPL/Loans 2010-2019	Credit-to-GDP 2010-2019	NPL/Loans 2010-2019	Credit-to-GDP 2010-2019
	(1)	(2)	(3)	(4)	(5)
	High credit	-to-GDP	Low credit-	-to-GDP	Low credit-to-GDP
Treatment	Fin. Leg.	SB14	Fin. Leg.	SB14	General financial SB13
Program year	0.034	0.548	-0.578*	-2.136	-0.092
	(0.944)	(0.773)	(0.346)	(1.306)	(0.647)
Program year t+1	0.27	1.443	-1.208**	-3.826**	0.375
	(1.167)	(2.079)	(0.504)	(1.565)	(1.397)
Program year t+2	0.585	1.547	-1.233**	$-6.154^{***}$	2.383
	(1.674)	(1.95)	(0.601)	(2.197)	(1.766)
Program year t+3	0.528	0.732	-1.283*	-7.423***	3.918**
	(2.615)	(1.99)	(0.729)	(2.473)	(1.981)
Program year -1	-0.43	0.67	0.216	-0.13	-0.045
	(0.719)	(0.561)	(0.404)	(0.688)	(0.474)
Program year -2	-0.553	0.378	-0.68	-0.833	0.186
	(1.454)	(1.029)	(0.724)	(1.682)	(1.019)
Program year -3	0.577	-0.159	-0.55	0.94	-0.739
	(1.881)	(1.448)	(0.704)	(2.178)	(2.321)
Observations	405	360	463	350	463
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

## Table 7: NPLs and Credit-to-GDP Following Financial Legislation SB Conditionality Using High and Low Credit-to-GDP Samples for 2010-2019.

*Note:* We estimate treatment effects using a staggered difference-in-differences design using country and year fixed effects with bootstrapped standard errors. Controls include GDP growth, fiscal balance change, inflation, and exchange rate depreciation. Columns 1 and 2 show results for the high credit-to-GDP countries treated by financial legislation conditionalities, while column 3 and 4 show the results for the low credit-to-GDP countries treated by the same types of conditionality. The years 2007-2009 are used to estimate the pre-trends in the pre-Covid period. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

## 6. Conclusion and Discussion

During the decade that followed the GFC, central banks, financial regulators, and supervisors dedicated their efforts to enacting reforms that strengthen financial sector resilience, including through the development of macroprudential policies. Attention to these policies was also evident in macro-financial conditionality in IMF-supported programs. This paper finds that post GFC and prior to the COVID-19 pandemic, macro-financial conditionality was often followed by periods of lower non-performing loans and in some cases lower credit-to-GDP ratios, relative to a control group consisting of countries (i) in an ongoing program with no macro-financial structural benchmark conditionality or macro-financial MEFP commitments in the corresponding treatment years or (ii) not undergoing an IMF-supported program but will enter into a program with macro-financial structural benchmark conditionality or macro-financial MEFP commitments in the following years.

The results show that program commitments that target vulnerabilities in the financial sector tend to decrease NPL-to-loan ratios and credit-to-GDP ratios. These responses are larger in magnitude when NPL-specific policies and bank resolution policies are in effect for NPLs and credit-to-GDP respectively. Countries that enter programs with a positive credit gap are most likely to benefit from deleveraging and lowering NPL-to-loan ratios, while countries that start IMF-supported programs with a low level of credit-to-GDP, proxying low financial development, tend to receive more policies aimed at financial inclusion and are therefore more likely to experience higher credit-to-GDP ratios following a program, on average. These patterns are especially true before the COVID-19 pandemic. Following the COVID-19 pandemic, only the results on the sharp declines in credit-to-GDP seem to hold for ex-post macro-financial policies aimed at tackling the consequences of realized shocks. To avoid these large adjustments, the results point to the importance of ex-ante macro-financial policies, offering milder and gradual adjustments before risks materialize.

Overall, our results suggest that macro-financial commitments, broadly defined, in the context of IMF-supported programs, help improve asset quality in banks' portfolios (proxied by the ratio of non-performing loans) and tame credit growth when it is above trend prior to the program (proxied by the credit gap). Program design should carefully consider the position of the country in the credit cycle and emphasize timely introduction and implementation of ex-ante macro-financial policies to achieve financial stability goals and mitigate the emergence of risks, thereby preventing the need for abrupt and costly ex-post macro-financial policies.

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## **Appendix**

#### **Summary Statistics**

#### **iSummary Statistics - Tables**

Variable	$\mathbf{Obs}$	Mean	Std. dev.	Min	Max			
Positive Credit Gap Sample (2010-2019)								
Credit Gap	587	2.591	3.916	-10.833	21.273			
Credit-to-GDP	587	23.738	18.293	1.322	84.340			
Credit Growth	587	16.975	18.163	-33.874	228.809			
NPL/Gross Loans	489	9.545	6.905	1.483	38.119			
Real GDP Growth	587	4.170	3.832	-13.757	17.095			
Fiscal Balance Change	587	-0.382	4.354	-31.731	20.481			
Inflation	587	5.074	5.244	-2.325	36.965			
ER Depreciation	587	3.439	8.875	-16.445	52.400			
Negative	Credit	Gap Sa	mple (2010-2	019)				
Credit Gap	281	-1.800	8.948	-45.178	26.780			
Credit-to-GDP	281	40.097	24.434	2.251	99.961			
Credit Growth	281	11.864	15.880	-13.305	80.569			
NPL/Gross Loans	221	10.252	7.066	1.721	38.119			
Real GDP Growth	281	3.146	3.685	-13.757	15.200			
Fiscal Balance Change	281	-0.033	10.067	-111.966	107.422			
Inflation	281	6.378	6.655	-2.325	48.684			
ER Depreciation	281	3.877	11.564	-16.445	73.152			

#### Table A1: Summary Statistics Credit Gap Sample

Note: NPLs-to-total gross loans, credit-to-GDP, inflation and exchange rate Depreciation contain outliers and are winsorized at the 1 percent level for both tails of the distribution. A similar exercise is done for GDP growth by winsorizing at the 10 percent level. The number of observations include the years 2007-2009 to estimate pre-trends. The credit-to-GDP gap is sourced from the IMF's Systemic Risk Tracker, which is estimated using a one-sided HP filter with a high smoothing parameter, as proposed by Borio and Lowe (2002). A country belongs to the positive credit gap sample if in the 3 years prior to the first treatment year of SB14 the median credit-to-GDP gap of the country is positive and vice-versa for the negative credit gap sample. Taking different pre-treatment periods lead to similar results. The majority i.e. 61 percent of our pre-Covid full sample belong to the positive credit gap sample. The programs included in the pre-Covid sample span the years 2020-2023. We exclude Haiti, St. Kitts and Nevis, Niger, Sao Tome and Principe, and Togo despite having NPL data available in staff reports, due to the lack of consistency of the NPL series across time. The dataset does not include

NPLs series of Mongolia. The remaining differences in sample size between NPLs and credit-to-GDP are due to countries missing NPLs in specific series.

Variable	$\mathbf{Obs}$	Mean	Std. dev.	Min	Max
High Cre	edit-to-	GDP Sar	nple (2010-2	019)	
Credit Gap	405	0.819	8.621	-45.178	26.780
Credit-to-GDP	405	47.721	17.844	12.790	99.961
Credit Growth	405	12.354	13.071	-6.330	79.665
NPL/Gross Loans	360	8.457	6.577	1.483	38.119
Real GDP Growth	405	3.334	3.464	-13.757	17.095
Fiscal Balance Change	405	-0.001	2.172	-9.325	11.585
Inflation	405	4.424	4.853	-2.325	48.684
ER Depreciation	405	2.763	9.315	-16.445	73.152
Low Cre	dit-to-	GDP Sar	nple (2010-20	)19)	
Credit Gap	463	1.461	3.112	-14.124	10.136
Credit-to-GDP	463	12.688	6.634	1.322	37.798
Credit Growth	463	17.915	20.448	-33.874	228.809
NPL/Gross Loans	350	11.111	7.091	1.483	38.119
Real GDP Growth	463	4.280	4.046	-13.757	17.095
Fiscal Balance Change	463	-0.503	9.015	-111.966	107.422
Inflation	463	6.435	6.319	-2.325	36.965
ER Depreciation	463	4.296	10.200	-16.445	60.022

#### **Table A2: Summary Statistics Credit Level Sample**

Note: NPLs-to-total gross loans, credit-to-GDP, inflation and exchange rate depreciation contain outliers and are winsorized at the 1 percent level for both tails of the distribution. A similar exercise is done for GDP growth by winsorizing at the 10 percent level. The number of observations include the years 2007-2009 to estimate pre-trends. A country belongs to the high credit-to-GDP sample if in the 3 years prior to the first treatment year of SB14 the median credit-to-GDP level of the country is lower than the median credit-to-GDP of a pooled sample based on their income group and vice-versa for the low credit-to-GDP sample. The programs included in the pre-Covid sample span the years 2020-2023. We exclude Haiti, St. Kitts and Nevis, Niger, Sao Tome and Principe, and Togo despite having NPL data available in staff reports, due to the lack of consistency of the NPL series across time. The dataset does not include NPLs series of Mongolia. The remaining differences in sample size between NPLs and credit-to-GDP are due to countries missing NPLs in specific series.

# Table A3: Summary Statistics for Comparing Ever Treated with Never Treated Groups Over the Period2007-2023: Any Macro-Financial Conditionality (MEFP) and General Macro-Financial SB Conditionality(SB13)

	Ever Treated General Macrofin SB (SB13)	Ever Treated Any Macrofin MEFP commit.	N Total
Credit-to-GDP	-6.649	-23.579***	1190
	(4.979)	(5.406)	
Credit Growth	-0.295	0.545	1190
	(1.519)	(2.353)	
NPL/Gross Loans	1.204	4.667***	1014
	(1.403)	(1.091)	
Real GDP Growth	0.565	0.736	1190
	(0.424)	(0.466)	
Fiscal Balance Change	0.030	-0.177*	1190
	(0.151)	(0.103)	
Inflation	1.752***	-0.500	1190
	(0.522)	(0.609)	
Exchange Rate Depreciation	1.250	-1.795	1190
	(0.789)	(0.914)	

*Note:* Balancing table for the sample years 2007-2023, treatment with general financial SB conditionality (SB13) and the any macrofinancial MEFP commitments. Each cell in the table refers to a regression with dependent variables listed in column 1 and regressed on an ever treated dummy indicator. The ever treated group refers to IMF-supported program countries with a general financial SB conditionality (SB13) or Macrofinancial MEFP commitments in at least one program review during that treatment year. Standard errors are in parentheses and are clustered at the country level.

#### iiSummary Statistics - Figures



Figure A1: Macro-Financial Balancing, any Macro-Financial MEFP Commitment

Note: This figure plots the average of the variables across all countries in the treatment group and across all countries in the control group for each year. \*The control group is a group of countries who have benefited from an IMF-supported program and that are currently in a program with no or not yet a financial reform MEFP commitment in the corresponding years. \*\*The treatment group is a group of IMF-supported program countries with any macro-financial MEFP commitment in at least one program review during that treatment year. Program countries are considered "treated" for that year and the following years of the program once any macro-financial MEFP commitment appears in a review. The inclusion of the years 2007-2009 is to test for pre-trends. We only consider programs starting in 2010.



Figure A2: Macro-Financial Balancing, General Financial SB Conditionality

Note: This figure shows the average of the variables across all countries in the treatment group and across all countries in the control group for each year. \*The control group is a group of countries who have benefited from an IMF-supported program and that are currently in a program with no or not yet a general financial SB conditionality in the corresponding years. \*\*The treatment group is a group of IMF-supported program countries with a general financial SB conditionality in at least one program review during that treatment year. Program countries are considered "treated" for that year and the following years of the program once general financial conditionality appears in a review. The years 2007-2009 is to test for pre-trends. We only consider programs starting in 2010.

#### **Textual Analysis**

#### iiiAutomatized Textual Analysis – MEFP Commitments Collection

For robustness with our selection method, we estimate the importance of the macro-financial section in the MEFP vis-a-vis other sections in the same document. Following the methodology proposed by Hassan et al. (2019), the text section has been first pre-processed by removing punctuation, capitals and stopwords (e.g. "the" "and"), and splitting the text into bigrams (e.g. sets of two words such as "increase capital", "many restructurings"). After the pre-processing we created a variable of macro-financial treatment intensity:

Next, in every MEFP document the program counts bigrams that are based on the macro-financial bigrams found in the Basel Framework<sup>1</sup>. We divide the number of bigrams by the total amount of bigrams in the MEFP.

Macfin Treatment<sub>*it*</sub> = 
$$\frac{\sum_{b=1}^{B_{it}} \mathbb{1}[b \in \mathbb{R}]}{B_{it}}$$

Step 3: we recategorize the continuous variable generated in this robustness check into five percentiles of 20 percent each.<sup>2</sup> Thus we are able obtain treatment intensity coefficients.

<sup>&</sup>lt;sup>1</sup> See also the Basel Framework at: https://www.bis.org/publ/bcbs189\_dec2010.htm

<sup>&</sup>lt;sup>2</sup> This is done since the continuous variable in step 2 produces very fine steps in the division (e.g. an MEFP of treated country X could have 0.2 macro-financial bigrams over the total bigrams in the MEFP, whereas treated country Y could have 0.21 macro-financial bigrams over the total bigrams in the MEFP, computing the differences in means to get the treatment intensity thus becomes computationally difficult

#### ivTextual Analysis - Regression

#### Table A4: Textual Analysis Robustness – Credit-to-GDP and NPLs Following Higher Prevalence of Macro-Financial Content in MEFPs

	ME	FP	MEI	7P
	Credit-to-GDP	NPL/Loans	Credit-to-GDP	NPL/Loans
	2010-2019	2010-2019	2020-2023	2020-2023
Treatment	(1)	(2)	(3)	(4)
	Any macrofin (te	extual analysis)	Any macrofin (te	extual analysis)
Program year	-0.58	0.761	1.32	1.59
	(0.622)	(0.601)	(0.838)	(1.188)
Program year t+1	$-1.959^{*}$	-0.51	$2.951^{**}$	-0.52
	(1.034)	(0.824)	(1.234)	(2.098)
Program year t+2	$-2.648^{*}$	-1.38	$2.992^{*}$	(2.000)
Program year t+3	-2.63	$-2.532^{*}$	-0.669	
Program year -1	(1.877) -0.239 (0.737)	(1.316) -1.258*	(2.071) 0.686 (0.812)	-0.021
Program year -2	(0.737)	(0.746)	(0.813)	(0.886)
	-0.739	-0.486	3.184**	0.574
Program year -3	(1.354)	(1.339)	(1.301)	(1.096)
	-1.481	-1.244	$4.247^{**}$	-0.275
	(1.314)	(1.206)	(2,134)	(0.402)
Observations	868	710	322	304
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

*Note:* We estimate treatment effects using a staggered difference-in-differences design using country and year fixed effects with bootstrapped standard errors. The treatment indicator is the any macrofinancial MEFP conditionality indicator generated using textual analysis where the indicator is the share of macrofinancial bigrams over the total number of bigrams in the MEFP. The share of macrofinancial bigrams is generated using Hassan et al. (2019) and discretized into five quantiles where the first review of a programs that contains macrofinancial conditionalities is set to the 5th quantile if the review belongs to the top 20% share of macrofinancial bigrams compared to other reviews in our MEFP sample. Controls include GDP growth, fiscal balance change, inflation, and exchange rate depreciation. The years 2007-2009 and 2017-2019 are used to estimate the pre-trends in the pre- and post-Covid regressions, respectively. Dynamic effects for the post-Covid regressions are limited to one year in the future due to sample constraints as an insufficient amount of program conditionalities start in 2020.

#### vMEFP Commitment Manual Textual Analysis

#### Figure A3: Manual Extraction of Macro-Financial Commitments in MEFPs

22. We remain actively engaged with our ECCU partners on the regional strategy to strengthen the banking sector. The upcoming asset quality review (AQR) of commercial banks across the region, which is expected to be completed in 2015Q1, will provide important insight into the financial position of banks in the region. Following the completion of the AQR, we are committed to taking immediate action as needed to strengthen the financial position of commercial

Note: This figure shows an example of manual extraction of macro financial commitments in the MEFP. Source: Authors' calculations.

BANKING CATEGORIES	EXAMPLES	NBFI CATEGORIES	EXAMPLES
Banking financial	Banking law, Law on	NBFI financial legislation	Legal Reforms for
legislation commitments	Financial Sector	commitments	Insurance Companies,
	Supervision		Pension Funds etc.
Bank capital requirements	Implement Basel Accords,	NBFI capital requirements	Solvency 2, ALM for
commitments	Increase Tier 1, 2 Capital	commitments	Pension Funds
Bank Non-Performing	Debt restructuring for	NBFI Non-Performing	Debt restructuring for
Loans policy commitments	firms, AQR, set up credit	Loans policy commitments	firms, recovery securities
	registry		set up credit registry
Bank stress-test	Conduct stress-test on	NBFI stress-test	Conduct stress-test on
commitments	credit, market or interest	commitments	credit, market or interest
	rate risk		rate risk
Bank liquidity	NSFR, Deposit Insurance	NBFI liquidity	Liquidity Ratios for
commitments	Scheme	commitments	Solvency II
Bank resolution	Wind down failed bank,	NBFI resolution	Wind down failed NBFI,
commitments	sell failed bank to healthy	commitments	sell failed NBFI to healthy
	bank		NBFI
Bank restructuring	Public Bail-Out Distressed	NBFI restructuring	Public Bail-Out, Debt to
commitments	Banks, Debt to Equity	commitments	Equity Conversion
	Conversion		
Bank macroprudential	CCyB, CCB, DSTI, LTV	NBFI macroprudential	Solvency II
regulation		regulation	macroprudential tools
Bank supervision	Increase supervisory staff,	NBFI supervision	Increase supervisory staff,
	off and on-site visits		off and on-site visits

#### **Figure A4: Macro-Financial Policies**

#### viEx-Ante and Ex-Post MEFP Commitments

#### List of Ex-Ante and Ex-Post Policies

#### **Ex-Ante Policies**

#### Bank capital requirements

- Commitments to increases in Tier 1 Capital
  - o E.g. Honduras 2019, Jordan 2012
- Commitments to increases in Tier 2 Capital
  - o E.g. Mongolia 2018

Stress-tests

- Commitments to implement stress test on credit risk
  - o E.g. Albania 2014,
- Commitments to implement stress test on interest rate risk
  - o E.g. Egypt 2016
- Commitments to implement stress test on foreign exchange risk
  - o E.g. Egypt 2016

Liquidity policies

- Commitments to implement deposit insurance scheme
  - o E.g. Mozambique 2013
- Commitments to implement Net Stable Funding Ratio
  - o E.g. Armenia 2019

NPL Policies (Ex-Ante)

- Commitments to set up a new credit (loan) registry (context: from scratch)
   Niger 2017,
- Commitments to implement wider loan coverage and strengthen loan provisioning requirements (context: there exists already a credit registry)
  - o E.g. Moldova 2017, Seychelles 2015
- Commitments to implement Asset Quality Review
  - o E.g. Grenada 2014

Financial legislation (Ex-Ante)

- Commitments to implement financial legislation related to
  - Corporate governance (e.g. fit and proper tests for management, remuneration structures)
    - E.g. Ukraine 2018
  - o Allocate and bolster supervisory powers for resolution and restructuring frameworks in line with best practices.
    - E.g. Pakistan 2013
  - o Strengthen bank licensing requirements.
    - E.g. Armenia 2014

Bank supervision (Ex-Ante)

- Commitments to increase on-site visits to banks
   o Bangladesh 2013
- Commitments to increase off-site visits to banks
  - o Bangladesh 2013
- Commitments to implement risk-based bank supervision.
  - o E.g. Sierra Leone 2017

Macroprudential (Ex-Ante)

- Commitments to implement Countercyclical Capital Buffer (CCyB)
  - o E.g. Georgia 2012
- Commitments to implement Capital Conservation Buffer (CCB)
  - o E.g. Georgia 2016
- Commitments to implement DSTI limits
  - o E.g. Kyrgyz Republic 2015
- Commitments to implement LTV limits
  - o E.g. Sri Lanka 2016

#### **Ex-Post Policies**

Bank restructuring (Ex-post)

- Private sector solutions to recapitalize weak banks (not failed bank)
  - o E.g. Tunisia 2013
- Remove obstacles to asset and collateral valuation to aid sell-off assets to improve capital position.
  - o E.g. Romania 2011

Bank resolution (Ex-Post)

- Commitment to winding down bank in orderly fashion through M&A (asset and liability transfers)
  - o Serbia 2015
- Set up Bad Bank structures (stimulate NPL market development).
  - o Kyrgyz Republic 2011

NPL (Ex-Post)

- Commitments to Loan Recovery
  - o E.g. Ghana 2015
- Commitments to expedite private debt restructuring
  - o E.g. Ghana 2015

#### viiMEFP Commitments and SB Conditionalities in the Case Studies

#### Figure A5: MEFP Commitments on NPL Policies Grenada

 In the banking sector, the Government will support regional efforts to strengthen banking regulation and supervision to bolster the ECCB's resolution powers and strengthen the loan classification and provisioning requirements. The authorities will commit to promptly

Note: MEFP commitments on NPL policies for Grenada in the year 2014 (Review 0). Note that the Structural Benchmark policies are a different set than the NPL policies as shown in the next figure. There were no Structural Benchmark policies on the financial sector adopted in the program of Grenada.

#### Figure A6: Structural Benchmarks Grenada (IMF-Supported Program 2014-2017)

#### Table 2. Structural Conditionality for the Program, 2014-17

Measure	Timing
Prior Actions	
Fiscal outcomes for 2013 (primary balance) in line with the 2013 budget (MEFP 117)	Completed
Safeguarding program-consistent budget execution in 2014 through (i) cabinet conclusion on committing only up to the programmed ceilings; and (ii) reduced one-quarter ahead appropriation. (MEFP 119)	Completed
Parliamentary approval of fiscal adjustment measures for the program (MEFP 119)	Completed
Consistent with the financing envelope of the program, satisfactory progress in negotiations with the creditors (MEFP 124)	Completed
Cabinet decision to eliminate the tax collector's bonus on interest from tax arrears (MEFP 118)	Completed
Structural Benchmarks	
Parliamentary approval of the revised PFM legislation (MEFP 125)	August 31, 2014
Cabinet approval of a strategic plan for the statutory bodies (MEFP 125)	October 31, 2014
Parliamentary approval of the revised Investment Promotion Act (MEFP 19)	November 30, 2014
Parliamentary approval of the revised legislation on tax incentive regime (MEFP 125)	November 30, 2014
Parliamentary approval of the legislation for the fiscal policy framework (MEFP 125)	December 31, 2014

Note: Structural Benchmarks in the Extended Credit Facility for Grenada in the year 2014 (Review 0). Note that the Structural Benchmark policies are a different set than the NPL policies as shown in the next figure. There were no Structural Benchmark policies on the financial sector adopted in the program of Grenada.

#### Figure A7: Structural Benchmarks Burkina Faso (IMF-Supported Program 2010-2013).

Measures	Reason	Completion Date
Make the tax information crosscheck module operational and functional in GERIF taxpayer database.	Improving information-sharing between the DGI and the DGD.	Dec. 2013
Update projections of the 2013-16 financial situation of the SOFITEX business plan based on results from fiscal year 2012 and submit update for approval by the Board of Directors	Updating of the latest developments in the financial situation.	Dec. 2013
Prepare a strategy to improve the quality of financial services offered by the national postal service (SONAPOST), and have it approved by the Board of SONAPOST.	Improving access to financial services	Dec. 2013 (building on the Dec. 2012 benchmark that was not met)

#### Table 2: Additional Structural Targets for December 2013

Note: Structural Benchmarks in the Extended Credit Facility for Burkina Faso in the year 2013 (Review 6).

#### viiiSummary Charts on MEFP Commitments and SB Conditionalities



Figure A8: Average Macro-Financial MEFP Commitments Per Program

Source: Author's calculations.



#### Figure A9: Average Macro-Financial MEFP Commitments Per Program Broken Down by GRA and PRGT

Source: IMF's MONA database and author's calculations. GRA refers to general resource programs by the IMF for non-lowincome countries, while the PRGT group refers to low-income countries.



Figure A10: Frontloading of Macro Financial Commitments in MEFPs Across Reviews (2010-2023)

Note: This chart shows the percentage of macro-financial SBs in each program review over the total number of macro financial SBs in the program. Source: IMF's MONA database and authors' calculations.



#### Figure A11: Frontloading of Macro-Financial SBs Across Reviews. Are Financial SBs Front-Loaded or Back-Loaded? Distribution of Macro-Financial Conditionality

Figure A12: Proportion of Macro-Financial SB and MEFPs per Year



Note: This figure shows the proportion of SBs and MEFPs per year (average across programs). Source: IMF's MONA database and authors' calculations.



Figure A13: Average Ex-Ante and Ex-Post MEFP Commitments per Year by Program

Note: This figure shows the average of ex-ante and ex-post MEFPs commitments per year (average across programs) Source: IMF's WEO, MONA, and authors' calculations.

#### Figure A14: Financial Legislation Over Total SBs for Positive and negative Credit-Gap Sample



**High Credit Gap Sample** 

Low Credit Gap Sample





Figure A15: Credit-to-GDP Ratio: Changes Over the Years for Program Countries

Note: This chart shows average CR-GDP ratio for GRA program countries, PRGT program countries, and no program countries. Source: IMF's MONA database and authors' calculations.



Figure A16: NPL Ratio: Changes Over the Years for Program Countries

Note: This chart shows average NPL ratio for GRA program countries, PRGT program countries, and no program countries. Source: IMF's FSI, MONA, and authors' calculations.



Figure A17: Evolution of NPLs and Exchange Rate of Sample Countries

Note: This chart shows average NPL ratio and the annual change in the exchange rate versus the dollar (higher values indicate larger depreciation) over the sample of GRA program countries. Source: IMF's FSI, MONA, and authors' calculations.



Note: This chart shows average NPL ratio and the annual change in the exchange rate versus the dollar (higher values indicate larger depreciation) over the sample of PRGT program countries. Source: IMF's FSI, MONA, and authors' calculations.



Figure A18: Correlation of Macro-Financial SBs with NPLs.

Note: The figure plots the correlation between the ratio of macro-financial SBs over total SBs (expressed as percentage) and NPLs-to-total gross loans.



Figure A19: Evolution of NPLs and Macro-Financial SBs (GRA)

figure plots the time series of the average macro-financial SBs per program in each year with the NPLs-to-total gross loans series for GRA countries.









Figure A21: Evolution of Credit-to-GDP and Macro-Financial SBs (PRGT)



Figure A22: Distribution by Year of Countries Falling Into Treatment and Control for any Macro-Financial MEFP Commitment

Note: The figure plots the number of countries switching into treatment by year for the sample years 2007-2019 for the any macro-financial MEFP commitment. The cross-section of countries equals 68 units. The years 2007-2009 are included to test for pre-trends for commitments made in 2010.

Note: The figure plots the time series of the average macro-financial SBs per program in each year with the credit-to-GDP series for PRGT countries.



Figure A23: Distribution by Year of Countries Falling Into Treatment and Control for General Mmacro-Financial SB Conditionality (SB13)

Note: The figure plots the number of countries switching into treatment by year for the sample years 2007-2019 for the general macro-financial SB conditionality (SB13). The cross-section of countries equals 68 units. The years 2007-2009 are included to test for pre-trends for commitments made in 2010.

#### **Regression Tables**

#### ixRegressions assessing whether MEFP commitments are followed up by implementation

#### Table A5: Implementation of Macroprudential Policies Following Macroprudential MEFP Commitments

	Number of Macroprudential Policies Implemented (IMAPP)
Treatment	Macroprudential MEFP commitment
Program year (t=0)	0.655**
,	(0.269)
Program year (t=1)	0.452
	(0.283)
Program year (t=2)	-0.102
	(0.189)
Program year (t=3)	-0.089
, ,	(0.437)
Program year (t=-1)	0.352*
	(0.211)
Program year (t=-2)	-0.069
	(0.127)
Program year (t=-3)	0.068
	(0.169)
Observations	533
Country FE	Yes
Year FE	Yes
Controls	Yes

IMAPP policies following Macrprudential MEFP commitments

*Note:* We estimate treatment effects using a staggered difference-in-differences design using country and year fixed effects with bootstrapped standard errors. The dependent variable is the number of IMAPP policies implemented in a given year. Controls include real GDP growth, fiscal balance

change, inflation, and exchange rate depreciation for the regressions with credit growth as dependent variable. Sample runs from 2007-2019.The years 2007-2009 are used to estimate the pre-trends in the pre- and post-Covid, respectively.

Note: We restrict our macro-financial MEFP commitments to macroprudential commitments (LTVs, CCyBs, and DSTIs) as treatment indicator and the dependent variable is the macroprudential implementation of policies from iMaPP data.

	S	В	SI	3
	NPL/Loans 2010-2019	NPL/Loans 2020-2023	NPL/Loans 2010-2019	NPL/Loans 2020-2023
	(1)	(2)	(3)	(4)
Treatment	Fin. Leg	. (SB14)	Fin. Leg. (S	B14) Strict
Program year	0.128	0.299	-0.824	-0.003
	(0.553)	(0.559)	(0.943)	(2.992)
Program year+1	-0.572	-0.222	-1.147	3.43
	(1.055)	(0.831)	(1.178)	(2.424)
Program year+2	-1.137	, ,	-2.017	
	(1.429)		(1.276)	
Program year+3	-1.846		-2.765*	
	(1.573)		(1.422)	
Program year-1	0.587	0.853	0.18	0.491
	(0.893)	(0.528)	(0.543)	(0.97)
Program year-2	0.725	0.161	-0.255	-0.227
	(1.293)	(0.726)	(0.988)	(0.823)
Program year-3	3.313**	0.512	0.003	0.573
	(1.317)	(0.849)	(1.353)	(0.471)
Observations	710	304	286	223
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

#### xNPLs and credit-to-GDP following SB14 conditionality in pre- and post-Covid period

SB SB

Table A6: NPLs and Credit-to-GDP Following Financial Legislation Conditionality (SB14) in Pre- and Post-Covid Periods

Note: We estimate run staggered difference-in-differences regressions using country and year fixed effects with bootstrapped standard errors. Controls include GDP growth, fiscal balance change, inflation. Columns 1 and 2 show results for the wide version of the financial legislation treatment, where the treatment and control group is allowed to have been treated by other SB conditionalities in the past. Column 3 and 4 show the smaller version of financial legislation, where the treatment and control group have not been treated by other macrofinancial SB conditionalities in the past and future, thus the sample size drop correspondingly. The years 2007-2009 and 2017-2019 are used to estimate the pre-trends in the pre- and post-Covid regressions, respectively. Dynamic effects for the post-Covid regressions are limited to one year in the future due to sample constraints as an insufficient amount of program conditionalities start in 2020. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

	$\mathbf{SB}$	SB	SB	SB	ME	FP
Sample	Credit Growth 2010-2019 (1) Pos. Credit Gap	Credit Growth 2010-2019 (2) Neg. Credit Gap	Credit Growth 2010-2019 (3) High credit-to-GDP	Credit Growth 2010-2019 (4) Low credit-to-GDP	Credit Growth 2010-2019 (5) Full	Credit Growth 2010-2019 (6) Full
Treatment	Fin. Leg. SB14	Fin. Leg. SB14	Fin. Leg. SB14	Fin. Leg. SB14	Ex-Ante	Ex-Post
Program year	-3.394 (3.457)	-4.255 (5.31)	0.97 (2.676)	-4.184 (4.596)	-1.042 (1.83)	-1.835 (2.273)
Program year t+1	-2.205 (3.885)	-0.416 (6.149)	-0.391 (1.959)	-2.574 (5.453)	-2.425 (2.421)	-0.8 (2.608)
Program year t+2	$7.072^{*}$ (4.055)	2.692 (7.094)	0.359 (1.946)	8.064 (5.326)	-1.409 (2.641)	0.59 (2.31)
Program year t+3	6.77 (4.668)	4.598 (7.651)	0.294 (3.028)	10.881* (6.237)	-2.951 (3.262)	$4.221^{*}$ (2.377)
Program year -1	2.512 (3.475)	0.652 (7.333)	-0.972 (1.968)	5.789 (4.858)	-2.222 (2.145)	-1.577 (2.437)
Program year -2	3.602 (7.072)	-6.844 (7.076)	-1.638 (3.234)	7.888 (9.576)	-1.828 (2.411)	2.987 (4.339)
Program year -3	1.727 (5.154)	-9.812 (8.864)	-0.614 (4.4)	-2.2 (6.507)	2.541 (3.347)	(3.991)
Observations	587	281	405	463	868	868
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

#### xiCredit growth regressions for the positive and negative credit gap samples

Table A7: Credit Growth Following Financial SB14, Ex-Ante and Ex-Post Conditionality for 2010-2019

*Note:* We estimate treatment effects using a staggered difference-in-differences design using country and year fixed effects with bootstrapped standard errors. Controls include GDP growth, fiscal balance change, inflation, and exchange rate depreciation. The years 2007-2009 are used to estimate the pre-trends in the pre-Covid period. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

	SB		
	Credit Growth	CR/GDP	
	2010-2019	2010-2019	
	(1)	(2)	
	Low credit-to	o-GDP	
Treatment	General financial SB13		
Program year	3.414	-0.092	
0.20	(5.182)	(0.647)	
Program year t+1	8.046**	0.375	
	(3.501)	(1.397)	
Program year t+2	17.594***	2.383	
	(5.456)	(1.766)	
Program year t+3	10.682***	3.918**	
	(3.665)	(1.981)	
Program year -1	2.438	-0.045	
	(3.883)	(0.474)	
Program year -2	7.441	0.186	
	(8.254)	(1.019)	
Program year -3	16.773***	-0.739	
	(3.585)	(2.321)	
Observations	463	463	
Country FE	Yes	Yes	
Year FE	Yes	Yes	
Controls	Yes	Yes	

#### Table A8: Credit Growth and Credit-to-GDP Following Financial SB13 Conditionality Using High and Low Credit-to-GDP Samples for 2010-2019

Note: We estimate treatment effects using a staggered difference-in-differences design using country and year fixed effects with bootstrapped standard errors. Controls include GDP growth, fiscal balance change, inflation, and exchange rate depreciation. Columns 1 and 2 show results for the low credit-to-GDP countries treated by general financial conditionalities (SB13). The years 2007-2009 are used to estimate the pre-trends in the pre-Covid period.

		SB
	NPL/Gross Loans	NPL/Gross Loans
	2010-2019	2010-2019
	(1)	(2)
Treatment	General fi	nancial SB (SB13)
Sample	100% implemented SB	At least 1 not implemented SB
Program year	0.856	-2.344
	(2.115)	(2.17)
Program year+1	3.01	-3.218
	(4.385)	(3.296)
Program year+2	1.176	-6.164
	(4.002)	(3.85)
Program year+3	-2.289**	-6.592
	(1.027)	(4.177)
Program year-1	1.225	-0.855
	(0.845)	(0.621)
Program year-2	1.52	-2.135
	(1.403)	(1.491)
Program year-3	1.472	-6.225
	(0.947)	(3.899)
Observations	490	220
Country FE	Yes	Yes
Year FE	Yes	Yes
Controls	Yes	Yes

## Table A9: NPLs following financial SB13 conditionality using 100 percent Implemented and at least 1 not implemented SB samples for 2010-2019

Note: We run staggered difference-in-differences regressions using country and year fixed effects with bootstrapped standard errors. The sub-sample 100% met SBs consists of countries that implemented all general macrofinancial conditionality (SB13) over the years 2007-2019 required in IMF-supported programs even when they have multiple programs. The sub-sample of at least 1 not implemented SB consists of countries that have not implemented at least 1 general macrofinancial conditionality (SB13) in IMF-supported programs over the years 2007-2019. Crucially, treatment is

defined as the year when a general macrofinancial conditionality (SB13) is introduced in an

IMF-supported program. The control group in column (1) is a group of countries who have benefited from an IMF-supported program at any given year in our sample, and that are either (a) not currently in an IMF-supported program, but have been in a program in the previous years or will be in a program in a future year. The program countries in columns (2) do not enter as the control group in column (1) and vice-versa. Controls include GDP growth, fiscal balance change, inflation, exchange rate depreciation and an FSAP dummy. The years 2007-2009 are used to

estimate the pre-trends. The numbers in parentheses are standard errors. \*, \*\* and \*\*\* indicate significance at 10 %, 5% and 1% respectively.

## Table A10 A: List of Countries Falling Into the High Credit Gap Sample Including a Note of the Year the Country Experienced a Crisis According to the Laeven and Valencia (2020) Database

ISO Code	Description
AFG	No crisis in sample years
AGO	Currency crisis in (2015)
ARM	No crisis in sample years
BDI	No crisis in sample years
BEN	No crisis in sample years
BFA	No crisis in sample years
BGD	No crisis in sample years
CAF	No crisis in sample years
CIV	Sovereign debt crisis (2010), Sovereign debt restructuring (2010)
CMR	No crisis in sample years
COG	No crisis in sample years
COL	No crisis in sample years
ECU	Sovereign debt crisis (2008), Sovereign debt restructuring (2009)
GAB	No crisis in sample years
GEO	No crisis in sample years
GHA	Currency crisis in (2014)
GNB	Banking crisis (2015)
GNQ	No crisis in sample years
HND	No crisis in sample years
HTI	No crisis in sample years
IRQ	Not present in database
JAM	Sovereign debt crisis (2010), Sovereign debt restructuring (2010, 2013)
KEN	No crisis in sample years
KGZ	No crisis in sample years
LKA	Currency crisis (2012)
LSO	Currency crisis (2015)
MAR	No crisis in sample years
MDA	Banking crisis (2014)
MDG	No crisis in sample years
MEX	No crisis in sample years
MKD	No crisis in sample years
MLI	No crisis in sample years
MNG	Banking crisis (2008)
MRT	No crisis in sample years
NER	No crisis in sample years
POL	No crisis in sample years
RWA	No crisis in sample years
SEN	No crisis in sample years
SLB	Not present in database
SLE	Not present in database
SYC	Currency crisis (2008), Sovereign debt crisis (2008), Sovereign debt restructuring (2009)
TCD	No crisis in sample years
TGO	No crisis in sample years
TUN	No crisis in sample years
TZA	No crisis in sample years
UGA	No crisis in sample years

## Table A10 B: List of Countries Falling Into the Low Credit Gap Sample Including a Note of the Year the Country Experienced a Crisis According to the Laeven and Valencia (2020) Database

ISO Code	Description
ALB	No crisis in sample years
ATG	No crisis in sample years
BIH	No crisis in sample years
BRB	No crisis in sample years
CPV	No crisis in sample years
EGY	Currency crisis (2016)
GIN	No crisis in sample years
GMB	No crisis in sample years
GRD	Sovereign debt restructuring (2015)
JOR	No crisis in sample years
KNA	Sovereign debt restructuring (2012)
KOS	No crisis in sample years
LBR	No crisis in sample years
MOZ	Currency crisis (2015)
MWI	Currency crisis (2012)
PAK	No crisis in sample years
ROU	No crisis in sample years
SLV	No crisis in sample years
SRB	No crisis in sample years
STP	No crisis in sample years
UKR	Banking crisis (2014), Currency crisis (2014), Sovereign debt crisis (2015) Sovereign debt restructuring (2015)
YEM	No crisis in sample years



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