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IMF Conditionality and Central Bank Independence*

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Abstract

This paper studies the role of the International Monetary Fund (IMF) in promoting central bank independence (CBI). While anecdotal evidence suggests that the IMF has been playing a vital role for CBI, the underlying mechanisms of this influence are not well understood. We argue that the IMF has ulterior motives when pressing countries for increased CBI. First, IMF loans are primarily transferred to local monetary authorities. Thus, enhancing CBI aims to insulate central banks from political interference to shield loan disbursements from government abuse. Second, several loan conditionality clauses imply a substantial transfer of political leverage over economic policy making to monetary authorities. As a result, the IMF through pushing for CBI seeks to establish a politically insulated veto player to promote its economic policy reform agenda. We argue that the IMF achieves these aims through targeted lending conditions. We hypothesize that the inclusion of these loan conditions leads to greater CBI. To test our hypothesis, we use a recently available dataset on IMF programs that includes detailed information on CBI reforms and IMF conditionality for up to 124 countries between 1980 and 2012. Our findings indicate that targeted loan conditionality plays a critical role in promoting CBI. These results are robust towards varying modeling assumptions and withstand a battery of robustness checks.

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1 Introduction

It is well established that central bank independence (CBI) produces all sorts of benign outcomes. CBI is associated with lower inflation, better sovereign credit ratings, enhanced capital inflows, and to a certain degree greater financial stability that ultimately translates into more stable economic output growth (e.g., Bodea and Hicks, 2015). Although most research relies on the implicit assumption that CBI is exogenously given, a lively debate remains around the question why some governments delegate monetary policy to an independent central bank whereas others remain reluctant to do so.

Existing research emphasizes the role of an entire battery of domestic and external economic, political, and social factors that lead to CBI (e.g., de Haan et al., 2018). In this literature, a particularly important role has been assigned to the IMF (Polillo and Guillén, 2005; Eichengreen and Dincer, 2011; Romelli, 2014). At the same time, few attempts have been made to isolate the mechanisms linking IMF conditionality to CBI. For example, Eichengreen and Dincer (2011), Romelli (2014), and Bodea and Hicks (2015) find that IMF program participation is positively associated with CBI, but do neither assess the type of central bank reform nor the type of IMF loan condition that would explain this positive association. In fact, the role of IMF loan conditionality in the context of CBI remains largely a ‘black box.’ In this article, we are trying to unpack critical mechanisms within this black box. Instead of replicating the results of prior research, our aim is to provide a coherent theoretical framework to explain (a) why the IMF cares about CBI and (b) why governments often follow suit with comprehensive monetary policy reform.

Historically, the IMF has pushed several countries towards implementing central bank reform when providing emergency loans. In particular, the Fund has often explicitly spelled out prohibitions of monetary financing and required governments to implement reforms in the conduct of monetary policy when formulating loan conditions (Polillo and Guillén, 2005; Johnson, 2016; Bossu, Hagan and Weenink, 2017). For example, during the Asian Financial Crisis in the 1990s, IMF conditionality played a critical role in pushing governments to loosen their grip on monetary authorities (Cargill, 2001; Polillo and Guillén, 2005; Corsetti, Guimaraes and Roubini, 2006). Furthermore, the IMF has been an active advocate for CBI and even threatens to withdraw from loan commitments

to block governments' attempts of undermining CBI (e.g., Johnson, 2016). For example, in 2011, the IMF threatened the Hungarian government to withdraw from its Stand-by Loan Agreement if policymakers were enacting and implementing new central bank legislation aimed at removing CBI (Bodea and Hicks, 2018).

From the IMF's perspective, CBI conditionality is not necessarily an ideological instrument. In fact, there are several practical/pragmatic reasons why the IMF attaches CBI conditions to its loans. First, CBI is a strong signaling device for investors concerning the soundness of future macroeconomic policies (Maxfield, 1997; Polillo and Guillén, 2005; Bodea and Hicks, 2018). Thus, requiring governments to enhance CBI, the IMF envisions to boost confidence among international investors to relief pressure from a country's balance of payments. Second, the IMF's due diligence protocol – before disbursing loans – foresees a thorough investigation into the operational and legal proceedings of monetary authorities to safeguard these funds (IMF, 2015). Through enhancing CBI, the IMF aims to insulate central banks from political interference, which is essential to minimize the risks of government abuse of disbursed funds. Third, loan conditionality clauses leading to a higher level of CBI imply a substantial transfer of political leverage over economic policy making to monetary authorities (e.g., Bodea and Higashijima, 2017). As a result, the IMF through pushing for CBI seeks to establish a politically insulated veto player within the borrowing country to constrain excess credit creation and promote its economic policy reform agenda (Nelson, 2017).

From a government's perspective, CBI implies substantial economic and political benefits, which come at the expense of losing direct control over a powerful tool to disburse cheap credit and to stimulate the economy. In particular, painful interest rate adjustments, a cutting-off of special funding windows, and the elimination of credit subsidy schemes for key political constituents make it often hard for an incumbent to craft a critical majority for CBI and to credibly commit to monetary reform (e.g., Aklin and Kern, 2019). Thus, governments often neither have incentives to give up control over this economic policy 'basooka' nor sufficient political capital to implement deep seated monetary reform (Bernhard, 1998; Cargill, 2001; de Haan et al., 2018). In these situations, the IMF entering the domestic policy scene has the potential to swing the domestic balance towards CBI. Especially, when domestic veto players cannot agree on or simply block monetary reforms,

CBI loan conditionality can provide governments with an external policy anchor (Eichengreen and Woods, 2016). Besides tipping the domestic political balance, IMF involvement sends a positive signal to international investors about the viability of CBI and thus enhances the credibility of monetary reform (Beazer and Woo, 2016). As many emerging market and developing economies simply lack qualified personnel, the basic financial infrastructure (e.g., functioning money markets), and do not have the institutional and technical prerequisites to successfully implement CBI, the IMF can bridge these gaps through providing targeted technical assistance (Johnson, 2016). Taken together, we hypothesize that CBI conditionality is conducive for monetary reform and leads to greater CBI. We expect this effect to be most pronounced in emerging market economies that heavily rely on international capital inflows.

To test our main hypothesis, we use a recently available dataset on IMF conditionality (Kentikelenis, Stubbs and King, 2016) from which we code CBI conditions for up to 124 countries between 1980 and 2012. Utilizing these data allows us to draw on detailed information about explicit IMF-mandated policy conditions aimed at enhancing CBI. Our quantitative findings indicate that targeted loan conditionality plays a critical role in promoting CBI. On average, IMF programs with CBI conditionality increase the CBI index (ranging from 0 to 100) by up to 2.7 index points (one-eighth of its standard deviation), compared to IMF programs without CBI conditionality. These results are robust towards varying modeling assumptions and withstand a battery of robustness checks. Given recent debates on the viability of CBI, our findings have important policy implications concerning the role of the IMF in promoting and shielding central bank autonomy.

We contribute to several lines of the literature. First, we complement a fast-growing political economy literature on the dynamic evolution of central bank autonomy and its underlying determinants (Bodea and Hicks, 2015; Ainsley, 2017; de Haan et al., 2018). In particular, we are trying to address the role of the IMF in promoting CBI. Although several authors refer to the prominent role of the IMF in the context of CBI (Polillo and Guillén, 2005; Eichengreen and Dincer, 2011; Romelli, 2014), few attempts have been made to isolate the mechanisms linking IMF conditionality to CBI. In comparison to this earlier work, our approach offers a more fine-grained view on IMF involvement in central bank reform. While previous research long noted the desirability of gaining

“*access to the detailed terms of [all] IMF programs*” (Polillo and Guillén, 2005, 1775), such data have become available only recently (Kentikelenis, Stubbs and King, 2016).

Second, we aim to complement a comparably large political economy literature on IMF loan conditionality (Copelovitch, 2010; Breen, 2013; Dreher, Sturm and Vreeland, 2015). In this context, our contribution is most related to research that focuses on structural reform conditions and their effectiveness (Beazer and Woo, 2016; Nelson, 2017). In particular, we aim to exploit the heterogeneity afforded by our dataset to analyze the IMF’s role in domestic monetary institution building. In this respect, using this newly available dataset on IMF loan agreements allows us to overcome a significant short-coming in prior research.

Finally, our contribution has important policy implications. As Beazer and Woo (2016) point out, it is often unclear “*when IMF conditionality encourages reform progress and when does it impede reforms?*” Our work shows that the IMF’s CBI loan conditionality faces less political obstacles, which makes it more appealing to domestic policymakers and thus a highly potent policy instrument. Given that central banks around the globe are subject to rising political pressure (Binder, 2018), we believe that the IMF’s role as guardian of politically independent monetary policy-making will increase significantly in the future.

2 The IMF and CBI Conditionality

Since IMF lending operations started in the 1970s, the IMF has increasingly, and to a widely varying degree, attached conditions when lending a helping hand (Bird, 2007; Breen, 2013; Dreher, Sturm and Vreeland, 2015). Built around general balance-of-payments considerations, loan conditionality often aims at pushing governments to implement policies that effectively remove underlying distorting factors behind balance-of-payments imbalances (e.g., Dreher, 2009). In general, these distortions arise from ballooning public deficits that are funded through excess money creation (Reinhart and Rogoff, 2009). To put an end to these developments and limit the scope of political agency undermining adjustment programs, the IMF frequently requests that governments implement radical spending cuts; in several instances, alongside significant structural adjustment measures (Nooruddin and Simmons, 2006; Vreeland, 2006; Hamm, King and Stuckler, 2012).

In terms of monetary policy-making, the IMF regularly attaches a standard set of monetary conditions to its loans. These are primarily aimed at preventing the exhaustion of international reserves and constraining excesses in domestic credit creation. In requiring governments to adhere to a minimum floor on the amount of the central bank’s foreign reserves and enforcing a ceiling on central bank credit/assets, the IMF’s goal is to attain “*a sustainable balance-of-payments position*” (Blejer et al., 2002, 440). Since the 1990s, the IMF expanded its arsenal of loan conditions targeting the institutional configuration of monetary policy-making, often demanding countries to cut central bank funding for governments, replace central bank governors, prioritize anti-inflationary central bank policies, and, in some cases, pushing for full-fledged central bank reform.¹ The recent case of Argentina is a prime example. Faced with soaring inflation (above 25 percent) and the Peso losing almost one third of its value in less than a year, President Macri running out of policy options in May 2018 turned to the IMF for a \$50 billion Standby Agreement to calm financial markets.² In response, Christine Lagarde stated that the IMF was “*encouraged by the authorities’ commitment to ensure legal independence and operational autonomy for the central bank.*”³

Besides reflecting a shift in the mainstream view among academic and political circles about the viability of politically insulated monetary policy-making (e.g., Polillo and Guillén, 2005), there were several reasons that led to the adoption of targeted CBI conditionality. First, in crisis situations that arise from monetary excesses, the credibility of monetary policy is severely undermined (Blejer et al., 2002; Reinhart and Rogoff, 2009; Alesina and Stella, 2010). A loss in monetary credibility implies that central banking authorities have hardly any leverage to rein in rampant inflation and/or to stifle speculative attacks.⁴ In the event that a government pursues a fixed exchange rate; losing

¹In March 2000, the IMF even institutionalized a so-called ‘Safeguards Assessment’ of central banks, which all loan recipients have to undergo prior to accessing funds. It consists of a multi-step process that aims “*to minimize the possibility of misreporting or misuse of Fund resources associated with the Fund’s lending activities*” (IMF, 2005, 1). An in-depth review of the institutional and legal independence of monetary authorities constitutes an integral part of this process.

²Wall Street Journal. “Argentina Seeks Credit Line From IMF.” May 8th, 2018.

³IMF. “IMF Reaches Staff-Level Agreement with Argentina on a Three-Year, US\$50 Billion Stand-By Arrangement.” June 7, 2018.

⁴The debate on monetary credibility arises from the time inconsistency problem inherent in monetary policymaking. This implies that policymakers are tempted to (ab-)use monetary instruments to stimulate the economy and/or to fund excess public outlays for short-run political gain, even at the expense of higher inflation rates (Kydland and Prescott, 1977; Barro and Gordon, 1983; Blinder, 2000). We chose to rely on the broad definition of monetary credibility as proposed in (Blinder, 2000, 1422): “*A central bank is credible if people believe it will do what it says.*” Following this logic, the degree of monetary credibility will be determined by a central banker’s ability to follow

monetary credibility implies that, no matter how hard monetary authorities lean against capital outflow pressures through increasing interest rates, financial investors will likely have doubts about the viability of these policy measures and subsequently place speculative attacks on a currency peg. For example, Thai monetary authorities were aggressively raising interest rates in an attempt to maintain the currency peg, but could not withstand the speculative forces tearing down the fixed exchange rate peg of the Thai baht on June 2nd 1997 (Reinhart and Rogoff, 2009). Thus, in attaching CBI conditionality to its loans, the IMF aims to restore monetary stability, and put an end to rampant inflation and further rounds of speculative attacks (Blejer et al., 2002).

Second, political interference in monetary policy-making constitutes a major threat to IMF loan disbursements (e.g., Hillman, 2004). Besides directly funneling funds to the treasury, governments can use their central banks to perform an entire battery of quasi-fiscal operations, such as imposing excess minimum reserve requirements forcing private banks to absorb surplus debt positions, providing special lending windows to state-owned banks, and/or directly disbursing subsidized loans or issuing loan guarantees to a governments' key constituents (Jácome and Vázquez, 2008; Maziad, 2009; Menaldo, 2015). For instance, in the run-up to the Jordanian financial crisis in 1989, almost 60 percent of the government budget was funded with central bank money (Maziad, 2009). Since many of these practices allow governments to reroute funds from their central banks, the IMF has often attached institutional CBI loan conditions with a particular focus on cutting the tight cord between monetary authorities and governments as a way of shielding its loan disbursements from “*willful override of controls or manipulation of data*” (IMF, 2005, 2).

Finally, loan conditionality clauses leading to a higher level of CBI imply a substantial transfer of political leverage over economic policy-making to monetary authorities (e.g., Bodea and Higashijima, 2017). In particular, the IMF – through pushing for CBI – seeks to establish a politically insulated ally within the borrowing country and thereby promote its economic policy reform agenda (Johnson and Barnes, 2015; Ban, 2016; Nelson, 2017). The case of Romania is particularly illustrative. As with other Eastern European countries, the Fund was a critical driving force behind with an pre-announced monetary policy path and steer the expectations in the economy concerning long-term interest rates and thus inflation. With respect to inflation, a loss in monetary credibility implies that monetary authorities lose the ability to anchor inflation expectations which limits their ability rein in rampant inflation (for a survey of related literature, see, de Haan and Eijffinger (2019)).

hind the legal and political independence of the Bank of Romania (BNR) during the 1990s (Ban, 2016). The BNR implemented restrictive monetary policies, cut off state-owned banks from special funding windows, and advocated for fiscal restraint even in times of economic slack, becoming the IMF's "*most sympathetic interlocutor on the domestic policy scene*" (Ban and Garbor, 2014, 10). In fact, locking the BNR into a close alliance became essential for the IMF to effectively nudge the government into painful austerity measures (Ban, 2016). In exchange, the BNR could publicly shift the blame for financial turbulence and painful austerity measures on the Romanian government (Ban and Garbor, 2014).

Against this background it remains unclear why governments would agree to these loan conditions and give in to the demands of the IMF. Here, we argue that IMF involvement can tip the domestic balance favorably towards the adoption of CBI by (a) enhancing the benefits and (b) mitigating the costs of implementation.

When governments choose to implement CBI they face a complex trade-off. On one hand, CBI carries substantial economic and political benefits. CBI is a strong signal to domestic and international investors that a government is deeply committed to establish a credible monetary framework (Maxfield, 1997; Crowe, 2008; Bodea and Hicks, 2014). Besides leading to lower inflation, CBI can also lower risk premia on public and private borrowing and thus be incremental to attract fresh capital (Alesina and Summers, 1993; de Haan, Masciandaro and Quintyn, 2008; de Haan et al., 2018). Take, for instance, the case of Hungary. After the government announced constitutional changes threatening CBI in December 2011, international rating agencies downgraded Hungarian government bonds to junk status. As a result, premia on government bonds increased by almost a 100 basis points, effectively preventing the issuance of new sovereign debt tranches and driving the Orbán administration to the verge of default (Bodea and Hicks, 2018).⁵ In addition, enhancing CBI can produce political benefits for a sitting government. In particular, an independent central bank represents a politically valuable scapegoat that can be blamed for the adverse consequences of such policy measures as raising interest rates or painful financial consolidations (de Haan and

⁵ *BBC*. "Hungarian Government Abandons Part of Debt Auction" December 29, 2011. Although the Hungarian government cancelled its auction in December 2011, in early 2012 it could raise some 35 billion Hungarian Forint (HUF) worth 10-year bills at steep interest rates of almost 10% (Johnson and Barnes, 2015).

Eijffinger, 2019; Fernández-Albertos, 2015; Goodman, 1991). For instance, in the case of South Korea, the government’s intention behind adopting CBI was to deflect blame for its own failure to deal with non-performing loans (Cargill, 2001). In the presence of powerful interest groups favoring price or exchange rate stability, central bank reform can represent an important bargaining chip for buying support from key constituents (Epstein and Rhodes, 2016; Treisman, 2000; Posen, 1998).⁶ In implementing CBI, an incumbent government can also signal competence to constituents and thus bolster domestic and international legitimacy (McNamara, 2002; Polillo and Guillén, 2005).

On the other hand, CBI effectively means that a government has to give up control over a powerful weapon in its economic policy arsenal to inflate the economy and appease key constituents. In fact, governments are often reluctant to give up control over interest rates on sovereign bonds and hand it to an independent central banker. In his memoirs, Gordon Brown illustrates that many British policymakers were struggling “*to give up the levers of power which the control of interest rates, [...], represented*” (Brown, 2017, 115). Besides leading to painful interest rate adjustments, monetary reform often involves cutting special funding windows and eliminating credit subsidy schemes for key political constituents. In fact, in many countries, monetary authorities have effectively been functioning as development banks – disbursing subsidized loans to politically important economic sectors (Maxfield, 1997; Jácome and Vázquez, 2008; Menaldo, 2015). Furthermore, control over monetary policy is essential to steer exchange rate dynamics and shield key political constituencies from adverse exchange rate movements (Jäger, 2016; Beckmann and Czudaj, 2017). Thus, societal groups that have been benefiting from high inflation rates, specific exchange rate arrangements and/or special funding windows, will try to sway governments to delay or even walk away from comprehensive monetary reform. The example of Colombia in the 1990s is a case in point. Before monetary reform in 1991, monetary authorities were responsible to manage and disburse subsidized loans to politically important economic sectors (Edwards and Steiner, 2000; Edwards, 2001; Rettberg, 2001). Gaining full operational and legal independence in 1991, Banco de la República Colombia was prohibited to extend direct loans to the public and private sector.

⁶CBI represents an additional layer of control on the central government for opposition parties and regional/local authorities, making it an attractive institutional configuration for monetary policymaking in federal systems (Hallerberg, 2002; Bernhard, Broz and Clark, 2002; Lohmann, 1998).

In addition, credit ceilings, credit subsidies, and forced credit allocations that have been playing an especially important role for the agricultural sector were significantly reduced or entirely eliminated (Edwards, 2001). As result, particularly exporting businesses from the agricultural sector were mobilizing Colombian policymakers to reinstate several credit subsidy schemes and to launch a large number of initiatives in order to change the course of monetary policy (Rettberg, 2001).

Against this background, governments facing such a trade-off often find it difficult to muster sufficient political support to implement far-reaching monetary reform or to give up control over their economic policy ‘basooka’ (Bernhard, 1998; Cargill, 2001; Bodea and Hicks, 2014). In these situations, the IMF can play a pivotal role in absorbing the pressure from these interest groups and thus allow an incumbent to garner political support for CBI (see also, e.g., Vreeland, 2006). For example, in Turkey in the late 1990s, domestic and international financial players were actively lobbying political elites so as to block CBI to maintain profits arising from excessively high real interest rates in sovereign bond markets and preferential access to central bank funding windows (Öniş and Bakir, 2007; Arpac and Bird, 2009). Entering the domestic policy scene, the Fund was incremental for absorbing political pressure from these interest groups and swinging the domestic balance towards CBI. In particular, providing governments with a credible external policy anchor, the IMF enables incumbents to shift the blame for painful short-term adjustments on the IMF (Simmons, 2000; Vreeland, 2006; Blanton, Blanton and Peksen, 2015).

Agreeing to CBI within the framework of an IMF program allows a country to draw on an abundance of technical resources, which are instrumental to an effective promotion of CBI. In fact, IMF loan recipient countries often lack the technical and institutional capacity to embark on wide-ranging monetary reforms (Johnson, 2016). For instance, a lack of qualified personnel puts severe limits on the overall functioning of monetary policy such as effective forecasting or communication of central bank policies, and thus hinders a central bank’s effective functioning (Neuenkirch, 2012; de Haan and Eijffinger, 2019).⁷ Synthesizing our findings, we hypothesize that the IMF’s CBI loan

⁷In addition, financial market underdevelopment and particularly underdeveloped domestic bond markets have severe consequences for the operational effectiveness of monetary policy. On one hand, severe financial frictions hamper the interest rate and thus the credit channel of monetary policy. This is problematic, as monetary impulses cannot be transmitted effectively into the domestic economy. Put differently, under these circumstances, monetary authorities have little control over monetary outcomes and this lack of control effectively undermines a central bank’s ability to anchor inflation expectations and subsequently control inflation outcomes. On the other hand, a lack of

conditionality is effective in promoting CBI.

Our theory has some additional observable implications. Building on previous work on the effectiveness of IMF interventions, we would expect CBI conditionality to be more effective in certain institutional settings and under certain economic conditions, where the benefits of CBI would be even greater and the costs comparatively lower. We discuss three such conditions below.

First, we expect CBI conditionality to be more effective when governments face more veto players that are able to block monetary reform. This effect is even more pronounced, when powerful societal groups – benefiting from high inflation rates and/or special funding windows – are able to mobilize key domestic veto players to block reform efforts. In these situations, an incumbent can attain sufficient political leverage to implement comprehensive central bank reform more easily if her hands are tied to an IMF program (Vreeland, 2006; Blanton, Blanton and Peksen, 2015). The case of South Korea serves as an illustrative example. Although the government was determined to grant the Bank of Korea (BoK) greater political independence, due to concerns of losing BoK’s mandate over financial supervision, Governor Lee Kyungshik was able to form a strong opposition against CBI (Cargill, 2001). In addition, labor unions were opposing CBI, which forced the government to delay monetary reform. In fact, it was the involvement of the IMF that allowed the government to revise the Bank of Korea Act in December 1997 (Cargill, 2001; Ha and Lee, 2007).

Second, we anticipate economies with substantial international capital exposure to be more likely to follow through with CBI conditionality. In particular, in small open economies that rely on international capital inflows, CBI constitutes an important signaling device and can have a first order dampening effect on risk premia (Maxfield, 1997; Bodea and Hicks, 2015).⁸ To illustrate this point, take for instance, the case of Jamaica. Recent CBI reform efforts under the IMF Stand-by Arrangement, in combination with wide-ranging fiscal consolidation and restructuring, have contributed to the recent sovereign credit ratings upgrade and the fall of Jamaican T-Bill rates below 2 percent (IMF, 2018).

domestic financial market development makes a government more reliant on direct central bank funding, and thus limits its ability to raise funds in bond markets (Jácome and Vázquez, 2008; Hauner, 2009; Menaldo, 2015).

⁸It is well established that small open economies are often too small to withstand the pressure of international investors, which are sensitive to sudden shifts in political risk premia and can hardly weather sudden capital flow reversals once foreign investor expectations turn sour (Rey, 2015).

Third, financial crises often open a window of opportunity for governments to implement central bank reforms because powerful lobbies against CBI may be weakened by the economic downturn (Grilli, Masciandaro and Tabellini, 1991; Waelti, 2015; Hlaing and Kakinaka, 2018). At the same time, enhancing CBI sends a strong signal to domestic and international investors that a government is deeply committed to restore monetary stability (Blinder, 2000; Alesina and Stella, 2010; Bodea and Hicks, 2014). In this respect, IMF involvement is often an important external policy anchor for governments to credibly commit to monetary reform (Simmons, 2000; Agnello et al., 2015; Blanton, Blanton and Peksen, 2015). To provide an example, the former governor of the Central Bank of Indonesia, Joseph Soedradjad Djiwandono outlines “*the original purpose of acquiring IMF support was to restore market confidence [...] as Indonesia faced problems of confidence in the Rupiah*” (Djiwandono, 2000, 62). Against this background, we expect countries experiencing financial turmoil to be receptive towards CBI conditionality and to follow through with monetary reforms.

3 Empirical Analysis

To test our hypothesis that CBI conditionality leads to greater CBI, we build a dataset consisting of 124 countries from 1980 to 2012. As our theoretical argument claims universal applicability, we include all countries in the analysis for which data are available. Due to missing data, our panel is unbalanced, with more observations available for later sample years. Our analysis unfolds in three steps, proceeding with correlational analysis and introducing our remedies to potential threats to inference arising from non-random selection and endogenous conditionality in subsequent sections. We report the results of our robustness checks throughout these sections. The full results of these robustness checks and descriptive statistics with a reference to the main data sources for all variables can be found in the supplemental appendix.

3.1 Data

Our main dependent variable is CBI. We use the latest available version of the composite index of CBI compiled by Bodea and Hicks (2014). Given its wide country-year coverage – capturing 124 countries between 1970 and 2012 – this index is one of the most comprehensive CBI indicators

available.

Following the coding procedures in Cukierman, Webb and Neyapti (1992), the index ranges from 0 to 1, whereby higher values indicate a greater degree of CBI. To save decimal points in our output tables, we multiply the CBI index by one-hundred. A distinct advantage using this index over alternative measures is that this CBI index covers multiple dimensions of monetary independence. In particular, it provides information on four dimensions of CBI: the selection of central bank governors, the legal mandate of monetary authorities, the degree of policy autonomy, and rules concerning quasi-fiscal operations. This feature is particularly relevant in our context, as it provides guideposts to map IMF conditions according to their relevance for CBI.⁹

While our main interest lies in analyzing the CBI index, we also consider two related dependent variables. First, to capture central bank reforms, we use a binary indicator that takes the value of 1 when a country implemented central bank reform in a given year and is 0 otherwise. As this indicator is insensitive to small fluctuations in the continuous CBI index, it complements our analysis. The data come from Garriga (2016). Second, to capture changes in *de facto* CBI, we use a binary indicator that gauges irregular central bank governor turnover. A turnover is irregular if the current governor is replaced by a new governor before the end of the constitutional term limit (Dreher, Sturm and de Haan, 2010). The turnover rate is useful especially in countries where the ‘*laws in the books*’ are different from the ‘*laws in practice*’, for example, due to a lack of state capacity to implement policies. The drawback of this measure, however, is its theoretically weak relationship with CBI – as central bank governors are less likely to be ousted if they are subservient to their political masters (Johnson, 2016).¹⁰

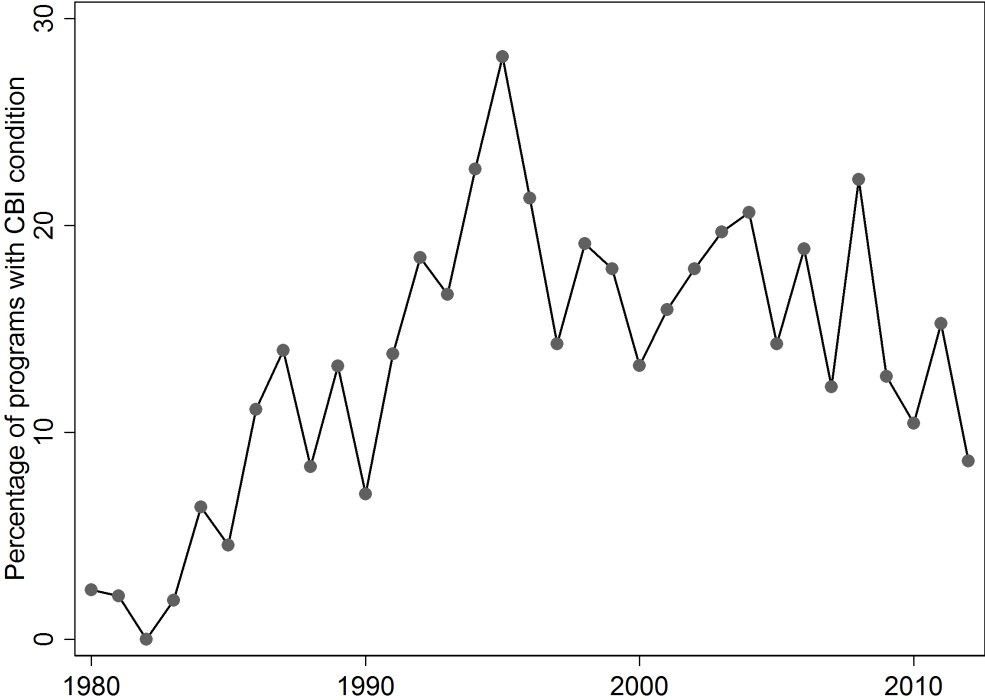
To construct our key predictor (CBI conditionality), we proceeded in two steps. First, we conducted a computer-assisted search for keywords related to central banks in the substantive content of all IMF conditions across all IMF programs from 1980 to 2012. The full text of IMF conditions is available through the IMF conditionality database (Kentikelenis, Stubbs and King, 2016). Sec-

⁹To verify the robustness of our findings (Table A5), we use an alternative CBI index (Garriga, 2016), which is based on the same coding protocol but provides a slightly different country-year coverage and coding of individual country cases.

¹⁰An additional small caveat using this dataset is that countries in which the law does not specify term limits have missing observations.

ond, we validated the matches of this search through manual coding. We also constructed four sub-indicators of CBI conditionality to match the respective dimensions of the CBI index. The first sub-indicator captures measures on the central bank governor, such as appointment procedures, term tenures, provisions for dismissal, prohibition of multiple terms, or the replacement of an incumbent governor. The second sub-indicator captures mandated changes to the central bank mandate, for instance toward legal independence. The third dimension concerns day-to-day central bank policy, while the fourth refers to measures aimed at limiting advances to government and securitized lending. As baseline specification, we chose to code CBI conditionality as a dichotomous variable. It takes the value of 1 whenever at least one CBI condition in a country-year observation is present and 0 otherwise. Our descriptive statistics suggest that CBI conditionality is not a rare event. More than one out of four IMF programs included at least one CBI condition in the mid-1990s (Figure 1).

Figure 1: IMF and CBI in Historical Perspective.



We first compare the group means of CBI outcomes for different IMF program scenarios and use *t*-tests to examine whether the differences across groups are statistically significant. Considering the CBI index, we find that the average CBI increase among non-program country observations is 0.55 index points, but 0.84 points for IMF program countries, and 2.21 index points for IMF programs with CBI conditionality. Only the latter difference of 1.37 points is statistically significant ($p < 0.05$). Using the CBI reform indicator, the mean incidence is 3.3% in the non-program group, 4.8% for observations under IMF programs without CBI conditions, and 8.3% with CBI conditionality. Both group differences are statistically significant ($p < 0.05$). Finally, there is evidence that irregular governor turnover is more frequent among IMF program countries (17.2%) compared to non-program countries (10.6%). The difference is highly significant ($p < 0.01$). IMF countries with CBI conditionality have a marginally lower turnover rate (16.2%). A plausible explanation for these results is that IMF pressure not only leads to changes in the law, but also to a change of the central bank governor. This in fact may help to give the legal change more credibility, notably if the previous governor was someone closely affiliated with the government.¹¹ Taken together, these results support the notion that CBI conditionality is positively associated with increasing CBI.

[Table 1 here]

In the appendix, we present the results of simple OLS models using the CBI index as well as conditional logit models respectively using the CBI reform indicator and irregular governor turnover as alternative outcomes. By including indicators of both CBI conditionality and IMF programs, our approach allows us to disentangle the differential effect of CBI conditionality in the presence of an IMF program. To establish the timing of the effects, we run distributed lag models for up to three lags under various sets of control variables. We find consistent support for an increase in the CBI index by up to 1.69 index points ($p < 0.1$) in the first year of CBI conditionality, although positive effects already exist in the same year. Using conditional logit estimations, we also find that CBI conditionality has a significantly positive instantaneous relationship with the binary CBI reform indicator. Finally, while IMF programs are positively related to the incidence of irregular

¹¹We thank an anonymous reviewer for highlighting this point.

turnover, CBI conditionality tends to have the opposite effect, although the coefficient is marginally significant only in the last model. A plausible interpretation of the positive IMF coefficient is that the IMF might push for a replacement of the governor to make CBI reform more credible.

3.2 Single-equation analysis

Following best-available advice, we proceed with a general auto-regressive distributed lag model, using the equivalent Error Correction Model (ECM) formulation. ECMs may be applied to a wide range of time-series data, without the need for a co-integration relationship (de Boef and Keele, 2008). Our specification tests indicate that the parameter restrictions implying simpler models do not hold, and using such simpler models would introduce bias due to non-stationarity and auto-correlated errors (e.g., Keele and Kelly, 2006).¹² Thus, we estimate ECMs in which the dependent variable is the annual difference in the CBI index. By definition, all ECMs include the lagged CBI level to capture mean-reverting behavior.

Our model equation in the basic ECM is:

$$\Delta y_{it} = \beta_0 y_{i,t-1} + \beta_1^D \Delta C_{it} + \beta_1^L C_{i,t-1} + \beta_2^D \Delta P_{it} + \beta_2^L P_{i,t-1} + \Delta X'_{it} B^D + X'_{i,t-1} B^L + \alpha_i + \mu_t + \varepsilon_{1it} \quad (1)$$

In equation 1, Δy_{it} is the differenced CBI index, $y_{i,t-1}$ its lagged level, ΔC_{it} and $C_{i,t-1}$ indicate contemporaneous differences and lagged levels of CBI conditionality, respectively, and analogously ΔP_{it} and $P_{i,t-1}$ for IMF programs. The same structure applies for the control variables that follow (X_{it}). Last are country-fixed effects (α_i), year-fixed effects (μ_t), and an error term (ε_{it}). All other symbols refer to parameters to be estimated.

We mitigate confounding bias by including control variables as well as country-fixed effects and year-fixed effects. Drawing on previous CBI literature, our baseline models control for GDP per capita, trade openness, G-5 bank exposure, inflation, financial assets, and regime type (Maxfield, 1997; Bodea and Hicks, 2015; McNamara, 2002; Polillo and Guillén, 2005; Posen, 1995). Countries with lower income may not have the capacity to control inflation and thus have incentives to

¹²Dickey-Fuller tests indicate the presence of unit roots in CBI levels but comfortably reject the null hypothesis of unit roots for CBI differences. As autocorrelated errors are an issue regardless of specification, we use country-clustered standard errors in all regressions.

increase CBI to allay concerns by foreign investors about macroeconomic stability (Maxfield, 1997). Furthermore, increased trade facilitates diffusion of CBI (McNamara, 2002). As high inflation rates undermine the effective functioning of financial markets, several authors argue that an inflation-averse financial sector will attempt to nudge the government into implementing CBI (Posen, 1995; Maxfield, 1997; de Haan et al., 2018).¹³ Given the paucity of data measuring the political influence of the financial industry, the credit-to-GDP ratio and similar measures have commonly been used in the international trade and finance literature (Dreher, Sturm and de Haan, 2010; Pepinsky, 2013; Winecoff, 2013).

To account for financial sector strength, we rely on Pepinsky (2013), who proposes to proxy for the strength of domestic financial interests as the combined assets of money banks, non-bank financial institutions, and the central bank.¹⁴ A key advantage of using this measure is that we can also account for interests of the non-bank financial sector. For example, in the US, credit from investment banks and other non-bank financial institutions constitutes the main share in providing credit to the private and public sector. At the same time, these financial firms exert substantial influence on US policymaking (Pagliari and Young, 2015; Bertrand et al., 2018). Furthermore, including assets of monetary authorities allows us to capture available bail-out funds for the financial industry in case of a financial downturn and provides a proxy for the financial position of state-owned financial and quasi-financial firms (IMF, 2005; Pepinsky, 2013).

In the context of IMF programs, it is well established that international investors exert substan-

¹³We note that a substantial literature exists that finds limited support for this hypothesis and highlights the shortcomings of Posen’s argument (de Haan and Van’t Hag, 1995; de Haan and Kooi, 2000; de Haan et al., 2018). We briefly outline these concerns. First, as Posen (1995, 256) admits “*isolating any one interest group as the primary source of effective opposition to inflation in all countries seems, of course, limiting.*” Thus, other special interest groups or an inflation averse population might push a government to implement CBI (Hayo and Hefeker, 2002; Scheve, 2004; Bearce and Tuxhorn, 2017). To give an example; (Bearce and Tuxhorn, 2017, 14) analyzing preferences of US citizens find that “*a large majority of respondents expressed a greater preference for domestic monetary policy autonomy.*” Second, politicians might have their own incentives to implement CBI (Maxfield, 1997). Take, for instance, the case of the UK. Shortly after assuming office in 1997, New Labor took it on itself to grant independence to the Bank of England to signal its commitment to sound macroeconomic policy-making and break with Labor’s inflationary reputation (Aklin and Kern, 2019). Finally, the financial sector might not be inflation averse after all. In several instances, financial players are profiting from rampant inflation and thus are openly opposing CBI. Russia is a case in point. In the early 1990s, Russian commercial banks were mobilizing political support against CBI, as their business models profited from higher inflation rates (Johnson, 2016).

¹⁴We admit that this measure has its limitations. In fact, it does not provide any information on the intensity of lobbying efforts or the mediating effects of a country’s institutional setup determining the effectiveness (or political influence) of the financial industry in the policymaking process (Pagliari and Young, 2015; Bertrand et al., 2018).

tial pressure on the IMF and thus have a first order impact on IMF loan conditionality (Copelovitch, 2010). To gauge the influence of these foreign financial interests, we construct a measure of foreign bank exposure to the G-5 countries.¹⁵ Furthermore, we expect autocratic regimes to be less inclined to adopt CBI because they are less willing to give up a powerful tool for meddling with financial and macroeconomic outcomes (Broz, 2002; Keefer and Stasavage, 2003; Pond, 2018). For instance, it is well documented that the Central Bank of Iran operates several special refinancing windows and credit subsidy schemes for important political constituents (Zahedi and Azadi, 2018). To account for these effects, we include the (combined) Polity IV index indicating the level of democracy (Marshall, Gurr and Jaggers, 2015).

We perform our analyses on three sets of control variables. The first is the empty set, which implies inclusion of two-way fixed effects and the main predictor on the right-hand side. The second is the set that contains the above variables (henceforth, KRR). The third set broadly follows Dreher, Sturm and de Haan (2010) (henceforth, DSH) in their analysis of irregular central bank governor turnover and includes inflation, financial assets, democracy, elections, government ideology, coup attempt, veto players, and financial crisis. Due to collinearity with country-fixed effects, we do not consider time-invariant predictors such as the exchange rate regime. In robustness tests, we include an indicator of the exchange rate regime along with other time-invariant variables in pooled estimations (Table A8).

In Table 2, we present the results of the above single-equation ECM. We find that lagged CBI conditionality is significantly positively related to CBI differences. For example, based on model 3, an IMF program with CBI conditionality is associated with an increase in CBI by 2.73 index points compared to an IMF program without such conditionality ($p < 0.05$). However, neither the instantaneous effect represented by differenced CBI conditionality, nor any of the IMF program variables are statistically significant.

Turning to control variables, we find a statistically significant mean reversion effect ($p < 0.01$), which also implies that countries with already high CBI are less likely to undergo large changes in CBI. Overall, most control variables are statistically not significant at conventional levels, which

¹⁵These are France, Germany, Japan, the United Kingdom, and the United States. The data come from the Bank of International Settlements (see, https://stats.bis.org/#ppq=CBS_C_AND_OTH_EXP_UR;pv=1110,5,60,0,0,name).

may be due to measurement error. The only exception is financial assets, which has a positive relationship with CBI ($p < 0.05$). This is in line with a literature underscoring the importance of the financial sector in driving CBI (e.g., Posen, 1995). Due to the inclusion of two-way fixed effects, the model fit – with up to 13% of the within-country variation explained – is necessarily moderate.

[Table 2 here]

3.3 Addressing non-random selection into IMF programs

Non-random selection of countries into IMF programs is a well-known challenge (e.g., Dreher, Sturm and Vreeland, 2015). To mitigate potential selection bias, we apply an instrumental variables approach and include an IMF program equation. We follow Lang (2016) in deploying the interaction between the probability of a country to obtain IMF credit (based on past program incidence) and the IMF liquidity ratio as an instrument, which is a proxy measure of how unconstrained the IMF is to give out loans at any given point in time. The identifying assumption is that changes in CBI will not be affected differently by changes in the IMF liquidity ratio between regular and irregular IMF borrowers other than through their impact on IMF programs, conditional on fixed effects and control variables. This approach is akin to a difference-in-difference design, which compares the effect of an IMF program on CBI in regular borrowers *versus* irregular borrowers as the IMF liquidity ratio changes (Nunn and Qian, 2014; Lang, 2016; Dreher and Langlotz, 2017). The relevance of the instrument is underpinned by the significantly positive correlation between the IMF liquidity ratio and the presence of an IMF program. We also verify the parallel trends assumption in the supplemental appendix (Figure C1).

Overall, we conduct joint estimation using maximum likelihood of the following two equations, allowing for country-clustered correlated errors across equations (Roodman, 2011).

$$\Delta y_{it} = \beta_0 y_{i,t-1} + \beta_1^D \Delta C_{it} + \beta_1^L C_{i,t-1} + \beta_2^D \Delta P_{it} + \beta_2^L \hat{P}_{i,t-1} + \Delta X'_{it} B^D + X'_{i,t-1} B^L + \alpha_{1i} + \mu_{1t} + \varepsilon_{1it} \quad (2)$$

$$P_{i,t-1} = \gamma_1 \bar{P}_{i,t-1} + \gamma_2 (\bar{P}_{i,t-1} \otimes L_{i,t-1}) + \gamma_3 L_{i,t-1} + \Delta X'_{it} \Gamma^D + X'_{i,t-1} \Gamma^L + \alpha_{2i} + \mu_{2t} + \varepsilon_{2it-1} > 0 \quad (3)$$

$$\begin{pmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \end{pmatrix} \sim \mathcal{N} \left[\mathbf{0}, \begin{pmatrix} 1 & \sigma_{12} \\ \sigma_{12} & 1 \end{pmatrix} \right] \quad (4)$$

whereby equation 2 is defined as before, equation 3 is a linear probability model of IMF program participation in which $(\bar{P}_{i,1..t-1} \otimes L_{i,t-1})$ is the compound instrument¹⁶ consisting of the country-specific probability of being under an IMF program¹⁷ and the IMF liquidity ratio (Lang, 2016), followed by all regressors from the first equation, including fixed effects. Expression 4 refers to error terms across equations which are allowed to be correlated by the parameter σ_{12} .

In Table 3, we present our main results. Consistent with our theoretical argument, we find that IMF interventions are particularly effective in promoting CBI when they entail specific CBI conditions. Substantively, an IMF program with CBI conditionality increases CBI by up to an additional 2.74 index points (about one-eighth of a standard deviation) compared to an IMF program without such conditionality ($p < 0.05$) – a fairly small, yet non-negligible effect, given the range of the CBI index (from 0 to 100). We cannot detect an immediate short-run effect of CBI conditionality. This result is hardly surprising, as changing the mandate of the central bank often requires successfully passing several legislative hurdles or even to change the constitution of a country (Aklin and Kern, 2019). Albeit statistically insignificant, its point estimate corresponds to a positive effect of up to 1.11 index points. As before, control variables in the outcome equation remain mostly insignificant, with the exception of financial assets. In the second model, we also find democratization to have an instantaneous effect on CBI.

Turning to the IMF program equation, we find the compound instrument to be highly relevant (as indicated by the negatively significant coefficient and the F-statistic of above twenty). Interpreted literally, while regular borrowers are more likely to request an IMF program compared

¹⁶ Referred to as *(Compound instrument)* _{$i,t-1$} in the table output.

¹⁷ $\bar{P}_{i,1..t} = \frac{1}{t-1980} \sum_{\tau=1980}^{t-1} P_{i\tau}$, which is defined for all $t \geq 1981$.

to irregular borrowers, this difference in probability reduces as the Fund becomes more liquid ($p < 0.01$). Some included covariates are statistically significant predictors of IMF programs, including per-capita income, inflation, G5 bank exposure, and left-wing government ideology (which makes IMF programs less likely). Overall, selection models explain up to 12% of the within-country variation.

[Table 3 here]

We probe robustness of our findings from the two-equation ECM system by adopting a different selection model. An alternative instrument often used in the related literature is the voting alignment of a country with the G-7 in the UN General Assembly. Several studies show that countries voting in line with the United States in the UN General Assembly are more likely to receive IMF credit (Thacker, 1999; Barro and Lee, 2005; Dreher, Sturm and Vreeland, 2015). The main drawback of this instrumental variable is that it identifies a local average treatment effect for those programs that are geopolitically motivated, rather than the full set of programs.

Noting that our results hold even when using a geopolitical instrument for IMF programs, we prefer a well-specified alternative model predicting IMF programs through IMF recidivism (the fraction of years in which a country was under a program in the past five years), foreign reserves, financial crises, economic growth, democracy, (lagged) executive elections, and (lagged) legislative election (Moser and Sturm, 2011). Our results are qualitatively unchanged when adopting the Moser-Sturm specification and a probit-type selection equation (Table A2).

Furthermore, we test three additional observable implications of our theory (Table 4). We create sub-samples in which we expect the effect of CBI conditionality to be particularly pronounced. First, we suspect that CBI conditionality is more effective in countries with many veto players. We use an index measuring the strength of domestic veto players (Henisz, 2002) and use the sample median as the cutoff value for the two groups. We find that CBI conditionality is only effective in promoting CBI when there is a significant number of veto players (Table 3, Column 1).

Second, we suspect the benefit of CBI reform to be greater in small open economies that heavily rely on international capital markets. We therefore compare countries with relatively high capital account openness to those in which it is relatively low according to the sample median. We use the

Chinn-Ito measure of capital account openness to that end (Chinn and Ito, 2008). CBI conditions have a positive coefficient only in the former countries (Table 3, Column 2).¹⁸

Third, we also argue that the benefits of CBI reform are greater during financial crisis, when governments have difficulty to establish the credibility of their policy reforms. To that end, we sub-sample our data along the time dimension to identify crisis episodes. We employ a widely-used crisis indicator (Laeven and Valencia, 2013) and restrict our sample to ten-year windows around each crisis. The estimated coefficient increases in size compared to the baseline estimates, which indicates that our results are driven mainly by crisis episodes (Table 3, Column 5). In effect, the robustness of our results for the crisis sample helps us dismiss concerns that our results are driven by financial crises as an omitted variable because such crises could trigger both an IMF program (and CBI conditionality) *and* CBI reform adopted independently by the crisis-affected country.

[Table 4 here]

Taken together, these additional empirical tests show that our results are consistent with our theoretical predictions. Furthermore, we have initial evidence that our results are stable and survive a battery of modifications to model specification, measurement of variables, and sample choices.

3.4 Addressing potential endogeneity of CBI conditionality

A remaining challenge in identifying the causal effect of CBI conditionality is that it may be endogenous with respect to CBI. For example, IMF staff might allocate such conditions precisely to countries with low CBI. To mitigate such concerns, we use an instrumental-variable design for CBI conditionality. Following recent advances in the aid allocation literature (Werker, Ahmed and Cohen, 2009; Lang, 2016; Dreher and Langlotz, 2017), we use a compound instrument, which implies a (continuous) difference-in-difference design. Specifically, we interact the (logged) total number of IMF conditions with interest rate increases in the United States.¹⁹

¹⁸Our result is robust to using the KOF Financial Globalization Index (Dreher, 2006; Gygli et al., forthcoming) as an alternative measure of financial openness (Table A12). The data comes from Gygli et al. (forthcoming).

¹⁹As explained below, rapidly rising interest rates are most concerning for borrowing countries. We thus measure only the positive growth of US interest rates.

Consider the individual components of this compound instrument. First, a high number of conditions indicates that the IMF has substantial leverage in negotiations with a recipient country (Nooruddin and Simmons, 2006; Eichengreen and Woods, 2016). In this situation, it is more likely to assert itself over a relatively weak borrowing country and more often succeeds in including CBI conditionality into the loan package, which it cares about.

Second, bargaining power is not static but varies with global conditions that are unrelated to individual country circumstances. One key source of global variation are US interest rates. On one hand, countries do not have any leverage over monetary policymaking and interest rates in the US. On the other hand, US interest rate conditions determine the attractiveness of their domestic financial markets and thus borrowing conditions of many developing countries.²⁰ In particular, in times of increasing US interest rates, developing countries become more vulnerable to capital flow reversals and subsequent financial crises (Rey, 2015; Waelti, 2015; Jäger, 2016).²¹ Put differently, US interest rate movements will determine how urgently a country requires IMF funding. At the same time, the urgency of mobilizing additional funds will impact a country's bargaining power in negotiations with the Fund (Stone, 2008). Thus, governments in dire (financial) straits – due to deteriorating international interest rate conditions – might be more willing to accept IMF mandated monetary reforms in order to reduce risk premia (Maxfield, 1997). To capture this effect, we interact the scope of conditionality with US interest rate increases and use this variable as our compound instrument in the CBI conditionality equation.

Note that the compound instrument – but not necessarily its constituent parts – provide excludability. For example, while the total number of conditions may affect CBI in ways other than CBI conditionality, we control for these pathways by including the condition count as a constituent term. The same argument applies for the US interest rate. In other words, identification derives from changes in IMF bargaining power vis-à-vis borrowers in times of low interest rates versus high interest rates, akin to a difference-in-difference design (Lang, 2016; Dreher and Langlotz,

²⁰We rely on a similar logic as proposed in Mian, Sufi and Verner (2017), who use US interest rate shocks to predict household borrowing conditions in third countries. Similarly, Arias (2017) takes the US Federal Funds Rate to instrument for sovereign borrowing conditions in countries outside the US.

²¹For instance, Rey (2015) finds that US monetary policy shocks have substantial spill-over effects on financial markets and lending conditions in third countries, independent of the exchange rate regime that a country pursues.

2017; Christian and Barrett, 2017). The supplemental appendix verifies that the parallel trends assumptions underlying this approach are met (Appendix C).

Overall, we add an auxiliary equation for CBI conditionality to our estimation framework, which now reads as follows:

$$\Delta y_{it} = \beta_0 y_{i,t-1} + \beta_1^D \Delta C_{it} + \beta_1^L \hat{C}_{i,t-1} + \beta_2^D P_{it} + \beta_2^L \hat{P}_{i,t-1} + \Delta X'_{it} B^D + X'_{i,t-1} B^L + \alpha_{1i} + \mu_{1t} + \varepsilon_{1it} \quad (5)$$

$$P_{i,t-1} = \gamma_1 \bar{P}_{i,t-1} + \gamma_2 (\bar{P}_{i,t-1} \otimes L_{i,t-1}) + \gamma_3 L_{i,t-1} + \Delta X'_{it} \Gamma^D + X'_{i,t-1} \Gamma^L + \alpha_{2i} + \mu_{2t} + \varepsilon_{2it-1} > 0 \quad (6)$$

$$C_{i,t-1} = \phi_1 N_{i,t-1} + \phi_2 (N_{i,t-1} \otimes \Delta^+ r_{t-1}) + \phi_3 \Delta^+ r_{t-1} + \Delta X'_{it} \Phi^D + X'_{i,t-1} \Phi^L + \alpha_{3i} + \mu_{3t} + \varepsilon_{3it-1} \quad (7)$$

$$\begin{pmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \\ \varepsilon_{3it} \end{pmatrix} \sim \mathcal{N} \left[\mathbf{0}, \begin{pmatrix} 1 & \sigma_{12} & \sigma_{13} \\ \sigma_{12} & 1 & \sigma_{23} \\ \sigma_{13} & \sigma_{23} & 1 \end{pmatrix} \right] \quad (8)$$

In equation 7, we instrument for CBI conditionality using the interaction between the total number of conditions ($N_{i,t-1}$) and US interest rate growth ($\Delta^+ r_{t-1}$), which is referred to in our tables more briefly as *(Compound instrument)_{i,t-1}*.

Our approach is fully consistent with recent advice on how to evaluate the effects of IMF interventions in the presence of endogeneity (Stubbs et al., 2018). Their advice is to (1) estimate a system of equations (as the one above) to untangle the respective effects of IMF programs and IMF conditions; (2) use the compound instrument defined above for IMF programs in a linear auxiliary equation; (3) use the country-specific mean of conditions interacted with the IMF liquidity ratio as a generic instrument for IMF conditions *unless a theoretically more relevant instrument is available*. As we have a theoretical rationale for our instrument in the specific context of CBI conditionality, we opt for the approach using a specific instrument.²²

We present our results in Table 5. Throughout all control sets, we continue to find evidence of a positive effect of CBI conditionality on CBI ($p < 0.1$). The effect is substantively larger than before (up to 7.76 index points or four-tenths of a standard deviation) but statistically less significant.

²²In addition, a practical reason for our choice is that our models do not converge when using the generalized instrument. This may be due to the low incidence of CBI conditionality.

In comparison to previous estimations, our results on the control variables are similar, as financial assets and transitions toward democracy remain significant.

Our regression results in the CBI conditionality equation indicate a strong positive correlation between the number of conditions and CBI conditionality ($p < 0.01$), consistent with theoretical explanations. We also find our compound instrument – the interaction of conditions and US interest rate shocks – to be significant. Its sign is consistent with our argument that countries are more willing to accept CBI conditionality in times of rapidly increasing US interest rates. The F-statistic for the instrument is below the conventional threshold of ten (Staiger and Stock, 1997; Stock, Wright and Yogo, 2002), which implies that we face some potential bias due to weak instruments. In our case, the result of weak instruments likely is a less precise estimate of the CBI effect.

[Table 5 here]

Given that our preferred instrument is rather weak, we probe robustness of our findings using two alternative instruments. First, we simply use the total number of conditions to predict IMF conditionality (Table A3). The intuition is that if the Fund has greater bargaining power, it can impose more conditions but also impose CBI conditionality – as it cares about CBI reform for its own benefit. While we cannot directly test for the validity of the exclusion restriction – to the best of our knowledge – we are not aware of any mechanism through which the number of conditions would affect CBI other than through CBI conditionality.

Second, we also test a compound instrument that relies on time-varying information about logistical support bases for US military operations. In particular, when the US military has deployed troops in a given country, the countries adjacent to these countries are strategically important to the US military for logistical support (Aklin and Kern, 2019). The US government thus has incentives to stabilize these adjacent countries, for instance by offering IMF loans with less stringent conditionality. Hence, for these so-called ‘echolon countries’, the IMF’s bargaining power is lower, which is what we find in our analysis (Table A4). Except for the first model, the F-statistic is above ten, which indicates that our instrument is relevant.

Finally, we also include all aforementioned instruments jointly (Table A13), which allows us to test whether they are exogenous using a test of overidentifying restrictions. Regardless of control variables, the Hansen overidentification test indicates that all instruments are exogenous ($p > 0.46$) (e.g., Hansen, 1982). Furthermore, the tests for underidentification (LM-test) and weak instruments (F-test) suggest that our instruments are significantly related to CBI conditionality ($LM > 23.8$) while also not being weak ($F > 11.1$). In terms of the second-stage coefficient of interest, we obtain point estimates that are similar to the ones in the main models. Except for the last specification, they are statistically significant. Overall, the findings lend support to our hypothesis that CBI conditionality causes increases in CBI.

3.5 Robustness tests

While we have probed robustness of our findings throughout the analysis, we perform several additional global robustness checks using our three types of model specifications (i.e., ECM model specification with and without controlling for selection effects) and alternative sets of controls as introduced above. We report these results in the supplementary appendix.

First, we verify that our findings are robust to an alternative CBI index (Garriga, 2016), which is based on the same coding protocol but provides a slightly different country-year coverage and coding of individual country cases (Table A5). Our results remain qualitatively similar or even more statistically significant.

Second, we drop highly autocratic regimes from our sample because the argument is unlikely to hold for them. Autocratic leaders use central banks to intervene heavily in the economy, for example to generate income via seignorage, which is why they will not sacrifice this instrument (Keefer and Stasavage, 2003). To illustrate this point; take for instance the case of Russia. Shortly after coming to power, President Putin reigned in CBI to regain full government control over the management of the Ruble and foreign currency reserves (Johnson, 2016). Consistent with our expectations, we find that as we move toward more complex models, the positive effect of CBI conditionality becomes substantively larger and more statistically significant in the sample that excludes these countries (Table A6).

Third, we may also be concerned about spatial dependence generated by common membership in regional financial arrangements (RFA) such as currency unions. Although the Fund prescribes CBI conditionality only to one central bank, the CBI scores of several countries would be affected at once as a result. To dismiss this possibility, we exclude RFA countries, finding that our results become statistically weaker in the simpler models but even stronger in the double-instrumented models (Table A7). In the last model, for example, CBI conditionality increases CBI by 8.58 index points ($p < 0.01$) in the long term and by about two points for the onset of conditionality ($p < 0.05$).

Fourth, we verify that our results also hold without country-fixed effects (Table A8). Pooled estimation further allows for testing the effect of time-invariant CBI determinants. We find some evidence that plurality is negatively related to CBI. Since plurality implies increased electoral competition and accountability to local districts, we suspect that politicians under plurality have greater incentives to manipulate monetary policy (Lohmann, 1998; Hallerberg, 2002). Furthermore, some models show that fixed exchange rate regimes are conducive to CBI, relative to flexible regimes. Most importantly, the effect of CBI conditionality increases in its magnitude – ranging from 2.81 to 9.90 index points across models – and is mostly significant. Using the third set of control variables, we also obtain a significant instantaneous effect ($p < 0.1$).

Fifth, we also verify that our results cannot be explained by other IMF interventions. Specifically, we can rule out that *any* IMF program promotes CBI because we find less consistent evidence of a positive relationship between IMF programs and the CBI index (Table A9). Importantly, we can rule out that the effect is due to CBI conditionality being part of a wider package of IMF reforms that itself leads to central bank reform. When we control for such areas of conditionality, the estimates of CBI conditionality remain unaffected (Table A10).

Finally, we include additional analyses that leverage the full depth of our data in the supplemental appendix. When disaggregating the CBI index into its sub-categories, we find that the positive long-term association is primarily due to changes in the central bank mandate, and to a lesser extent to day-to-day policy. There is no effect on legislation pertaining to the central bank governor and quasi-fiscal operations (Table A11).

4 Concluding Discussion

In general, governments try to avoid painful IMF adjustment programs. Nevertheless, during times of financial turbulence, governments often find themselves in a situation in which they do not have any options left other than turning to the IMF. For example, facing mounting macro-financial pressures in 2002, Turkish policymakers urged the US government officials to provide a direct financial standby arrangement instead of “*a new IMF standby, which ‘would have too many conditionalities.’*”²³ In these situations, the IMF traditionally brings a battery of conditions to the bargaining table. Besides, fiscal austerity measures, governments often agree to monetary conditions that imply a loss in substantial political autonomy over monetary policy-making. Given that governments have substantial leverage in negotiations with the IMF (Nooruddin and Simmons, 2006; Eichengreen and Woods, 2016), we were interested in answering the question as to why countries participating in IMF programs are more likely to adopt CBI?

Here, we argue that IMF involvement and particularly CBI conditionality can tip the domestic balance favorably towards the adoption of CBI by (a) enhancing the benefits and (b) mitigating the costs of implementing CBI. Using a recently available dataset that includes detailed information on CBI reforms and IMF conditionality for up to 124 countries between 1980 and 2012 (Kentikelenis, Stubbs and King, 2016), our quantitative findings indicate that targeted loan conditionality plays a critical role in promoting CBI. These findings withstand a battery of robustness checks. To further explore our results, we tested for institutional configurations where we would expect CBI conditionality especially effective. In fact, we find the effect of CBI conditionality to be stronger in countries with (a) many veto players, (b) small open economies that heavily rely on international capital inflows, and (c) during financial crisis episodes.

From a policy perspective our findings have important implications. First, we find that it is not the sheer existence of an IMF program, but CBI conditionality that leads to higher levels of CBI. Second, CBI conditionality can produce important second round economic policy effects (Johnson and Barnes, 2015). Exploring these second round effects represents an interesting future research avenue. Finally, we believe that the IMF’s role in the context of CBI will change significantly. In a

²³ *Wikileaks*. “Subject: Wolfowitz and Grossman Press Turks for Support on Iraq.” December 20th, 2002.

recent interview, commenting on President Erdogan’s attempt to reign in CBI in Turkey, Christine Lagarde stated that “*in terms of monetary policy, it’s always better for all political leaders to let the central bank governors do the job that they have to do.*”²⁴ Thus, besides continuing to provide technical assistance to countries that aim to strengthen their monetary frameworks, in times of populist movements threatening the political independence of central banks, we expect the Fund to become an even more important policy anchor for monetary authorities to fend off political pressures.

²⁴*Bloomberg*. “Lagarde, Carstens Tell Turkey to Leave Central Bank Alone.” May 25, 2018.

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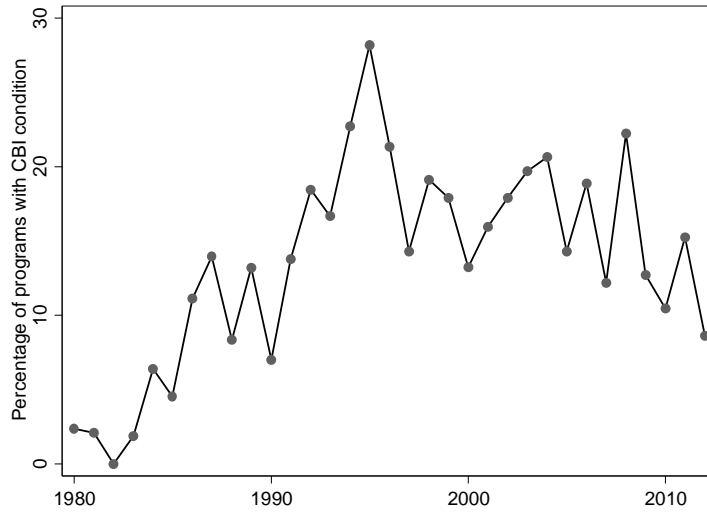
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Figures and Tables

Figure 1: Evolution of CBI conditionality.



Source: Own coding based on IMF conditionality database (Kentikelenis et al. 2016)

Table 1: CBI outcomes and IMF program scenarios.

| | CBI index | | CBI reform | | Irregular turnover | |
|--------------------|-----------|----------|------------|----------|--------------------|-----------|
| No IMF program | 0.553 | | 0.033 | | 0.106 | |
| IMF program | 0.841 | +0.288 | 0.048 | +0.015** | 0.172 | +0.066*** |
| CBI conditionality | 2.212 | +1.371** | 0.083 | +0.035** | 0.162 | -0.010 |

Notes: For each outcome in a column, cell entries in the left columns represent the mean of this outcome among country-year observations corresponding to the respective row criterion. The secondary column shows the difference in outcomes to the previous row scenario along with the p-value of a t-test.

Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 2: The effect of IMF interventions on CBI.

| | (1) | | (2) | | (3) | |
|---|-----------|---------|-----------|---------|-----------|---------|
| Δ .CBI conditionality _t | 0.796 | (0.652) | 0.582 | (0.748) | 1.114 | (0.861) |
| CBI conditionality _{t-1} | 1.689** | (0.854) | 1.945* | (1.076) | 2.736** | (1.208) |
| Δ .IMF program _t | -0.225 | (0.377) | -0.446 | (0.469) | -0.513 | (0.479) |
| IMF program _{t-1} | 0.259 | (0.287) | 0.148 | (0.376) | 0.057 | (0.375) |
| CBI index _{t-1} | -0.126*** | (0.009) | -0.154*** | (0.013) | -0.144*** | (0.012) |
| GDP per capita _{t-1} | | | -0.081 | (0.923) | | |
| Δ .GDP per capita _t | | | -0.036 | (0.041) | | |
| Openness _{t-1} | | | 0.741 | (0.678) | | |
| Δ .Openness _t | | | -1.501 | (1.564) | | |
| G5 bank exposure _{t-1} | | | -0.037 | (0.112) | | |
| Δ .G5 bank exposure _t | | | -0.025 | (0.023) | | |
| Inflation _{t-1} | | | 0.084 | (0.211) | 0.140 | (0.208) |
| Δ .Inflation _t | | | 0.068 | (0.181) | -0.057 | (0.172) |
| Financial assets _{t-1} | | | 0.534** | (0.229) | 0.557** | (0.237) |
| Δ .Financial assets _t | | | 0.071 | (0.076) | -0.000 | (0.086) |
| Polity IV _{t-1} | | | 0.071 | (0.079) | 0.020 | (0.082) |
| Δ .Polity IV _t | | | 0.379* | (0.193) | 0.201 | (0.228) |
| Executive elections _{t-1} | | | | | -0.626 | (0.678) |
| Δ .Executive elections _t | | | | | -0.145 | (0.484) |
| Left-wing government _{t-1} | | | | | 0.612 | (0.534) |
| Δ .Left-wing government _t | | | | | -0.207 | (0.348) |
| Coup attempt _{t-1} | | | | | 0.431 | (1.202) |
| Δ .Coup attempt _t | | | | | -0.320 | (0.723) |
| Veto players _{t-1} | | | | | 0.873 | (1.354) |
| Δ .Veto players _t | | | | | 1.457 | (1.796) |
| Financial crisis _{t-1} | | | | | 1.016 | (1.142) |
| Δ .Financial crisis _t | | | | | 0.325 | (0.632) |
| Observations | 3237 | | 2039 | | 2296 | |
| Within-R ² | 0.08 | | 0.13 | | 0.11 | |

Notes: Single-equation Error Correction Model in which the change of the CBI index is the dependent variable. Standard errors are clustered on countries.

Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 3: The effect of IMF interventions on CBI.

| | (1) | | (2) | | (3) | |
|---|-----------|---------|-----------|---------|-----------|---------|
| Equation 1: $\Delta.CBI\ index_t$ | | | | | | |
| $\Delta.CBI\ conditionality_t$ | 0.802 | (0.649) | 0.582 | (0.738) | 1.113 | (0.851) |
| CBI conditionality _{t-1} | 1.717** | (0.854) | 1.945* | (1.062) | 2.744** | (1.198) |
| $\Delta.IMF\ program_t$ | -0.189 | (0.371) | -0.446 | (0.462) | -0.488 | (0.471) |
| IMF program _{t-1} | 1.534* | (0.830) | 0.116 | (1.745) | 1.726 | (2.000) |
| CBI index _{t-1} | -0.128*** | (0.009) | -0.154*** | (0.013) | -0.145*** | (0.012) |
| GDP per capita _{t-1} | | | -0.093 | (1.167) | | |
| $\Delta.GDP\ per\ capita_t$ | | | -0.036 | (0.040) | | |
| Openness _{t-1} | | | 0.743 | (0.671) | | |
| $\Delta.Openness_t$ | | | -1.504 | (1.536) | | |
| G5 bank exposure _{t-1} | | | -0.037 | (0.111) | | |
| $\Delta.G5\ bank\ exposure_t$ | | | -0.025 | (0.025) | | |
| Inflation _{t-1} | | | 0.085 | (0.207) | 0.078 | (0.201) |
| $\Delta.Inflation_t$ | | | 0.067 | (0.187) | -0.007 | (0.185) |
| Financial assets _{t-1} | | | 0.534** | (0.228) | 0.578** | (0.236) |
| $\Delta.Financial\ assets_t$ | | | 0.071 | (0.075) | 0.015 | (0.086) |
| Polity IV _{t-1} | | | 0.071 | (0.080) | 0.024 | (0.082) |
| $\Delta.Polity\ IV_t$ | | | 0.379** | (0.191) | 0.199 | (0.222) |
| Executive elections _{t-1} | | | | | -0.608 | (0.682) |
| $\Delta.Executive\ elections_t$ | | | | | -0.152 | (0.481) |
| Left-wing government _{t-1} | | | | | 0.719 | (0.541) |
| $\Delta.Left\text{-}wing\ government_t$ | | | | | -0.166 | (0.361) |
| Coup attempt _{t-1} | | | | | 0.530 | (1.222) |
| $\Delta.Coup\ attempt_t$ | | | | | -0.261 | (0.748) |
| Veto players _{t-1} | | | | | 0.732 | (1.467) |
| $\Delta.Veto\ players_t$ | | | | | 1.452 | (1.780) |
| Financial crisis _{t-1} | | | | | 0.901 | (1.126) |
| $\Delta.Financial\ crisis_t$ | | | | | 0.355 | (0.611) |
| Equation 2: $IMF\ program_{t-1}$ | | | | | | |
| Past programs _{t-1} | 1.552*** | (0.174) | 1.386*** | (0.221) | 1.347*** | (0.231) |
| (Compound instrument) _{t-1} | -0.195*** | (0.031) | -0.229*** | (0.039) | -0.191*** | (0.042) |
| IMF liquidity ratio _{t-1} | 0.013 | (0.011) | 0.029 | (0.026) | -0.037** | (0.017) |
| GDP per capita _{t-1} | | | -0.376*** | (0.067) | | |
| $\Delta.GDP\ per\ capita_t$ | | | 0.002 | (0.002) | | |
| Openness _{t-1} | | | 0.083 | (0.073) | | |
| $\Delta.Openness_t$ | | | -0.054 | (0.070) | | |
| G5 bank exposure _{t-1} | | | -0.001 | (0.007) | | |
| $\Delta.G5\ bank\ exposure_t$ | | | -0.006*** | (0.002) | | |
| Inflation _{t-1} | | | 0.018 | (0.017) | 0.034** | (0.016) |
| $\Delta.Inflation_t$ | | | -0.020 | (0.013) | -0.025** | (0.011) |
| Financial assets _{t-1} | | | -0.010 | (0.015) | -0.018 | (0.016) |
| $\Delta.Financial\ assets_t$ | | | -0.005 | (0.005) | -0.008 | (0.005) |
| Polity IV _{t-1} | | | -0.001 | (0.004) | -0.000 | (0.004) |

| | | | | | |
|---|--------|--------|---------|---------|---------|
| Δ .Polity IV _t | | -0.001 | (0.007) | 0.000 | (0.006) |
| Executive elections _{t-1} | | | | -0.007 | (0.038) |
| Δ .Executive elections _t | | | | 0.007 | (0.020) |
| Left-wing government _{t-1} | | | | -0.068* | (0.040) |
| Δ .Left-wing government _t | | | | -0.027 | (0.031) |
| Coup attempt _{t-1} | | | | -0.034 | (0.081) |
| Δ .Coup attempt _t | | | | -0.028 | (0.048) |
| Veto players _{t-1} | | | | 0.094 | (0.137) |
| Δ .Veto players _t | | | | 0.017 | (0.090) |
| Financial crisis _{t-1} | | | | 0.072 | (0.060) |
| Δ .Financial crisis _t | | | | -0.016 | (0.031) |
| Observations (Equation 1) | 3237 | 2039 | | 2296 | |
| Within-R ² (Equation 1) | 0.085 | 0.133 | | 0.109 | |
| F-statistic (Equation 2) | 39.804 | 34.316 | | 21.139 | |
| Observations (Equation 2) | 6311 | 3118 | | 3384 | |
| Within-R ² (Equation 2) | 0.078 | 0.124 | | 0.083 | |

Notes: Maximum-likelihood estimation of a Vector Error Correction Model system of two equations: the outcome equation and an auxiliary equation modelling selection into IMF programs using a compound instrument that multiplies the IMF liquidity ratio with the past incidence of IMF programs (Lang 2016). Standard errors are allowed to be correlated across equations and clustered on countries.

Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 4: Conditional effects of CBI conditionality on CBI.

| | Veto players | | Financial openness | | Financial crisis | |
|---|--------------|---------|--------------------|---------|------------------|---------|
| | High | Low | High | Low | Yes | No |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Δ .CBI conditionality _t | 2.205* | -0.534 | 1.047 | 1.206 | 1.320 | 0.541 |
| | (1.295) | (1.186) | (1.037) | (1.284) | (1.185) | (0.876) |
| CBI conditionality _{t-1} | 3.563** | 0.947 | 4.438** | 1.356 | 3.683** | 1.260 |
| | (1.610) | (1.890) | (1.844) | (1.415) | (1.824) | (1.796) |
| Δ .IMF program _t | -0.524 | -0.733 | -0.342 | -0.733 | -0.833 | -0.304 |
| | (0.646) | (0.653) | (0.607) | (0.627) | (0.768) | (0.566) |
| IMF program _{t-1} | 1.137 | 2.229 | 0.869 | 3.252 | -5.532 | 5.702* |
| | (5.843) | (3.082) | (2.842) | (3.435) | (6.349) | (3.393) |
| Observations (Equation 1) | 693 | 1603 | 1141 | 1155 | 1241 | 1055 |
| Within-R ² (Equation 1) | 0.130 | 0.152 | 0.119 | 0.189 | 0.128 | 0.155 |
| Observations (Equation 2) | 1247 | 1996 | 1530 | 693 | 884 | 1329 |
| Within-R ² (Equation 2) | 0.339 | 0.498 | 0.260 | 0.301 | 0.245 | 0.233 |
| F-statistic (Equation 2) | 9.752 | 12.854 | 2.492 | 37.893 | 10.646 | 16.472 |

Notes: Maximum-likelihood estimation of Vector Error Correction Models including two equations. All equations include two-way fixed effects and control variables (Dreher, Sturm, and de Haan 2010). IMF program is instrumented using the interaction of the IMF liquidity ratio and the past incidence of IMF programs (Lang 2016). Cutoffs for veto players and financial openness are based on the median over country-year observations. For financial crises, the entire system is estimated on a restricted sample consisting of symmetric five-year windows around all crisis events. Always the first column of any pair of column should have a positive effect. Standard errors are allowed to correlate across equations and clustered on countries.

Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 5: The effect of IMF programs on CBI.

| | (1) | | (2) | | (3) | |
|--------------------------------------|-----------|---------|-----------|---------|-----------|---------|
| Equation 1: $\Delta.CBI\ index_t$ | | | | | | |
| $\Delta.CBI\ conditionality_t$ | 0.804 | (0.650) | 0.630 | (0.744) | 1.170 | (0.863) |
| CBI conditionality _{t-1} | 1.941 | (1.823) | 6.274* | (3.610) | 7.758* | (4.001) |
| $\Delta.IMF\ program_t$ | -0.198 | (0.374) | -0.662 | (0.468) | -0.739 | (0.486) |
| IMF program _{t-1} | 1.510* | (0.845) | -0.405 | (1.732) | 1.155 | (1.958) |
| CBI index _{t-1} | -0.128*** | (0.009) | -0.155*** | (0.013) | -0.146*** | (0.012) |
| GDP per capita _{t-1} | | | 0.020 | (1.180) | | |
| $\Delta.GDP\ per\ capita_t$ | | | -0.035 | (0.041) | | |
| Openness _{t-1} | | | 0.818 | (0.689) | | |
| $\Delta.Openness_t$ | | | -1.407 | (1.518) | | |
| G5 bank exposure _{t-1} | | | -0.033 | (0.113) | | |
| $\Delta.G5\ bank\ exposure_t$ | | | -0.017 | (0.025) | | |
| Inflation _{t-1} | | | 0.087 | (0.213) | 0.078 | (0.209) |
| $\Delta.Inflation_t$ | | | 0.042 | (0.181) | -0.029 | (0.184) |
| Financial assets _{t-1} | | | 0.547** | (0.236) | 0.635** | (0.254) |
| $\Delta.Financial\ assets_t$ | | | 0.064 | (0.077) | 0.004 | (0.088) |
| Polity IV _{t-1} | | | 0.066 | (0.079) | 0.005 | (0.080) |
| $\Delta.Polity\ IV_t$ | | | 0.382** | (0.188) | 0.204 | (0.216) |
| Executive elections _{t-1} | | | | | -0.635 | (0.689) |
| $\Delta.Executive\ elections_t$ | | | | | -0.204 | (0.474) |
| Left-wing government _{t-1} | | | | | 0.794 | (0.565) |
| $\Delta.Left-wing\ government_t$ | | | | | -0.188 | (0.379) |
| Coup attempt _{t-1} | | | | | 0.550 | (1.287) |
| $\Delta.Coup\ attempt_t$ | | | | | -0.230 | (0.796) |
| Veto players _{t-1} | | | | | 1.093 | (1.422) |
| $\Delta.Veto\ players_t$ | | | | | 1.742 | (1.824) |
| Financial crisis _{t-1} | | | | | 0.850 | (1.097) |
| $\Delta.Financial\ crisis_t$ | | | | | 0.392 | (0.600) |
| Equation 2: $IMF\ program_{t-1}$ | | | | | | |
| Past programs _{t-1} | 1.560*** | (0.174) | 1.394*** | (0.220) | 1.355*** | (0.231) |
| (Compound instrument) _{t-1} | -0.195*** | (0.031) | -0.229*** | (0.039) | -0.191*** | (0.041) |
| IMF liquidity ratio _{t-1} | 0.013 | (0.010) | 0.029 | (0.026) | -0.037** | (0.017) |
| GDP per capita _{t-1} | | | -0.376*** | (0.067) | | |
| $\Delta.GDP\ per\ capita_t$ | | | 0.002 | (0.002) | | |
| Openness _{t-1} | | | 0.083 | (0.073) | | |
| $\Delta.Openness_t$ | | | -0.054 | (0.070) | | |
| G5 bank exposure _{t-1} | | | -0.001 | (0.007) | | |
| $\Delta.G5\ bank\ exposure_t$ | | | -0.006*** | (0.002) | | |
| Inflation _{t-1} | | | 0.017 | (0.017) | 0.034** | (0.016) |
| $\Delta.Inflation_t$ | | | -0.020 | (0.013) | -0.025** | (0.011) |
| Financial assets _{t-1} | | | -0.010 | (0.015) | -0.018 | (0.016) |
| $\Delta.Financial\ assets_t$ | | | -0.005 | (0.005) | -0.008 | (0.005) |
| Polity IV _{t-1} | | | -0.001 | (0.004) | -0.000 | (0.004) |

| | | | | | |
|---|--|--------|---------|---------|---------|
| Δ .Polity IV _t | | -0.001 | (0.007) | -0.000 | (0.006) |
| Executive elections _{t-1} | | | | -0.007 | (0.038) |
| Δ .Executive elections _t | | | | 0.007 | (0.020) |
| Left-wing government _{t-1} | | | | -0.068* | (0.040) |
| Δ .Left-wing government _t | | | | -0.027 | (0.031) |
| Coup attempt _{t-1} | | | | -0.034 | (0.081) |
| Δ .Coup attempt _t | | | | -0.028 | (0.048) |
| Veto players _{t-1} | | | | 0.095 | (0.137) |
| Δ .Veto players _t | | | | 0.018 | (0.090) |
| Financial crisis _{t-1} | | | | 0.072 | (0.060) |
| Δ .Financial crisis _t | | | | -0.016 | (0.031) |

| | | | | | | |
|--|----------|---------|-----------|---------|----------|---------|
| Equation 3: <i>CBI conditionality</i> _{t-1} | | | | | | |
| Total conditions _{t-1} | 0.043*** | (0.007) | 0.038*** | (0.006) | 0.038*** | (0.007) |
| (Compound instrument) _{t-1} | 0.018** | (0.009) | 0.028*** | (0.011) | 0.025** | (0.010) |
| US interest rate shock _{t-1} | 0.015 | (0.012) | 0.028 | (0.022) | -0.004 | (0.019) |
| GDP per capita _{t-1} | | | -0.019 | (0.020) | | |
| Δ .GDP per capita _t | | | -0.000 | (0.001) | | |
| Openness _{t-1} | | | -0.019 | (0.029) | | |
| Δ .Openness _t | | | -0.013 | (0.042) | | |
| G5 bank exposure _{t-1} | | | 0.000 | (0.003) | | |
| Δ .G5 bank exposure _t | | | -0.002*** | (0.001) | | |
| Inflation _{t-1} | | | -0.002 | (0.005) | -0.002 | (0.005) |
| Δ .Inflation _t | | | 0.006 | (0.004) | 0.005 | (0.004) |
| Financial assets _{t-1} | | | 0.001 | (0.006) | -0.008 | (0.007) |
| Δ .Financial assets _t | | | 0.002 | (0.003) | 0.003 | (0.002) |
| Polity IV _{t-1} | | | 0.001 | (0.002) | 0.003 | (0.002) |
| Δ .Polity IV _t | | | 0.000 | (0.003) | -0.000 | (0.003) |
| Executive elections _{t-1} | | | | | 0.013 | (0.022) |
| Δ .Executive elections _t | | | | | 0.011 | (0.015) |
| Left-wing government _{t-1} | | | | | -0.018 | (0.016) |
| Δ .Left-wing government _t | | | | | 0.002 | (0.017) |
| Coup attempt _{t-1} | | | | | 0.016 | (0.042) |
| Δ .Coup attempt _t | | | | | 0.008 | (0.024) |
| Veto players _{t-1} | | | | | -0.074 | (0.052) |
| Δ .Veto players _t | | | | | -0.053 | (0.054) |
| Financial crisis _{t-1} | | | | | 0.018 | (0.022) |
| Δ .Financial crisis _t | | | | | -0.002 | (0.013) |

| | | | |
|------------------------------------|--------|--------|--------|
| Observations (Equation 1) | 3237 | 2039 | 2296 |
| Within-R ² (Equation 1) | 0.085 | 0.133 | 0.109 |
| F-statistic (Equation 2) | 40.331 | 35.246 | 21.261 |
| Observations (Equation 2) | 6311 | 3118 | 3384 |
| Within-R ² (Equation 2) | 0.078 | 0.124 | 0.083 |
| F-statistic (Equation 3) | 4.025 | 6.643 | 6.298 |

Notes: Maximum-likelihood estimation of a vector error correction model system of three equations. IMF program is instrumented using the interaction between the IMF liquidity ratio and past incidence of IMF programs. CBI

conditionality is instrumented using the interaction between the total number of conditions and US interest rate shocks. Standard errors are allowed to be correlated across equations and clustered on countries.

Significance levels: * $p < .1$ ** $p < .05$ *** $p < .01$.