ECONOMIC POLICY

74th Economic Policy Panel Meeting

21-22 October 2022

The Political Economy of Reforms in Central Bank Design: Evidence from a New Dataset

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Davide Romelli*

Abstract

What explains the worldwide changes in central bank design over the past five decades? Using a new dataset on central bank institutional design, this paper investigates the timing, pace and magnitude of reforms in a sample of 155 countries over the period 1972-2017. I construct a new dynamic index of central bank independence and show that initial reforms that increase the level of independence, as well as regional convergence, represent important drivers of changes in central bank design. Similarly, external pressures, such as obtaining an IMF loan, and political events, such as democratic reforms and the election of nationalistic governments, also impact the reform process. Reforms also follow periods of high inflation rates suggesting an endogeneous evolution of central bank independence. The results also reveal important heterogeneities in the reform process depending on the level of development, the size and direction of reforms, as well as the different dimensions along which central bank legislation can be amended.

Keywords: Central banking, central bank independence, central bank governance, legislative reforms, political economy.

JEL classification: E58, G28, N20, P16.

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Previous versions of this paper were circulated under the title: "Regulatory reforms and central bank independence". I would like to thank Frédérique Bec, Alex Cukierman, Jakob de Haan, Maarten Dossche, Andre Fourçans, Bernd Hayo, Roman Horváth, Yannick Lucotte, Donato Masciandaro, Bilin Neyapti, Oana Peia, Dilyara Salakhova, Estefania Santacreu-Vasut, Pierre Siklos, Eleftherios Spyromitros and Cristina Terra for stimulating discussions. I am also grateful to seminar participants in Trinity College Dublin, Namur University, Bank of Finland, as well as conference participants at the 30^{th} Annual Congress of the EEA, 32^{nd} Annual Irish Economic Association Conference, 64^{th} AFSE Annual Meeting, 5^{th} International Conference of the FEBS, 19^{th} ICMAIF Annual Conference, 4^{th} PhD Student Conference in International Macroeconomics and Financial Econometrics, 19^{th} T2M Conference, MIFN 2014 Workshop. Guanghong Luo and Vigia Peia provided excellent research assistance. I gratefully acknowledge financial support from the 2017 Trinity College Dublin Arts and Social Sciences Benefactions Fund. All remaining errors are mine.

1 Introduction

The four decades prior to the 2008 global financial crisis have been characterized by significant changes in the institutional design of central banks around the world, generally towards assigning monetary authorities a higher degree of independence from the executive branch. Yet, despite the large consensus on the optimality of this institutional arrangement in stabilizing inflation rates, the degree of central bank independence still varies considerably across countries (see Figure 1). Moreover, the decade since the 2008 financial crisis has seen a new wave of reforms concerning, among other things, the involvement of central banks in financial supervision.[1] In recent years, the autonomy of central banks has also come under pressure, particularly in countries with populist political movements (The Economist, 2019).

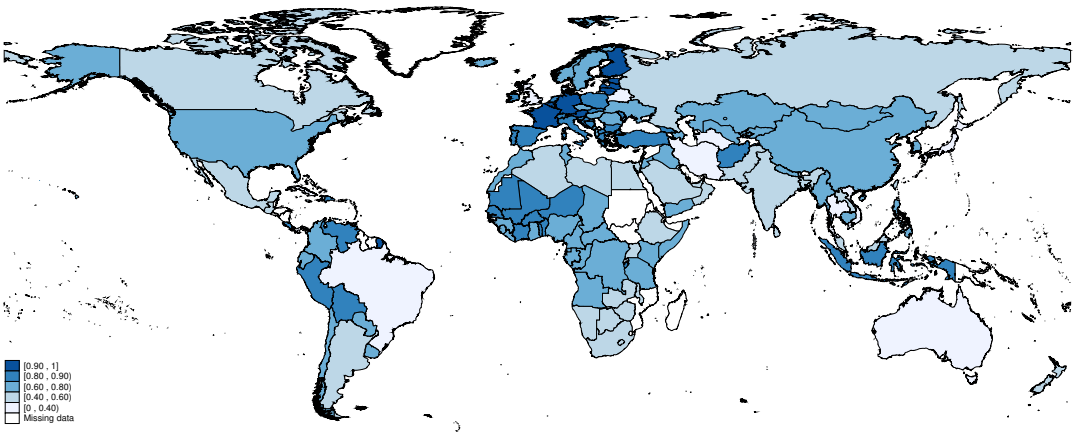
This paper investigates why and how central bank reforms come about. While a considerable body of work has investigated the *consequences* of assigning more independence to monetary policy authorities, the *causes* of reforms in central banking have received less attention. Two empirical challenges in investigating the drivers of institutional changes in central banks are represented by (i) the use of different definitions for constructing indices of central bank independence (CBI) and, more importantly, (ii) the fact that such indices are generally computed at specific points in time and do not capture the entire set of reforms.

This paper overcomes these limitations by introducing a large cross-country database on the timing of legislative changes in central banking for a set of 155 countries during the period 1972-2017. It constructs a dynamic measure of central bank independence that allows for a more precise determination than previously possible of the timing and magnitude of reforms in central bank design. This dynamic index builds on the two most common measures of de jure central bank independence in Grilli et al. (1991) and Cukierman et al. (1992). However, given that the role of central banks has evolved considerably since the early 1990s, the new measure of CBI proposed extends previous ones by capturing new characteristics that can affect the conduct of monetary policy, such as financial independence and reporting and disclosure.

Employing this dynamic index, I provide a comprehensive overview of the evolution and timing of reforms in central bank design around the world. I find that, while central

[1] For example, the Dodd-Frank Act of 2010 in the USA increased the responsibilities of the Federal Reserve Bank as financial supervisor. Similar reforms occurred in the UK (2012), Euro Area (2014), New Zealand (2010) or Russia (2013).

Figure 1: Central Bank Independence around the world in 2017



Notes: This figure shows the degree of central bank independence around the world in 2017.

banks have become increasingly more independent over the last five decades, there is still a large variation across regions. Moreover, significant improvements in independence relate to a few dimensions of the index, such as those referring to the primary objectives of the central bank or its lending to the government.

I then employ a political economy framework to identify five sources of reforms: (i) status quo bias, (ii) external inducements, (iii) crises and shocks, (iv) ideology and political factors and (v) economic conditions. The results show that the lagged level of central bank independence or status quo, as well as regional pressures are important in the reform process, as countries with lower levels of independence or those that are further from their regional average are more likely to adopt reforms that increase their level of independence. An external pressure to reform also comes from international institutions, as countries receiving an IMF loan or becoming a member of a currency union adopt reforms that increase the independence of their central banks.

Reforms that increase the level of central bank independence also follow periods of high inflation rates, suggesting central bank institutional design is endogenous to the inflation dynamics of a country. On the other hand, other types of crises such as systemic banking crises, currency or sovereign debt crises are not followed by reforms that increase the level of central bank independence. The data also shows important heterogeneities depending on the level of development. For instance, government fractionalization, cabinet changes or economic growth matter for the reform process among advanced economies, while external pressures and inflationary episodes are more important in developing economies.

The index constructed also allows for a more granular analysis of the magnitude and direction of reforms. This highlights important differences in the reform process. For

instance, I find that financial crises are generally followed by reforms that decrease the level of central bank independence, while external inducements, regional convergence and status quo bias matter for reforms that increase the level of independence, but not those that decrease it.

The robustness of these results is checked along several lines. First, I employ several estimation strategies, alternative definitions and proxies for the main determinants of reforms. Next, I control for the different dimensions along which central bank legislation can be amended, as well as the interaction between the lagged level of independence and external factors. I also perform various split sample analyses and control for other reform processes such as democratic reforms. For instance, I find that countries undertaking democratic reforms will experience improvements in central bank independence, while the election of nationalistic political parties are typically associated with reforms that decrease the degree of independence. The results are robust to all these alternative specifications and provide the first comprehensive picture of the determinants and timing of reforms in central bank design over the last five decades.

These results, together with the new dataset introduced in this paper, contribute to two main streams of literature. First, a large body of work has tested the effectiveness of central bank independence in lowering inflation.[2] Overall, while higher levels of CBI are negatively correlated with inflation rates, this link is not always robust across countries, time periods or when different controls are included.[3] One explanation for these heterogeneous results might rest in the construction of the various indices. For example, the two most common measures of CBI, the Grilli et al. (1991) and the Cukierman et al. (1992) indices, capture quite different information: 40 percent of the criteria collected in the former are not present in the latter (Mangano, 1998).[4] The index proposed in this paper comprises the most comprehensive set of central bank characteristics, including elements of financial independence and reporting and disclosure that have been of key interest in light of recent

[2]See, among others, Grilli et al. (1991), Cukierman et al. (1992), Alesina and Summers (1993) and Siklos (2008). Extensive reviews of this literature is included in Arnone et al. (2006); Cukierman (2008); Klomp and de Haan (2010); Arnone and Romelli (2013); Garriga (2016).

[3]For example, Cukierman et al. (2002) look at former socialist economies and find that CBI is unrelated to inflation during the early stages of liberalization, but the link becomes significant when countries become more liberalized. Similarly, Campillo and Miron (1997) and Oatley (1999) show that CBI has no effect on inflation when they control for the degree of openness, political instability or historical levels of debt and inflation (see also Posen, 1995; Forder, 1998).

[4]A different argument is that *de jure* measures, which look at legislative reforms, do not represent actual levels of central bank independence, in particular in developing countries where written rules are often circumvented by *de facto* procedures. A common measure of *de facto* independence is the turnover rate of the central bank governor (Cukierman et al., 1992). However, the link between this measure and inflation dynamics is also not very robust (see, for example, Crowe and Meade, 2007).

unconventional monetary policy measures.

Second, a more general literature on endogenous political institutions discusses how regulatory changes are rarely imposed "exogenously", but rather respond to changing political, social or economic factors. For example, Aghion et al. (2004) argue that central banks have been made more independent in order to "insulate" monetary policy in periods of high inflation.[5] Alesina and Stella (2010) build a political economy model in which the fractionalization of the party system makes the delegation of monetary policy to independent experts more cumbersome given the conflicts among groups. Empirically, Moser (1999) finds that legal independence is higher in OECD countries with legislative processes characterized by extensive checks and balances, while in Keefer and Stasavage (2003) monetary policy credibility (captured by a lower governor turnover rate) is enhanced by the presence of multiple veto players in the government.

The arguments above have created avenues for a recent stream of research that looks at the timing of reforms in central bank legislation. For example, Bodea and Hicks (2015a) build a dummy variable that takes value of one in years in which the Cukierman et al. (1992) index has been modified. They find that the competition between countries for international capital increases the likelihood of reforms. Berggren et al. (2016) investigate the effect of social trust on central bank legislative reforms, where information on reforms is collected from a questionnaire sent to central banks. Finally, Crowe and Meade (2008) look at the change in the degree of independence between the index computed by Cukierman et al. (1992) in 1989 and its recomputed value in 2003. However, this approach does not take into account the timing of reforms and may under/overestimate the magnitude of changes given the potentially different interpretations of the central bank charters. Furthermore, these empirical findings on the endogeneity of CBI are, nonetheless, limited to smaller samples, sensitive to the choice of CBI indices and are mainly concerned with the probability of reforms and not the magnitude or direction of changes.

This paper overcomes these empirical challenges by building a comprehensive survey of the timing and magnitude of reforms in central bank design. As such, it also relates to a broader literature that looks at the determinants of institutional reform processes.

[5] A typical example is the German Bundesbank, whose statute was modified in 1957 as a result of a strong public aversion towards inflation following periods of hyperinflation (Alesina and Stella, 2010). Posen (1995) also argues that the different levels of CBI across the world reflect differences in countries' preferences for low inflation (see also de Haan and van't Hag, 1995). de Jong (2002) finds that the distribution of power in the society and the degree of uncertainty avoidance explain differences in CBI. In a political economy model, Masciandaro and Passarelli (2019) argue that the distribution of financial wealth among individuals can influence the decision to maintain or reform a central bank regime.

Closely related to this paper is Abiad and Mody (2005) who look at the determinants of financial liberalization reforms, and Giuliano et al. (2013) who study the effect of democracy on the adoption of financial and product market reforms. Other related work includes Gokmen et al. (2020) who find that, contrary to conventional belief, crises are followed by fewer structural reforms that liberalize trade, agriculture, network industries and financial markets. Mian et al. (2014) also find that financial crises can result in legislative stalemates that are not conducive to meaningful macroeconomic reforms.

The paper is organized as follows. Section 2 discusses the methodology followed in building the new index of central bank independence and identifying reforms. Section 3 discusses the political economy arguments of reforming monetary policy institutions and the explanatory variables used. Section 4 presents the empirical strategy and results, while Section 5 concludes.

2 Data and stylized facts

This section describes the new index of central bank independence proposed in this paper and provides some stylized facts about the evolution of central bank design over the last five decades in a sample of 155 countries.[6]

2.1 Indices of Central Bank Independence

This paper constructs a comprehensive index of central bank independence covering a wide range of central bank characteristics based on their charters.[7] The construction of the index uses, as a starting point, the two most commonly employed CBI indices, namely the Grilli et al. (1991) (GMT) and Cukierman et al. (1992) (CWN).[8] The new index, called Central Bank Independence - Extended (CBIE) index, provides information on 42 criteria of central bank institutional design across six dimensions: 1) Governor and central bank

[6]See Appendix Table A.1 for the full set of countries and information on data availability.

[7]Classical measures of CBI are built using two different methodologies: i) *de jure*, and ii) *de facto* measures of independence. The first consists in the codification of central banks' statutes. *De facto* indices, on the other hand, associate the independence of central banks to the autonomy of its governor, i.e. higher turnover rates of central bank governors are associated with a lower independence of the central bank. *De facto* indices, however, are known to suffer from important limitations such as the fact that the reasons behind the dismissal of the governor are not considered or the fact that they focus on the governor only and overlook the entire board of directors (see, among others Dreher et al., 2008). I thus focus my analysis on *de jure* CBI indices.

[8]For a detailed explanation of these indices and a literature review, see Eijffinger and de Haan (1996); Arnone et al. (2006); Masciandaro and Romelli (2015); de Haan et al. (2018); de Haan and Eijffinger (2019); Masciandaro and Romelli (2019); Peia and Romelli (2019).

board, 2) Monetary policy and conflict resolution, 3) Objectives, 4) Limitations on lending to the government, 5) Financial independence and 6) Reporting and disclosure.

This extended index incorporates the characteristics of *both* the GMT and CWN indices. Moreover, it expands the GMT political independence index by collecting additional information on the dismissal of the governor and other board members, in addition to identifying if the governor is legally allowed to hold other offices in the government. It also augments the GMT economic independence index by including information on the authority responsible for setting the financial conditions on lending to the government.

Apart from integrating these two indices, one important innovation of the CBIE index is the inclusion of new criteria that capture good practices in central bank financial independence and reporting and disclosure. The financial independence criterion concerns the conditions for capitalization and recapitalization of the central bank capital, the identification of the authority that determines and approves the budget of the central bank, as well as the requirements for profit allocation. These last two features are particularly important during periods in which central banks' assets increase exponentially, such as following large asset purchase programs. In this context, the presence of conditions on the budget and the distribution of profits may reduce central banks' capacity to implement monetary policy. Regarding profit allocation, in particular, Reis (2013) argues that governments under fiscal stress will be tempted to demand the central bank to generate more profits and transfer them to the Treasury.

Previous literature has also argued that central bank accountability nowadays goes in tandem with central bank independence (Haan et al., 2005; Jacome and Vazquez, 2008). Haan et al. (2005) outline three main features of central bank accountability: (i) explicit definition and ranking of objectives of monetary policy; (ii) final responsibility with respect to monetary policy, and (iii) disclosure of actual monetary policy (see also de Haan et al., 2018). Elements of accountability captured in the first two categories are already incorporated in the Grilli et al. (1991) and Cukierman et al. (1992) indices.[9] The CBIE index includes additional information related to disclosure, namely information on the legal provisions that require central banks to report on a regular basis the fulfilment of their policy targets. A question related to the publication of financial statements and whether these are certified by an independent auditor is also included in this dimension. The assumption is

[9]For example, several questions relate to the responsibility of formulating monetary policy, the presence of government representatives in the central bank board, or the conditions for the dismissal of monetary policy committee members.

that higher disclosure and regular publication of certified financial statements correspond to greater central bank accountability and decreases the risk of being "captured" by the executive branch.

Table 2 presents a summary of the characteristics captured in the GMT and CWN indices as well as the new characteristics added by the CBIE index. Details on the guiding principle for the creation of the CBIE index are presented in Online Appendix A, while Online Appendix B shows the coding rules. The codification strategy follows Cukierman et al. (1992) closely, and the points assigned to the answers of the 42 questions that construct the CBIE index range between 0 (no independence) and 1 (full independence). A score for each of the six dimensions of the index is obtained by assigning equal weights to each question in a given dimension. Then, the overall index is computed as the average of the scores across these six dimensions. This guarantees that all dimensions are given the same weight in determining the level of independence. The resulting index is normalized over the interval [0;1].[10]

2.2 Central Bank legislative reforms

To construct the dataset of reforms in central bank design, I identify, for each country, all the years in which the central bank charter has been changed or amended over the period 1972-2017.[11] A total of 2,490 changes to central bank legislation took place in the sample, with 1,303 reforms in the form of complete changes of statutes or reprints of central bank charters, and 1,187 legislative amendments. This implies that countries have modified their legislation, on average, about 16 times over the analyzed period. Yet these legislative changes may not necessarily modify, in a significant way, the institutional design of central banks. To gauge the magnitude and significance of these legislative changes, I focus my attention on reforms that change the degree of central bank independence, which has been long considered the optimal institutional design for modern central banks.

[10]There are, of course, different ways to aggregate the collected data. For example, Grilli et al. (1991) assign an equal weight to the 15 questions included in their index. Since more questions are included in the criterion for governance, the weighting scheme assigns the largest weight to this dimension. Cukierman et al. (1992), Jacome and Vazquez (2008), Dincer and Eichengreen (2014), among others, assign a set of a priori weights to each dimension. For instance, in the Cukierman (1992) index, 62.5% of the weight is assigned to the dimension on the limitations on lending to the government. Online Appendix Figure OnlineApp.B.1 presents a bar chart that compares the weights assigned to different dimensions across various indices of CBI in the literature. The figure shows considerably different weighting schemes across the main indices of central bank independence. Since this paper is mainly concerned with reforms, I take a conservative approach and assign equal weights to the six dimensions collected. Nonetheless, robustness tests are performed using alternative weighting methods.

[11]The full list of analyzed documents was obtained from central bank websites or by directly contacting the central bank and can be made available upon request.

Table 1: Measures of Central Bank Independence and Reforms

Paper	Index Name	Variables	Countries	Period	Nr. of reforms
Grilli et al. (1991)	GMT	16	18	1989	–
Cukierman et al. (1992)	CWN	16	72	1950-1989	35
Cukierman et al. (2002)	CWN	16	26	1991-1998	9
Polillo and Guillén (2005)	CWN	16	91	1989-2000	60
Crowe and Meade (2008)	CWN	16	99	2003	–
Jacome and Vazquez (2008)	CWNE	17	24	1990-2002	13
Acemoglu et al. (2008)	CWN	16	52	1972-2005	40
Arnone et al. (2009)	GMT	16	162	2003	–
Dincer and Eichengreen (2014)	CBIU	24	85	1998-2010	44
Bodea and Hicks (2015a)	CWN	16	83	1972-2010	108
This paper	**CBIE**	**42**	**155**	**1972-2017**	**286**

Note: This table shows the number of countries and reforms in central bank independence identified in previous works and in this paper.

For each year in which a change to the central bank charter has occurred, I recompute the value of the CBIE index. A reform is then defined as a date in which the level of the CBIE index changes. The information collected also allows me to construct the dynamic evolution of other indices of central bank independence proposed in the literature. Table 1 shows that the new index introduced in this paper captures the highest number of reforms: out of the 2,490 changes in legislation collected, 286 have changed the degree of independence of the central bank. This large number of identified reforms is due to the fact that I recompute the index in *every* year a legislative change takes place, while in previous work reforms are identified by computing the change in an index of CBI between two random (usually distant) moments in time. For example, Acemoglu et al. (2008) build a dummy variable that captures reforms by looking at the Cukierman et al. (1992) index computed at different points in time. They identify 40 major central bank legislative reforms in a sample of 52 countries over 1972-2005. This approach, however, overlooks the fact that significant changes in independence might have occurred between the dates when the indexes are computed. While this might be less important when looking at long-run inflation outcomes as they do, capturing the exact timing and magnitude of reforms is crucial in understanding the reform process. Indeed, by looking at the full set of legislative changes, I identify 286 reforms that modify the degree of central bank independence in a sample of 155 countries. This shows that CBI indices are rather dynamic over time and motivates the main empirical investigation in this paper that aims to understand the triggers of these many reforms.[12]

Figure 2 shows the distribution of reforms over time. A large number of reforms occurred

[12]Since the CBIE index also captures some new central bank characteristics, in robustness checks I employ the re-computed indices of Grilli et al. (1991) and Cukierman et al. (1992) to check that the results presented in this paper are not exclusively driven by the reforms along the new dimensions considered.

Table 2: Institutional characteristics captured by indices of central bank independence

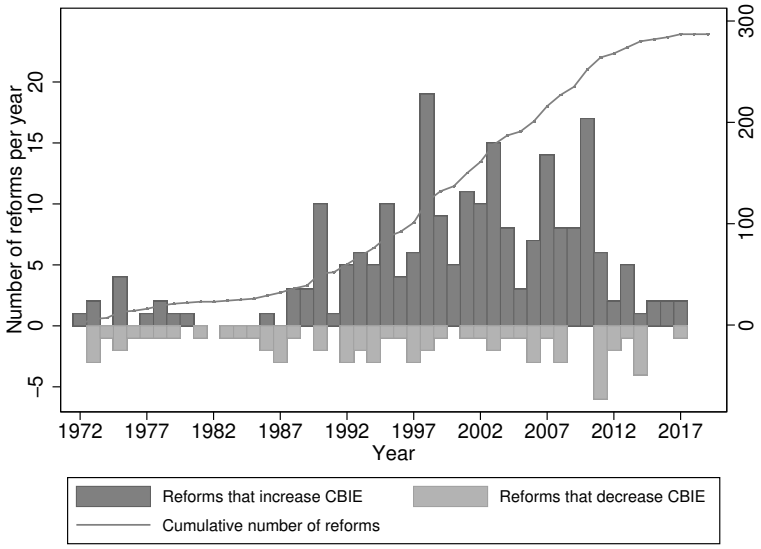
Criteria	GMT	CWN	CBIE
Governor and central bank board			
Who appoints the governor	*	*	*
Term of office of the governor	*	*	*
Reappointment option for the governor			*
Dismissal of governor		*	*
Governor allowed to hold another office in government		*	*
Qualification requirements for governor			*
Who appoints the board members	*		*
Term of office of board members	*		*
Reappointment option for board members			*
Dismissal of board members			*
Board members allowed to hold another office in government			*
Qualification requirements for board members			*
Staggering term of office for board members			*
Government representatives in the board	*		*
Monetary policy and conflicts resolution			
Who formulates monetary policy	*	*	*
Central bank responsible to fix key policy rates	*		*
Banking sector supervision	*		*
Central bank role in government's budget and/or debt	*		*
Final authority in monetary policy	*	*	*
Objectives			
Central bank's statutory goals	*	*	*
Limitations on lending to the government			
Direct credit: not automatic	*	*	*
Direct credit: market for lending		*	*
Who decides financing conditions to government		*	*
Beneficiaries of central bank lending		*	*
Direct credit: type of limit	*	*	*
Direct credit: maturity of loans	*	*	*
Direct credit: interest rates	*	*	*
Prohibition from buying government securities in primary market	*	*	*
Financial independence			
Payment of the initial capital of the central bank			*
Authorized capital of the central bank			*
Central bank financial autonomy			*
Arrangements for automatic recapitalization			*
Transfers of money from the treasury			*
Central bank approves its annual budget			*
Central bank adopt its annual balance sheet			*
Auditing agency			*
Allocation of net profits			*
Allocation of profits to a general reserve fund			*
Partial payments of dividends before the end of the fiscal year			*
Unrealized profits included in the calculation of distributable profits			*
Reporting and disclosure			
Central bank reporting			*
Central bank financial statements			*

Note: This table summarizes the set of information collected in the GMT (Grilli et al., 1991), CWN (Cukierman et al., 1992) and CBIE indices of central bank independence.

during the 1990s, with a peak in 1998, when the ECB became the unique monetary policy authority for Euro area countries.[13] A new reform wave can also be noticed following the

[13]Many former socialist economies have also adopted new central bank legislation over the 1990s (Cukierman et al., 2002). However, since the legislation prior to 1990 was not available, most of these reforms are not captured in this dataset. Hence, in most of these countries the first index of central bank independence

Figure 2: Central Bank legislative reforms (1972-2017)



Notes: This figure shows the frequency of reforms that increased/decreased the CBIE index, together with the cumulative number of reforms in central bank independence between 1972 and 2017.

2008 financial crisis, with increases mainly associated with improvements in the degree of independence along the dimension related to the governor and board, while decreases in the index corresponded to reforms regarding the involvement of central banks in banking supervision.

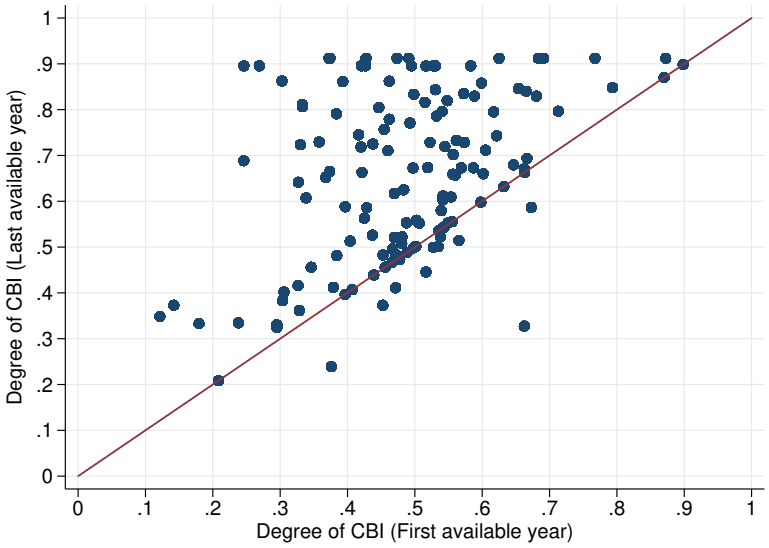
Figure 3 compares the level of central bank independence proxied by the CBIE index in 1972 (or the first year available) and 2017. As most countries cluster above the 45 degree line, there is a clear tendency towards adopting higher levels of central bank independence. One of the countries with the highest level of independence is Finland, while the lowest is in Macao. The highest drop in independence is recorded in Vietnam, which moved from 0.38 to 0.24, after a reform that took place in 1997. Similarly, Figure 4 shows the evolution of the average CBIE index by regional clusters. [14] Several regions appear to lag behind in the reform process, such as South and East Asia, the Middle East and North Africa.

Figure 5 shows the evolution of independence across the six dimensions of the CBIE index. Independence increases, on average, across all dimensions, with the highest increase in the dimension regarding the objectives of monetary policy-making, which more than doubles during the period 1972-2017. This confirms the increasing focus on the goal of price

corresponds to the one in the post-communist era.

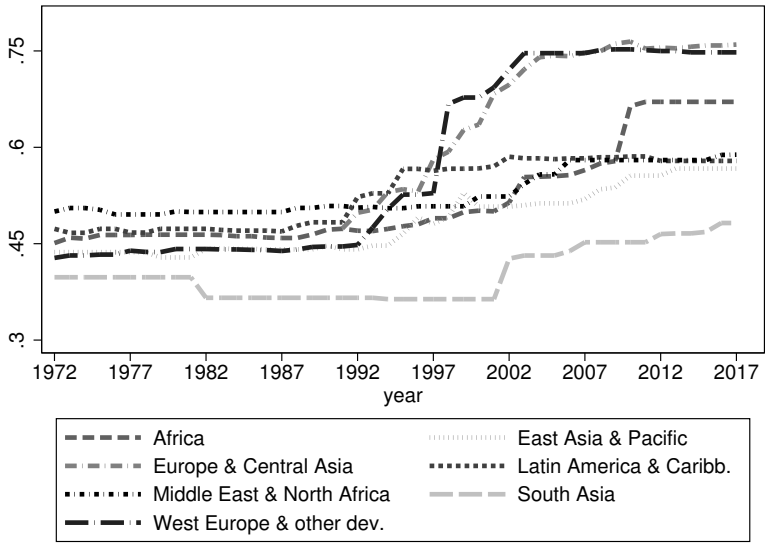
[14] Similar to Acemoglu et al. (2019), we create regional clusters by following the World Bank classification which groups countries into seven geographic regions: 1) Africa, 2) East Asia and the Pacific, 3) Eastern Europe and Central Asia, 4) Latin America and the Caribbean, 5) Middle East and the North of Africa, 6) South Asia and 7) Western Europe and other developed countries.

Figure 3: Evolution of Central Bank Independence



Notes: This figure compares the level of central bank independence proxied by the CBIE index in 1972 (or the first year available) and 2017.

Figure 4: Evolution of CBI by regions



Notes: This figure shows the evolution of the average index of CBI by regional clusters.

stability across the world over the past five decades. Central banks have also increased significantly their independence in terms of lending to the government. Interestingly, financial independence as well as reporting and disclosure were the two dimensions characterised by the highest degree of independence in the early 1970s and have only marginally increased since then.

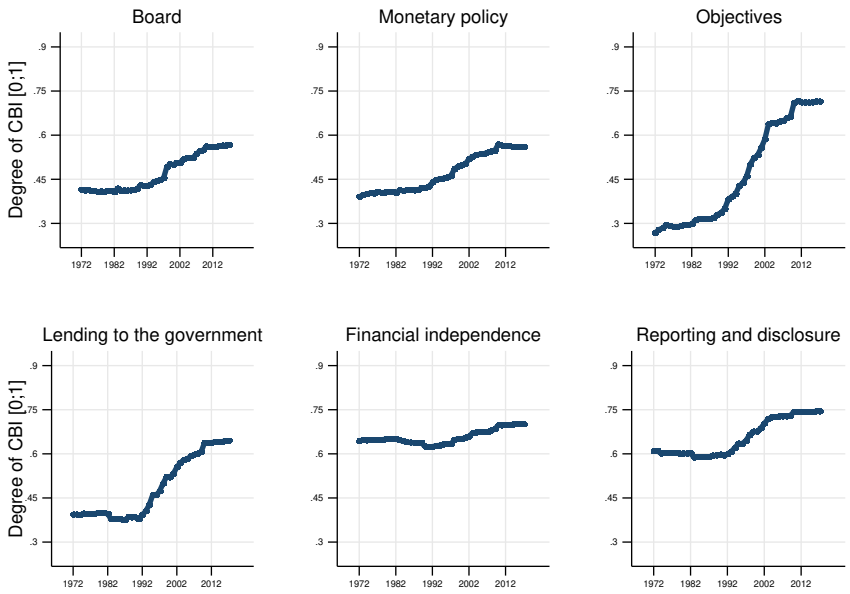
3 The political economy of reforms

This section employs a political economy perspective to highlight some potential drivers of the timing and pace of reforms in central bank design over the past half-century. Motivated by these theoretical arguments, it also describes the set of variables that proxy the potential determinants of reforms.

A classical political economy framework to study reform processes is the war of attrition model in which a political conflict between two different social groups, such as political parties, can delay the implementation of reforms (Alesina and Drazen, 1991). In Alesina and Drazen (1991), fiscal stabilization following a negative shock to government revenues is delayed because political parties disagree on how to allocate the costs of stabilization. They will thus engage in a war of attrition that delays the implementation of reforms until the passage of time reveals which group bears a higher cost of waiting.

A similar mechanism can explain reforms in central bank legislation if one assumes that an established interest group benefits from maintaining the existing level of CBI. For example, the conventional view that left-wing governments are less receptive to market-oriented

Figure 5: Evolution of CBI by subcategories (1972-2017)



The figure shows the evolution of the average degree of independence of the different dimensions of the CBIE index. *Board* relates to governor and central bank board; *Monetary policy*: monetary policy and conflicts resolution. *Objectives*: monetary policy objectives. *Lending to the government*: limitations on lending to the government. *Finances independence*: financial independence. *Reporting and disclosure*: reporting and disclosure.

reforms suggests that these governments may resist increasing the degree of independence of the central bank since this reduces their ability to monetize fiscal deficits (Alesina and Roubini, 1992). Moreover, uncertainty about the outcome of reforms can also explain why countries prefer maintaining the status quo (Fernandez and Rodrik, 1991). Thus, conflicting political interests coupled with some uncertainty about the cost or benefits of reforming central banks can lead to a war of attrition game that can explain why some countries do *not* reform their central bank legislation. Then what triggers a reform?

Theories of reforms suggest several factors that may explain the timing of reforms as a function of politico-economic characteristics of a country (Drazen, 2000; Abiad and Mody, 2005; Alesina et al., 2006). These can be broadly grouped in several categories, including: (i) status quo bias; (ii) external inducements; (iii) crises and shocks; (iv) ideology, political structure and institutional environment; and (v) economic conditions. I briefly discuss how each of these factors can impact the probability of reforming central bank statutes.

(i) *Status quo bias.* The previous level of central bank independence can be a proxy for incentives in favor or against the implementation of reforms, in particular if reforms are a multistage process. On the one hand, early reforms can reveal information about the policy regime in place and, in turn, diminish the political opposition to reforming. On the other hand, in countries with low central bank independence, governments may oppose reforms that reduce their ability to monetize fiscal deficits. I include the lagged level of the index to identify the existence of convergence toward some possible country-specific level of central bank independence. Moreover, since the CBIE index is bounded between 0 and 1, controlling for its lagged value allows us to account for the fact that reforms in countries with already high levels of independence might be smaller in magnitude.

(ii) *External inducements.* International institutions or foreign aids can provide an equally important incentive to reform. For example, binding agreements with international lenders like the IMF or the World Bank often require countries to commit to a particular set of policies. Among these, granting more independence to the central bank is often suggested (Gutierrez, 2003; Rodrik and Bank, 2006). Empirical evidence on the ability of such international institutions to provide the incentives to implement long-lasting reforms is mixed. For example, Alesina et al. (2006) find weak support for fiscal stabilization reforms following IMF programs, while Abiad and Mody (2005) and Gokmen et al. (2020) find a positive impact of IMF programs on the probability of undertaking reforms to liberalize financial markets or international trade. On the other hand, Kern et al. (2019) show that

IMF loan conditionality plays a critical role in promoting central bank independence. I thus employ a dummy variable that takes value one in the two years following an IMF agreement.

A second variable is represented by a monetary union dummy that takes value one in the five years prior to joining a monetary union. This second proxy is motivated by the reform process that took place in the EU, as prior to joining the European Monetary Union, countries are required to grant more independence to their central bank in order to align with the charter of the European Central Bank that follows the best practices in central bank independence.

Another type of external pressure can come from regional clustering, which is often found to be cohesive of certain types of reform processes such as democratisations and economic liberalisations (Simmons and Elkins, 2004; Elhorst et al., 2013; Giuliano et al., 2013; Acemoglu et al., 2019). As such, countries might also reform their central bank design following other countries in their region. To capture this effect, I assume that the farther a country is from the average level of CBI in its region, the higher the impetus for reforms to catch-up. Hence, regional pressure is computed as the difference between the average level of independence of other countries in the region and a country's own level of independence.

(iii) *Crises and shocks.* Conventional wisdom states that "it takes a crisis to reform". The prevailing view is that economic and financial crises lower the cost of reforming structural problems as the public is more willing to bear the pains associated with such reforms (Drazen, 2000; Masciandaro et al., 2008). For example, numerous country studies highlight the importance of episodes of hyperinflation in shaping monetary policy institutions (Alesina and Summers, 1993; Hayo, 1998). Similarly, in the wake of financial crises, uncertainty about monetary policy might increase uncertainty about the financial sector, worsening the crisis. As a result, policymakers could modify the degree of independence of the central bank as a way of stabilizing the economy (Alesina and Stella, 2010). For example, following the 2008 global financial crisis, many governments have increased the involvement of central banks in banking and financial sector supervision (Masciandaro and Romelli, 2018). In line with these theoretical arguments, Alesina et al. (2006) find that countries are more likely to stabilize their government deficits during crisis periods, while Abiad and Mody (2005) show that financial sector liberalization reforms tend to occur following balance of payments crises, but are less likely after banking crises episodes. Gokmen et al. (2020), on the other hand, find no evidence for the crisis hypothesis in driving

economic and financial reforms.

Four types of crises and shock episodes are likely to shape the design of monetary policy institutions: financial, currency and sovereign debt crises, as well as severe inflationary episodes with annual inflation rates higher than 20% (see Reinhart and Rogoff, 2004). Each episode is captured through an indicator variable taking the value one if the country has experienced such a crisis in the two years prior to a reform.

(iv) *Ideology, political structure and institutional environment.* Reforms are also more likely following elections that lead to a political consolidation or to changes in the government. For example, only four days after the start of Tony Blair's mandate in 1997, his new Chancellor, Gordon Brown, announced the government's intention to implement the "most radical internal reform to the Bank of England since it was established in 1694". To capture political instability I follow Giesenow et al. (2020) and use two dummy variables from the Cross-National Time-Series Database: one for changes in the cabinet and one indicating the occurrence of a government crisis (Banks and Wilson, 2021). In addition, I control for the degree of political fractionalisation of the government.

The level of democracy has also been shown to have a positive impact on the likelihood of implementing economic reforms in a country (see Giuliano et al., 2013, among others).

Furthermore, reforms might be less likely in countries where the degree of independence of the central bank is already entrenched in the constitution.[15] This is due not only to the fact that amending constitutional provisions requires a larger majority than normal law, but also that countries characterised by a more independent central bank might already have the autonomy of its monetary policy institution entrenched in the constitution. To construct a measure that captures the constitutional provisions on central bank independence, I collected all the constitutions in force in a country since the 1970s (or first year available for younger countries). I then created a dummy variable which takes the value of one whenever the independence of the central bank is entrenched in the constitution.

(v) *Economic conditions.* Finally, while crises or periods of instability can potentially reduce the costs of reforms, the opposite view might apply as well. Reforms could also occur during periods of growth since wealthier economies may find it easier to compensate the potential losers of reforms (Giuliano et al., 2013; Alesina et al., 2020). To capture periods of significant economic growth, I construct a dummy equal to 1 if GDP growth in

[15] Gutierrez (2003) documents that, in the late 1980s and early 1990s, several Latin American countries have reformed their constitution by introducing provisions explicitly establishing the autonomy of the central bank.

the last two years has exceeded the average over the last 10 years.

Similarly, the degree of internationalization of a country and/or its willingness to attract international capital may influence the likelihood of reforms. Cukierman et al. (2002) argue that the negative relationship between CBI and inflation is connected to the implementation of other sound economic policies together with central bank legislative reforms. Similarly, Bodea and Hicks (2015a) suggest that governments' decision to reform central bank legislation might be connected to the willingness of a country to attract more foreign investors. In such environments, one might expect that the benefits of reforming are higher in economies that are more globalized. I include the change in the KOF Economic Globalisation index as a proxy for the implementation of other economic reforms that render an economy more open.

Previous studies have also documented that the debt-to-GDP ratio of a country might influence the probability of reforms (see Giesenow et al., 2020). As the dimension on the limitations on lending to the government represents an important component of our index, we also control for the ratio of debt-to-GDP of a country.

I describe the construction of all these variables in Appendix Table B.1. Appendix Table B.2 provides some summary statistics.

4 Determinants of reforms in central bank design

The baseline empirical strategy investigates the determinants of reforms in central bank design, where a reform is defined as the change in the CBI index over time: $\Delta CBIE_{i,t} = CBIE_{i,t} - CBIE_{i,t-1}$. The model estimated is as follows:

$$\begin{aligned} \Delta CBIE_{i,t} &= \beta_1 Status\ quo_{i,t-1} + \beta_2^{'}\phi^{External\ pressure} + \beta_3^{'}\phi^{Crisis} + \\ &+\beta_4^{'}\phi^{Politics} + \beta_6^{'}\phi^{Economic} + \alpha_i + \tau_t + \epsilon_{i,t}, \end{aligned} \tag{1}$$

where $Status\ quo_{i,t-1}$ is the lagged level of the index, $\phi^{External\ pressure}$ is the vector of external inducement variables; ϕ^{Crisis} is the vector of crisis variables; $\phi^{Politics}$ is a vector of political characteristics; and $\phi^{Economic}$ is the vector of economic variables. Most independent variables enter with a lag in Eq. (1) to reduce endogeneity concerns and reflect how conditions prior to the reform impacted the policy change. Eq. (1) also controls for country and year fixed effects to account for convergence to a country-specific level of CBI, as well as the existence of waves of reforms that occur in all countries in a given year.

Table 3: Drivers of reforms in central bank design

	(1)	(2)	(3)	(4) Advanced	(5) Developing
Status quo	-0.039***	-0.038***	-0.056***	-0.218**	-0.038*
	(0.014)	(0.014)	(0.018)	(0.089)	(0.020)
Regional pressure	0.045***	0.046***	0.042*	-0.137	0.080***
	(0.017)	(0.017)	(0.022)	(0.088)	(0.023)
IMF Programs	0.004***	0.003***	0.004***	0.007	0.004**
	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)
Monetary Union	0.044***	0.045***	0.042***	0.044***	0.022
	(0.006)	(0.006)	(0.006)	(0.009)	(0.014)
Financial Crisis		-0.001	-0.001	-0.001	0.001
		(0.002)	(0.002)	(0.004)	(0.003)
Currency Crises		-0.001	-0.001	0.008	-0.001
		(0.002)	(0.002)	(0.010)	(0.003)
Sovereign Debt Crisis		0.006	0.008	0.006	0.008
		(0.005)	(0.006)	(0.006)	(0.006)
Inflationary episodes		0.003**	0.005**	-0.008	0.005*
		(0.001)	(0.002)	(0.005)	(0.003)
Cabinet change			0.004	0.013*	0.002
			(0.003)	(0.007)	(0.004)
Government Crisis			0.002	0.001	0.004
			(0.002)	(0.003)	(0.002)
$\text{Polity}_{i,t-1}$			0.001	-0.002	0.001
			(0.000)	(0.002)	(0.000)
$\text{Constitution}_{i,t-1}$			-0.009		-0.008
			(0.006)		(0.007)
Government Fractionalization			0.002	-0.017*	0.009**
			(0.004)	(0.010)	(0.005)
GDP Growth dummy			0.002	0.005*	0.001
			(0.002)	(0.003)	(0.002)
Δ Econ. $\text{Globalization}_{i,t-1}$			0.001**	-0.001	0.001**
			(0.000)	(0.001)	(0.000)
$\text{Debt to GDP}_{i,t-1}$			-0.001	0.001	-0.001
			(0.000)	(0.000)	(0.000)
Observations	5,592	5,592	3,886	1,044	2,842
Number of countries	151	151	133	33	108
R-squared	0.099	0.101	0.118	0.315	0.107

The dependent variable is $\Delta CBIE_{i,t}$. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. In Columns (4) and (5), the sample is restricted to advanced and developing countries, respectively. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Furthermore, as the dependent variable is highly persistent, the error terms may exhibit serial correlation. To control for this, standard errors are clustered at the country level.[16]

The results of this baseline specification are presented in Table 3. Columns (1) to (3) gradually add the sets of covariates discussed in Section 3. Column (1) shows that status

[16] The Durbin-Watson statistic generalised by Bhargava et al. (1982) for fixed effects model in Table 3, column (3) is 1.97, which suggests that there is little evidence of serial correlation when we cluster the standard errors at the country level.

quo and external pressure are important drivers of reforms. Specifically, countries with lower levels of CBI adopt larger reforms in central bank design. External pressure appears equally important. The positive and significant sign of *Regional pressure* suggests that countries farther from the average level of CBI in their region implement larger reforms. Reforms also follow the participation in IMF loan programs. This confirms anecdotal evidence that central bank legislative reforms were often one of the conditions imposed by the IMF or the World Bank for the disbursement of loans (Gutierrez, 2003). The new index built in this paper provides systematic evidence of the importance of these international institutions in influencing institutional reforms over a large period of time.[17] The results in column (1) also confirm the positive relationship between reforms in CBI and joining monetary unions, which is mainly driven by countries joining the European Monetary Union.

Column (2) considers the effect of crises. I find no evidence suggesting that periods of distress in the financial sector, currency crises or sovereign debt crises drive reforms in central banking. However, the inflationary episodes dummy is positive and significant, suggesting reforms in CBI follow periods characterised by high inflation rates. This provides the first piece of evidence on the endogeneity of the evolution of central bank design, and suggests that central banks are made more independent as a response to high rates of inflation. Column (3) adds the full set of politico-economic characteristics. These additional controls have little explanatory power in the reform process of central banks, with the exception of the change in the index of economic globalization, which suggests countries that become more globalized are more likely to also increase their level of central bank independence.[18]

In Columns (4) and (5) in Table 3, the sample is split between advanced and developing countries, following the OECD classification. This distinction is useful in understanding whether the results obtained are driven by a specific cluster of countries. Several important differences emerge from this split sample analysis. First, among advanced economies, changes in government seem to matter in the reform process, while the strong effects of

[17] Berggren et al. (2016), on the other hand, find that obtaining an IMF loan increases the time it takes to reform. Their dependent variable is the number of years between 1980 and a reform year, where the reform year is self-reported by central banks through a survey. It is not clear, however, whether this self-reported measure captures the date of the largest reform or the latest reform. It also does not capture the magnitude of reforms as done in this paper.

[18] In Online Appendix Table OnlineApp.C.3 we include in separate regressions all the various subcomponents of the KOF index of globalisation. These additional results suggest that only reforms related to economic globalisation, i.e. trade and financial globalisation and not other dimensions of the KOF index such as social or political globalisation, are related to reforms in central banking.

regional pressure and IMF loan programs appear driven mainly by developing economies (see column (5)). Second, reforms that increase the level of CBI follow periods of high economic growth in developed countries. Together with the low explanatory power of the crisis proxies, this evidence provides support for the argument that periods of boom foster reforms in advanced economies as richer countries might have more resources to compensate the potential losses from the reform (Giuliano et al., 2013). Finally, the statistically significant effect of inflationary episodes or changes in economic globalization is driven by the sample of developing countries.

Overall, the evidence presented in Table 3 points to a strong effect of status quo, external factors and inflation crises in explaining reforms in central bank design, with macroeconomic or political conditions playing a lesser role. Moreover, a split sample analysis by the level of development shows important differences between advanced and developing countries in the drivers of the reform process in central bank design.

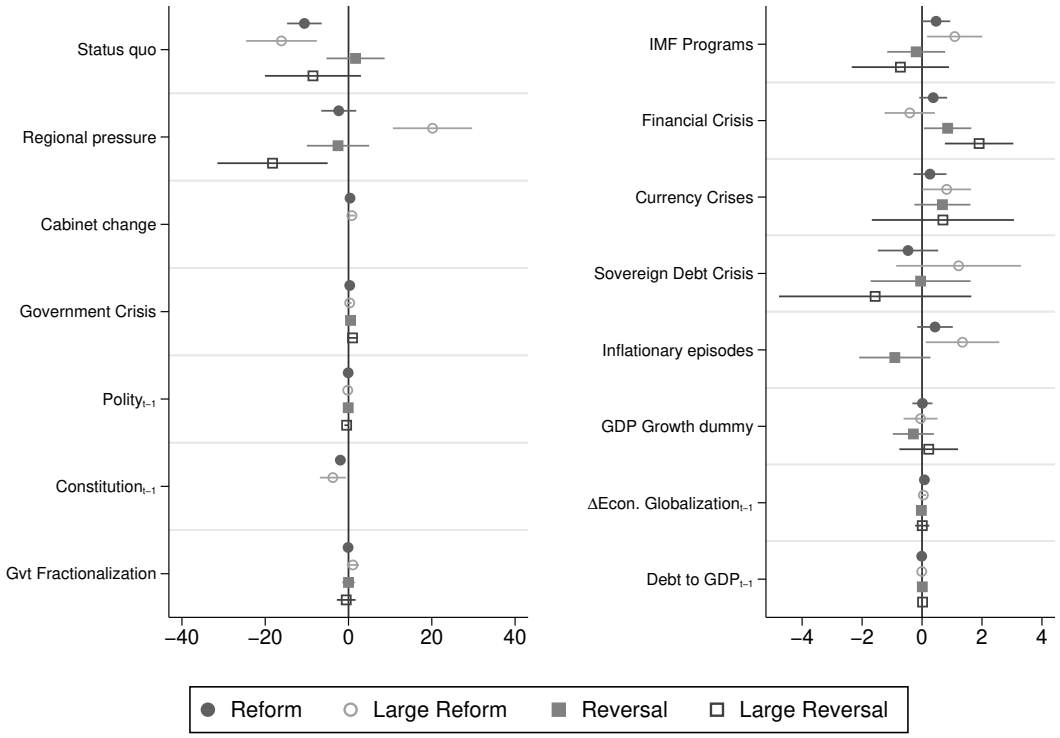
4.1 Direction and magnitude of reforms

The extended index of central bank independence constructed in this paper allows us to identify the exact magnitude and direction of reforms at each moment the central bank legislation is amended. As such, a natural question is whether the determinants of reforms, as previously identified, can explain both reforms that increase as well as those that decrease the level of independence. This section investigates the probability of adopting a positive or a negative reform by constructing dummy variables equal to 1 in years when $\Delta CBIE$ is positive or negative, respectively. Furthermore, as not all reforms constitute large changes in central bank independence, additional dummy variables capturing large reforms and large reversals are constructed, taking the value of one if the change in CBIE is larger than the median increase/decrease of the index among regional peers. The model estimated is as follows:

$$\begin{aligned} Prob(Reform_{i,t} = 1) \quad = \quad & F(\beta_2 Status\ quo_{i,t-1} + \beta_2^{'}\phi^{External\ pressure} + \beta_3^{'}\phi^{Crisis} + \\ & + \beta_4^{'}\phi^{Politics} + \beta_6^{'}\phi^{Economic} + \epsilon_{i,t}), \end{aligned} \tag{2}$$

where $Reform_{i,t}$ is a reform dummy as defined above. The methodology to estimate Equation (2) is determined by the shape of the cumulative distribution function, $F(\cdot)$. Under a standard logit estimation, $F(\cdot)$ is the cumulative logistic distribution, $F(z) = exp(z)/(1 + exp(z))$. However, since episodes of reforms occur irregularly (95% of the

Figure 6: Sign and magnitude of reforms



The figure shows the coefficient of the estimates of Equation (2), where the dependent variable is an indicator variable equal to one in years in which the CBIE index changes. Reform refers to the model where the dependent variable is equal to one in the years where the CBIE index increases, while Large Reform includes only increases in the degree of CBI greater than the median increase in a sample of peer countries. Reversal refers to reforms that decreased the level of the CBIE index, while Large Reversal is a dummy that takes the value one in years where reversals are greater than the median reversal in independence among peer countries. See Online Appendix Table OnlineApp.C.1 for the details of the estimations. 90% confidence intervals are shown.

sample is zero), $F(\cdot)$ is asymmetric. As such, a complementary logarithmic (or cloglog) framework is most appropriate by assuming that $F(\cdot)$ is the cumulative distribution function of the extreme value distribution: $F(z) = 1 - exp[-exp(z)]$.

Figure 6 shows the coefficient estimates for the clogclog model in Equation (2) for each type of reform dummy. The results when looking at the probability of implementing positive and large reforms are broadly consistent with the baseline estimations in Table 3. This is expected given the overall trend towards increasing the level of CBI across the world documented in section 2.2. Furthermore, as expected, the coefficient of the lagged value of the index is much larger in magnitude when we look at large reforms, suggesting these are disproportionately less likely in countries already characterized by high levels of independence. At the same time, regional pressure and inflationary episodes seem to matter less when we only look at the probability of adopting positive reforms, while countries with

high levels of democracy (captured by the Polity index) are less likely to further increase their degree of central bank independence. In addition, we find a negative and statistically significant effect of the Constitution dummy for both positive and large reforms, suggesting that changes to central bank design are less likely in countries where the concept of central bank independence is entrenched in the Constitution.

However, the most important differences emerge when restricting the attention to episodes that decrease the degree of CBI. First, the lagged value of the index is not significant for either reversals or large reversals. This implies that the internal pressure to reform is mainly driving legislative changes that increase the level of independence. Second, the variable capturing regional pressure loses its significance for reversals, but becomes negative and statistically significant for large reversals, suggesting that large reversals are less likely in countries with levels of independence far from regional peers. In addition, neither obtaining an IMF loan nor joining a monetary union is associated with decreases in central bank independence. Finally, financial crises, which had little impact on increasing the level of independence, do seem to influence the probability of reducing CBI. This is in line with the findings in Masciandaro and Romelli (2018), who show that crises increase the likelihood of assigning the responsibility of financial sector supervision to central banks, which, in the CBIE index, would correspond to a reduction in independence.

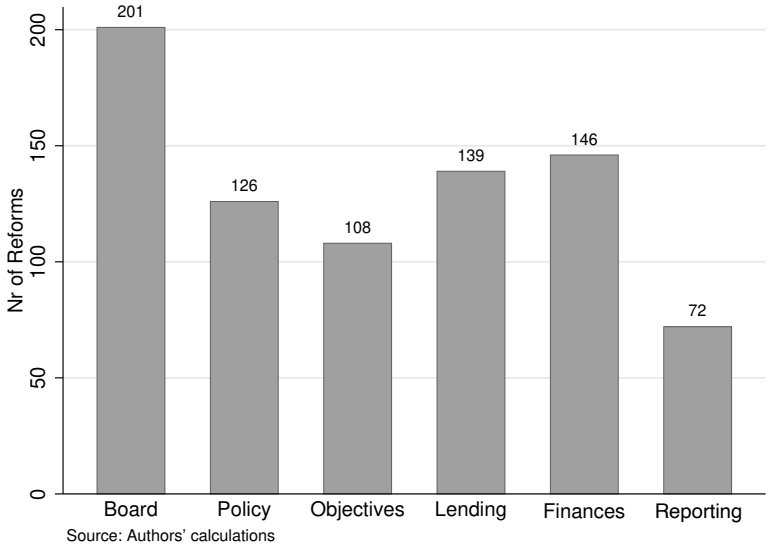
Overall, these results stress the richer implications derived when looking at the size and sign of reforms. The next section takes the analysis further by looking at amendments adduced to specific sections of the central bank charter.

4.2 Types of reforms

The construction of a dynamic index of central bank independence has highlighted the large number of changes to the design of these institutions over the past five decades. However, one might wonder whether reforms shape all aspects of the institutional framework of central banks or are mainly focused on a particular function. I explore this possibility by looking at the drivers of reforms along the six categories of the CBIE index: 1) Governor and central bank board, 2) Monetary policy and conflict resolution, 3) Objectives, 4) Limitations on lending to the government, 5) Financial independence and 6) Reporting and disclosure. I first compute the independence score for each of these six subcategories and normalize it between 0 and 1. Then, similar to the baseline analysis, the dependent variable is the change in the level of central bank independence between years t and $t-1$

in country i, for each dimension d of the CBIE index.

Figure 7: Legislative reforms by subcategories (1972-2017)



Each bar indicates the number of reforms undertaken for the different dimensions of the CBIE index. *Board* relates to governor and central bank board; *Policy*: monetary policy and conflict resolution. *Objectives*: monetary policy objectives. *Lending*: limitations on lending to the government. *Finances*: financial independence. *Reporting*: reporting and disclosure.

Figure 7 displays the distribution of reforms across the six dimensions of the index over the period 1972-2017. Reforms related to central bank governance (Governor and central bank board) are the most common, while those related to reporting and disclosure are the least common. Moreover, out of the 42 questions codified in the construction of the index, the one that has been modified the most is the one on the objectives of monetary policy. This suggests that the reforms captured modify significant aspects of the functioning of central banks and confirms the increasing focus on the goal of price stability over the past five decades.

The results pertaining to the OLS model in Equation (1) for each dimension of the CBIE index are presented in Table 4. To obtain consistent econometric tests, I also recompute the proxy for regional pressure for each dimension. The proxy for status quo is still strongly significant across all specifications. The results for the other covariates are broadly similar to the ones obtained for the aggregated CBIE index in Table 3, with a few notable differences. First, the regional pressure proxy seems to mainly boost reforms related to monetary policy and conflict resolutions and conditions on lending to the government, that are among the subcategories that have been characterised by the highest improvements in the last five decades (see Figure 5 above). Obtaining an IMF loan matters for reforms

Table 4: Drivers of reforms by sub-categories

	(1) Δ Board	(2) Δ Mon. Policy	(3) Δ Objectives	(4) Δ Lending	(5) Δ Financial Ind.	(6) Δ Reporting
Status quo	-0.059***	-0.066***	-0.065***	-0.051**	-0.024**	-0.030**
	(0.018)	(0.021)	(0.024)	(0.021)	(0.012)	(0.011)
Regional pressure	0.005	0.034*	0.038	0.060**	-0.002	0.010
	(0.017)	(0.020)	(0.025)	(0.025)	(0.013)	(0.012)
IMF Programs	0.002	0.005**	0.007	0.010***	-0.001	0.001
	(0.002)	(0.002)	(0.005)	(0.003)	(0.001)	(0.001)
Monetary Union	0.054***	0.033***	0.049***	0.060***	0.007	0.002
	(0.006)	(0.006)	(0.009)	(0.012)	(0.004)	(0.006)
Financial Crisis	0.001	-0.003	-0.003	0.001	-0.002**	0.002
	(0.003)	(0.002)	(0.005)	(0.005)	(0.001)	(0.002)
Currency Crises	-0.001	-0.003	-0.007	0.003	0.001	0.004
	(0.002)	(0.002)	(0.005)	(0.006)	(0.001)	(0.002)
Sovereign Debt Crisis	0.006	0.005	0.018	0.009	-0.001	-0.001
	(0.006)	(0.004)	(0.012)	(0.011)	(0.002)	(0.002)
Inflationary episodes	0.007***	0.002	0.009*	0.008*	0.001	-0.001
	(0.002)	(0.002)	(0.005)	(0.004)	(0.001)	(0.002)
Cabinet change	0.004	0.004	0.006	0.005	-0.001	-0.001
	(0.004)	(0.003)	(0.006)	(0.006)	(0.001)	(0.001)
Government Crisis	0.001	0.005**	-0.001	0.004	-0.002**	-0.001
	(0.002)	(0.002)	(0.004)	(0.004)	(0.001)	(0.001)
$\text{Polity}_{i,t-1}$	-0.001	0.001	-0.001	0.001*	0.001***	-0.001
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
$\text{Constitution}_{i,t-1}$	-0.013**	-0.005	-0.011	-0.013**	-0.004***	-0.001
	(0.006)	(0.010)	(0.016)	(0.006)	(0.001)	(0.002)
Government Fractionalization	0.002	0.001	0.011	0.003	0.001	-0.002
	(0.004)	(0.003)	(0.009)	(0.009)	(0.001)	(0.003)
GDP Growth dummy	-0.001	0.001	0.003	0.005	-0.001	0.002*
	(0.002)	(0.002)	(0.004)	(0.003)	(0.001)	(0.001)
Δ Econ. $\text{Globalization}_{i,t-1}$	0.001	0.001	0.002***	0.001	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
$\text{Debt to GDP}_{i,t-1}$	-0.001	-0.001**	-0.001*	-0.001	0.001**	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,886	3,886	3,886	3,886	3,886	3,886
Number of countries	133	133	133	133	133	133
R-squared	0.114	0.095	0.098	0.100	0.042	0.041

The dependent variable is the change in dimension d of the CBIE index, $\Delta\text{CBIE}_{d,i,t}$. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

related to monetary policy and lending, but not for the two new categories added by the CBIE index, i.e. finances and reporting. This might be related to the set of guidelines used by the IMF to provide technical assistance to countries, where marginal importance is assigned to financial independence and reporting and disclosure (Lybek, 1999). Second, in previous sections financial crises were shown to increase the likelihood of reducing the degree of central bank independence. This is confirmed in Column (5) that shows that financial crises are likely to be followed by reductions in financial independence. These reforms mainly concern the increase in the distribution of profits to the Government, which are likely to decrease the degree of independence on the central bank. While much anecdotal evidence discusses these trends in central bank design following financial crises, this is the first paper to document these empirical patterns in a large cross-section of countries.

Finally, periods of high inflation are followed by reforms related to the board composition, objectives and lending to the government, but, surprisingly, not those related to the conduct of monetary policy.

4.3 Democratization and reforms

Previous studies have documented how structural reforms and democratization sometimes come in waves (see Giavazzi and Tabellini, 2005; Giuliano et al., 2013; Acemoglu et al., 2019, among others). The results presented so far do not show a strong effect of democracy, as captured by the Polity2 index. However, the ordinal nature of this index does not reflect a clear distinction between authoritarian regimes and democracies. To overcome this issue, I follow Giavazzi and Tabellini (2005) and create a democracy dummy variable that takes the value of one for strictly positive values of the Polity2 score.

The results using this alternative definition of democracy are presented in Table 5, Column (1) for the full sample, and Column (2) for the sample of developing countries, respectively. While the effect of the other covariates remain robust to the inclusion of this alternative measure, the democracy dummy variable in Columns (1) and (2) is still not statistically significant.

An alternative approach is to analyze whether episodes of democratization are followed by changes in the institutional design of central banks. To do so, I create a dummy variable that takes the value of one in the first year in which a country moves from an autocracy (corresponding to a polity2 value lower or equal to 0) to a democracy (strictly positive values of polity2).

The results employing this alternative proxy of democracy are presented in Columns (3) and (4), for the full sample and developing countries, respectively. The positive and statistically significant sign of the democratic reform dummy variable across all specifications implies that the process of democratization is accompanied by reforms in central bank institutional design. This suggests that the degree of independence of monetary policy institutions is an important aspect of the process towards a full democracy.

Furthermore, the emergence of populists parties in recent years has brought, once again, monetary policy and the role of central banks to the centre of the political debate (The Economist, 2019). To test whether nationalistic political parties might affect the degree of independence of their central bank, I employ a measure that captures changes in the degree of countries' nationalism orientation following Agur (2018). Δ *Nationalism*

Table 5: Central bank design and democracy

	(1)	(2) Developing	(3)	(4) Developing	(5)	(6) Developing
Status quo	-0.057***	-0.039*	-0.057***	-0.035*	-0.070***	-0.078***
	(0.018)	(0.020)	(0.018)	(0.020)	(0.023)	(0.025)
Regional pressure	0.042*	0.080***	0.041*	0.083***	0.041	0.066**
	(0.022)	(0.023)	(0.022)	(0.023)	(0.027)	(0.028)
IMF Programs	0.004***	0.004**	0.005***	0.005**	0.006***	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Monetary Union	0.042***	0.022	0.042***	0.022	0.041***	0.024
	(0.006)	(0.014)	(0.006)	(0.014)	(0.006)	(0.015)
Financial Crisis	-0.001	0.001	-0.001	0.001	0.001	0.005
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Currency Crises	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
Sovereign Debt Crisis	0.008	0.008	0.007	0.007	0.009	0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.009)
Inflationary episodes	0.005**	0.005*	0.005**	0.004*	0.009***	0.008**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)
Cabinet change	0.004	0.002	0.005	0.002	0.007	0.003
	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.005)
Government Crisis	0.002	0.004	0.001	0.003	0.001	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$\text{Democracy}_{i,t}$	0.003	0.003				
	(0.004)	(0.004)				
$\text{Democratic Reform}_{i,t}$			0.029**	0.029**		
			(0.014)	(0.014)		
Δ Nationalist Index					-0.023***	-0.026**
					(0.007)	(0.010)
$\text{Constitution}_{i,t-1}$	-0.009	-0.008	-0.008	-0.007	-0.006	-0.003
	(0.006)	(0.007)	(0.006)	(0.007)	(0.009)	(0.010)
Government Fractionalization	0.002	0.009*	0.003	0.010**	-0.001	0.007
	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.007)
GDP Growth dummy	0.002	0.001	0.002	0.001	0.004**	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Δ Econ. $\text{Globalization}_{i,t-1}$	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
$\text{Debt to GDP}_{i,t-1}$	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,883	2,839	3,882	2,838	3,056	2,049
Number of countries	133	108	133	108	124	99
R-squared	0.118	0.107	0.124	0.115	0.132	0.131

The dependent variable is $\Delta CBIE_{i,t}$. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial,Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. In Columns (2), (4) and (6), the sample is restricted to developing countries. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Index in Columns (5) and (6) of Table 5 represents the change in the Nationalist Index from the World Bank Database of Political Institutions. The negative and statistically significant sign of this populism proxy confirms the idea that populist waves may undermine the degree of CBI (see Masciandaro and Passarelli, 2019; Binder, 2021, among others).

4.4 Robustness tests

This section presents several robustness tests of the main results in the previous sections. First, Appendix Figure C.1 shows that the main results do not hinder on the construction

of the dependent variable by considering alternative aggregation methods to construct the CBIE index. Specifically, instead of the equal weights for the six dimensions employed in the main analysis, weights are assigned based on (i) propensity score matching and (ii) the weighting scheme proposed in Jacome and Vazquez (2008). The results in Appendix Figure C.1 are not sensitive to the weighting scheme and suggest the same drivers of reforms in central bank design.

Furthermore, the results are also robust to employing alternative definitions of central bank independence. In particular, Appendix Table C.3 re-estimates the baseline results using restricted versions of the CBIE index. First, columns (1)-(3) exclude the new dimensions on financial independence and disclosure, focusing therefore on the characteristics typically employed in previous literature such as governance, objectives and lending to the government. This robustness test ensures that the main results are not driven by reforms along the new elements of central bank design included in the CBIE index.[19] Second, columns (4)-(6) show the robustness of our results when excluding the information related to the degree of central bank involvement in banking supervision. The construction of the CBIE index follows Grilli et al. (1991) who assume that the involvement of the central bank in banking supervision decreases its independence. However, as discussed in Masciandaro and Romelli (2018), two conflicting views on the impact of the involvement of central banks in supervision exist in the literature. On the one side, the integration view recognises the informational advantages and economies of scale derived from bringing all functions under the authority of the central bank (Peek et al., 1999). On the other hand, the separation argument highlights the higher risk of policy failure, as financial stability concerns might impede the implementation of optimal monetary policies (Ioannidou, 2005). Under this second argument, being responsible for banking supervision decreases independence, as central banks involved in both monetary policy and supervision might face a conflict of interest, which could affect the optimal conduct of monetary policy. While the construction of the CBIE follows this separation argument, columns (4)-(6) of Appendix Table C.3 show that our results are qualitatively the same when central bank involvement in supervision is excluded from the index.

In a final robustness check with regards to the definition of independence, I recalculate the indices of CBI in Grilli et al. (1991), Cukierman (1992), Jacome and Vazquez (2008) and Dincer and Eichengreen (2014) employing the dataset constructed in this paper for

[19]Table C.2. in the Online Appendix replicates the results in Figure 6 that looks at the magnitude of reforms using this restricted CBIE index.

the entire sample of countries and an extended time period. Appendix Table C.4 shows the main results are robust using these alternative indices, which suggests that the drivers of reforms identified correspond to important changes in central bank design that are also captured in other indices proposed in the literature.

Next, throughout the analysis, higher levels of central bank independence were robustly related to the probability and magnitude of subsequent reforms. It might be the case that other determinants of reforms also depend on past levels of independence. To check this hypothesis, Columns (1)-(3) of Table C.5 include interaction terms between the lagged level of the CBIE index and the external inducement variables. These interaction terms are negative and statistically significant, suggesting that the external pressure to reform is important at lower levels of independence and less so when CBI is already high. Similarly, and in spite of the limited role played by the Polity index in driving reforms, the level of democracy of a country might have an indirect effect through the other drivers of reforms[20]. To control for this, in Appendix Table C.5, columns (4)-(6), we introduce an interaction term between the Polity index and the main drivers of reforms. Interestingly, the coefficients for the regional pressure and IMF Programs remain positive and statistically significant, while the interaction terms between these variables and the Polity index are not statistically different from zero. The dummy for Monetary Union is negative, and the interaction term is positive. These results suggest that the effect of joining a currency union on central bank design is strongest among the most democratic countries. Again, this result is most likely driven by countries joining the European Union.

The results are also robust to the inclusion of the size of the IMF loan relative to GDP as opposed to a dummy variable (see Table C.6). Furthermore, while the results do not point to a strong effect of financial, currency or sovereign debt crises, a potential concern is that the proxy for IMF programs may capture these effects, as IMF interventions are likely to follow these crisis episodes. I check if this is the case through a placebo test that assigns a random date for IMF programs. Columns (3) and (4) in Table C.6 show that the randomized IMF programs are not significant, confirming the importance of the external inducement played by the IMF. At the same time, the significance of the crises proxies remain unchanged.

The literature on the drivers of reforms has also suggested that reforms often come together. For example, Rode and Gwartney (2012) show how transitions to democracy are

[20]For example, Bodea and Hicks (2015b) investigate the effect of democracy on money supply and inflation and find that the effect of CBI on inflation expectations is unlikely to hold in nondemocratic countries.

associated with improvements in economic liberalization. Similarly, Mierau et al. (2007) show that improvements in the economic freedom of a country increase the likelihood of gradual fiscal policy adjustments. Similarly, Lavigne (2011) finds that, in advanced economies, institutional quality as captured by the rule of law favours the implementation of larger and more persistent fiscal policy adjustments. In addition, as noted in Obstfeld et al. (2010), reserve accumulation is a key tool for managing domestic financial instability as well as exchange rates in a world of increasing financial globalization. In such a setting, the level of international reserves to GDP might act as an additional proxy for the economic environment of a country and pressure to reform. Appendix Figure C.2 shows the robustness of our baseline results to the inclusion of additional control variables employed in the literature on reform processes. These include: the rule of law, reserve-to-GDP ratio and change in the economic freedom index from the Fraser Institute. We present the results for the full sample, a subset of developing countries, as well as a subsample that excludes the countries which joined the euro area and which had, in most cases, to undertake reforms which improved the degree of independence of their monetary policy institutions. The additional controls are not significant in explaining the reform process in central bank design. At the same time, our baseline results remain unchanged when we exclude the sample of Euro area countries.

Finally, a last robustness check considers alternative econometric approaches to our baseline investigation of the drivers of reforms in central bank institutional design. First, since regional pressure is important in the reform process, we employ the dynamic spatial panel data model proposed in Elhorst et al. (2013), which stresses the importance of taking into account spatial spillovers when estimating peer effects in financial liberalization reforms.

We follow their approach and first test for the stability of the system, through a joint test on the coefficients of the lagged dependent variable and those of the regional pressure proxies. The p-value of these tests is shown in Table C.7, columns (1)-(3). These columns use different definitions for the regional pressure matrix, based on regional groups in column (1) and on inverse distances with a cut-off point of 2,000 in column (2) and 4,000 km in column (3), respectively. As the null hypothesis of the joint test of the coefficients cannot be rejected, the model is spatially cointegrated. After confirming the spatial cointegration among peer countries, we proceed to estimating a first difference model in columns (4)-(6). The results under this more demanding econometric setting confirm our initial findings.

The coefficients of the dependent variables in space W CBIE$_t$ are positive and significant in the spatial first-differenced model. Similar to Elhorst et al. (2013), we consider the coefficient W CBIE$_t$ as the impact of the regional pressure effect. This result is consistent regardless of the definition of the spatial weights. In addition, the effect of both the IMF Programs dummy and the Monetary Union one are still significant.

One final concern with the estimation in Table 3 is that the change in CBIE does not occur frequently, and, in fact, some countries do not change their independence over the entire period of our analysis. The linear specification in Table 3 includes both groups in which reforms occur and those where they do not, and estimates the average marginal effect of a covariate as a linear combination of zero (countries with no reform that have slope coefficients of zero) and the estimated coefficient of the group of countries which have reformed (Beck, 2020). While employing cloglog estimations in Section 4.1 partly mitigates this concern, a more stringent approach is to employ a fixed effects logit model that drops cross-sections where the dependent variable does not change (see Allison, 2009). We therefore check the robustness of the baseline results in Appendix Table C.8 (columns (1)-(3)) using a fixed effects logit model. Columns (4)-(6) in Appendix Table C.8 re-estimate the baseline results in Table 3 using complementary logarithmic estimations. Our main results remain robust to the adoption of these alternative econometric approaches. In particular, the coefficient for the status quo variable is negative and statistically significant across all estimations. The IMF programs variable is positive and significant at the 10% level for the full sample and the subset of developing countries, while the results for the Monetary Union dummy remain significant for the full sample and for advanced economies, in line with the baseline results in Table 3. Interestingly, the regional pressure variable and the dummy for inflationary episodes loses significance while the one for financial crisis becomes significant across all estimations. These results are in line with the estimations presented in Figure 6, where financial crises play an important role in driving reversals in the CBIE index, while regional pressure and inflationary episodes mainly increase the probability of large reforms.

5 Concluding remarks

This paper investigates the drivers of reforms in central bank design in a set of 155 countries over the period 1972-2017. Employing a comprehensive survey of central bank design, it documents 2490 legislative changes over this time frame. Yet, to gauge whether these

reforms had a significant impact on the design of central banks, I restrict the analysis to reforms that modify the degree of central bank independence, which has long been considered the optimal institutional setting of monetary policy authorities. I propose a new index of central bank independence that incorporates and extends previous indices by including new information on central bank financial independence and disclosure.

Employing this new dynamic index, I document several new stylized facts about the evolution of central bank design, including an increase in the average level of independence across time, several waves of reforms such as the ones that followed the 2008-09 global financial crisis, as well as a still significant cross-country variation in the level of central bank independence.

Looking at the determinants behind the many reforms central banks have implemented over the past five decades, I find that both internal and external factors matter. Countries with lower levels of central bank independence or those experiencing high inflation are more likely to enhance their independence. Reforms are also influenced by international pressures to reform coming from regional peers, IMF loans or joining a monetary union. At the same time, economic and political factors have a heterogeneous impact depending on the level of development. For example, reforms are more likely following cabinet changes or periods of high economic growth in advanced economies, while in developing countries democratic reforms go hand in hand with central bank reforms. Looking at the direction and magnitude of the reform also reveals important heterogeneities in the reform process. For instance, financial crises are followed by reforms that decrease central bank independence, while regional pressure is more likely to result in large reforms.

The empirical investigation proposed in this paper, while focused on central bank reforms, contributes to a broader political economy literature on the endogenous evolution of political institutions. The results obtained reinforce some widely held conclusions, such as the importance of external inducements in reforming central banks, but also shed light on some ambiguities in the literature such as the role of crises. The new index constructed not only sheds light on the endogenous evolution of central banks, but also provides a useful time-varying instrument of institutional design.

The endogenous evolution of central bank design is an ongoing process and the index and methods proposed in this paper can be useful in identifying how new challenges faced by central banks will affect their independence. For example, the results in section 4.3 show that an increase in nationalistic political parties is likely to be followed by reforms

that decrease central bank independence. This increased political pressure faced by many central banks due to the rise of populist movements across the world could further threaten the hard won independence of these policy institutions. A second challenge faced by central banks nowadays can arise from the extensive asset purchase programs undertaken to respond to the last financial crisis and, more recently, the Covid-19 global pandemic. The large amounts of government debt held by many central banks increase the risk of fiscal dominance, i.e. situations in which monetary policy could be undermined and interest rates pegged at low levels to reduce the costs of servicing sovereign debt. Finally, the highly debated impact of climate change on the institutional design of central banks might influence reforms in the years to come. As noted by Lagarde (2021):

> climate change [has] macroeconomic and financial implications and [have] consequences for [the European Central Bank's] primary objective of price stability, other areas of competence including financial stability and banking supervision, as well as for the Eurosystem's own balance sheet.

So far, no central bank around the world has formally changed their statute to include environmental and climate goals. However, governments are pressuring central banks to take actions in this direction. For example, in March 2021, Rishi Sunak, the Chancellor of the Exchequer, stated that the Bank of England will have to support the government's efforts to make the UK economy greener and achieve zero greenhouse gas emissions by 2050. While reaffirming the Bank of England's longstanding inflation target, Rishi Sunak also said that monetary policy should now "also reflect the importance of environmental sustainability and the transition to net zero" (Hodgson et al., 2021).

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Appendices

A Countries

Table A.1: Analyzed countries

Countries, year of first analyzed legislation and region group					
Afghanistan	2003	Middle East & the North of Africa	Dominica	1983	Latin America & the Caribbean
Albania	1992	Europe & Central Asia	Dominican Republic	1959	Latin America & the Caribbean
Algeria	1962	Middle East & the North of Africa	Ecuador	1957	Latin America & the Caribbean
Angola	1997	Africa	Egypt	1957	Middle East & the North of Africa
Anguilla	1987	Latin America & the Caribbean	Equatorial Guinea	1972	Africa
Antigua and Barbuda	1983	Latin America & the Caribbean	Estonia	1993	Europe & Central Asia
Argentina	1935	Latin America & the Caribbean	Ethiopia	1994	Africa
Australia	1959	Western Europe & other developed countries	Finland	1966	Western Europe & other developed countries
Austria	1955	Western Europe & other developed countries	France	1936	Western Europe & other developed countries
Azerbaijan	1996	Europe & Central Asia	Gabon	1972	Africa
Bahrain	1973	Middle East & the North of Africa	Gambia	1971	Africa
Bangladesh	2003	South Asia	Georgia	1995	Europe & Central Asia
Belarus	1990	Europe & Central Asia	Germany	1957	Western Europe & other developed countries
Belgium	1948	Western Europe & other developed countries	Ghana	1975	Africa
Benin	1956	Africa	Greece	1959	Western Europe & other developed countries
Bolivia	1945	Latin America & the Caribbean	Grenada	1983	Latin America & the Caribbean
Bosnia and Herzegovina	1997	Europe & Central Asia	Guatemala	1959	Latin America & the Caribbean
Botswana	1975	Africa	Guinea-Bissau	1956	Africa
Brazil	1964	Latin America & the Caribbean	Guinea	1994	Africa
Brunei	1984	East Asia & the Pacific	Haiti	1979	Latin America & the Caribbean
Bulgaria	1991	Europe & Central Asia	Hungary	1991	Europe & Central Asia
Burkina Faso	1956	Africa	Iceland	1966	Western Europe & other developed countries
Burundi	1965	Africa	India	1934	South Asia
Cambodia	1954	East Asia & the Pacific	Indonesia	1953	East Asia & the Pacific
Cameroon	1972	Africa	Iran	1972	Middle East & the North of Africa
Canada	1954	Western Europe & other developed countries	Iraq	1964	Middle East & the North of Africa
Central African Republic	1972	Africa	Ireland	1942	Western Europe & other developed countries
Chad	1972	Africa	Italy	1948	Western Europe & other developed countries
Chile	1953	Latin America & the Caribbean	Ivory Coast	1956	Africa
China	1995	East Asia & the Pacific	Jamaica	1992	Latin America & the Caribbean
Colombia	1923	Latin America & the Caribbean	Japan	1957	Western Europe & other developed countries
Comoros	1987	Africa	Jordan	1971	Middle East & the North of Africa
Costa Rica	1953	Latin America & the Caribbean	Kazakhstan	1993	Europe & Central Asia
Croatia	1991	Europe & Central Asia	Kenya	1984	Africa
Cuba	1959	Latin America & the Caribbean	Kuwait	1968	Middle East & the North of Africa
Cyprus	1963	Western Europe & other developed countries	Kyrgyzstan	1992	Europe & Central Asia
Czech Republic	1991	Europe & Central Asia	Laos	1995	East Asia & the Pacific
Democratic Republic of the Congo	1993	Africa	Latvia	1992	Europe & Central Asia
Denmark	1942	Western Europe & other developed countries	Lebanon	1969	Middle East & the North of Africa

Table A.1 Continued: Analyzed countries

Countries, year of first analyzed legislation and region group					
Liberia	1974	Africa	Saint Kitts and Nevis	1983	Latin America & the Caribbean
Libya	1996	Middle East & the North of Africa	Saint Lucia	1983	Latin America & the Caribbean
Lithuania	1994	Europe & Central Asia	Saint Vincent and the Grenadines	1983	Latin America & the Caribbean
Luxembourg	1983	Western Europe & other developed countries	Saudi Arabia	1957	Middle East & the North of Africa
Macao S.A.R	2000	East Asia & the Pacific	Senegal	1956	Africa
Macedonia	1992	Europe & Central Asia	Seychelles	1986	Africa
Malawi	1989	Africa	Sierra Leone	1963	Africa
Malaysia	1982	East Asia & the Pacific	Singapore	1991	East Asia & the Pacific
Maldives	1982	South Asia	Slovakia	1992	Europe & Central Asia
Mali	1984	Africa	Slovenia	1991	Europe & Central Asia
Malta	1994	Western Europe & other developed countries	Somalia	1960	Africa
Mauritania	1956	Africa	South Africa	1956	Africa
Mauritius	1966	Africa	South Korea	1950	East Asia & the Pacific
Mexico	1960	Latin America & the Caribbean	Spain	1962	Western Europe & other developed countries
Moldova	1992	Europe & Central Asia	Sri Lanka	1953	South Asia
Mongolia	1996	East Asia & the Pacific	Sweden	1966	Western Europe & other developed countries
Montenegro	2005	Europe & Central Asia	Switzerland	1953	Western Europe & other developed countries
Morocco	1959	Middle East & the North of Africa	Taiwan	1979	East Asia & the Pacific
Myanmar	1952	East Asia & the Pacific	Thailand	1942	East Asia & the Pacific
Namibia	1990	Africa	The Bahamas	1974	Latin America & the Caribbean
Nepal	1955	South Asia	Togo	1956	Africa
Netherlands	1948	Western Europe & other developed countries	Trinidad and Tobago	1964	Latin America & the Caribbean
New Zealand	1933	Western Europe & other developed countries	Tunisia	1958	Middle East & the North of Africa
Niger	1956	Africa	Turkey	1970	Europe & Central Asia
Nigeria	1969	Africa	Turkmenistan	1994	Europe & Central Asia
Norway	1966	Western Europe & other developed countries	Uganda	1966	Africa
Oman	2000	Middle East & the North of Africa	Ukraine	1991	Europe & Central Asia
Pakistan	1972	South Asia	United Arab Emirates	1980	Middle East & the North of Africa
Panama	1941	Latin America & the Caribbean	United Kingdom	1946	Western Europe & other developed countries
Paraguay	1952	Latin America & the Caribbean	United Republic of Tanzania	1966	Africa
Peru	1962	Latin America & the Caribbean	United States of America	1951	Western Europe & other developed countries
Philippines	1948	East Asia & the Pacific	Uruguay	1938	Latin America & the Caribbean
Poland	1997	Europe & Central Asia	Uzbekistan	2000	Europe & Central Asia
Portugal	1962	Western Europe & other developed countries	Venezuela	1939	Latin America & the Caribbean
Qatar	1993	Middle East & the North of Africa	Vietnam	1990	East Asia & the Pacific
Republic of Congo	1972	Africa	Yemen	1971	Middle East & the North of Africa
Romania	1991	Europe & Central Asia	Zambia	1971	Africa
Russia	1992	Europe & Central Asia	Zimbabwe	1956	Africa
Rwanda	1997	Africa			

B Data

Table B.1: Data and data sources

Variable	Definition	Data sources
	Dependent variables	
ΔCBIE	The change in the CBIE index between year t and $t-1$: $\Delta CBIE_t = CBIE_{i,t} - CBIE_{i,t-1}$.	Authors
Reform	Dummy variable that takes the value one if $\Delta CBIE_t > 0$ and zero otherwise.	Authors
Large Reform	Dummy variable that takes the value of one if country i is experiencing a reform that increases the level of the CBIE index by a value higher than the median increases in CBI in a country's region.	Authors
Reversal	Dummy variable that takes the value one if $\Delta CBIE_t < 0$.	Authors
Large Reversal	Dummy variable that takes the value one if the reform that decreases the level of the CBIE index is higher than the median reduction in the CBIE index in a country's region.	Authors
ΔCBIE$_d$	The change in each of the six dimensions (d) of the CBIE index.	Authors
ΔGMT/ ΔCWN/ ΔCWNE/ ΔCBIU	Variable that captures the change in the degree of central bank independence as defined in Grilli et al. (1991), Cukierman et al. (1992), Jacome and Vazquez (2008), and Dincer and Eichengreen (2014), respectively.	Authors
	Explanatory variables	
Status quo	Lagged level of the CBIE index	Authors
Regional pressure	Variable capturing the difference between the average level of CBIE in the region minus the country i's level of CBI. Regions are defined following Acemoglu et al. (2019).	Authors
IMF Programs	Dummy variable that takes the value one in the two years following an IMF loan program.	Authors following Dreher (2006)
IMF credit / GDP	Variable capturing the average ratio of IMF loans to GDP in years t, $t-1$ and $t-2$.	Authors
Random IMF Programs	Dummy variable that takes the value one in the two years following a randomly assigned date of an IMF loan program.	Authors
Monetary Union	Dummy variable that takes the value of one in the five years prior to joining a currency union.	Authors
Financial Crisis	Dummy variable that takes the value of one in the two years following a systemic banking crisis.	Authors following Laeven and Valencia (2020)
Currency Crisis	Dummy variable that takes the value of one in the two years following a systemic sovereign debt crisis.	Authors following Laeven and Valencia (2020)
Sovereign Debt Crisis	Dummy variable that takes the value of one in the two years following a systemic sovereign debt crisis.	Authors following Laeven and Valencia (2020)
Inflationary episodes	Dummy variable that takes the value one in the two years following an inflation rate higher than 20%.	Authors following Reinhart and Rogoff (2004)
Cabine change	Dummy that takes the value of one if a change of president or prime minister takes place, or at least 50% of the ministers of a cabinet are replaced.	Banks and Wilson (2021)
Government crisis	Dummy that takes the value of one if a situation which could lead to the downfall of the ruling government takes place in a country.	Banks and Wilson (2021)
Government Fractionalisation	Variable that measures the probability that two deputies picked at random from among the government parties will be of different parties.	Cruz, Keefer, and Scartascini (Cruz et al.)
Polity	Index that measures the difference between the democratic and the autocratic score of a country, ranging from +10 (strongly democratic) to -10 (strongly autocratic).	PolityIV (2018)
Constitution	Dummy that takes the value of one if the degree of independence of the central bank is entrenched in the constitution.	Authors
Democracy	Dummy that signals whether country i is a democracy or not (democracy=1 if Polity has positive values, =0 otherwise).	Authors following Giavazzi and Tabellini (2005)
Democratic Reform	Dummy that signals whether country i became a democracy in the current year (where democracy$_t$=1 and democracy$_{t-1}$=0).	Authors
Δ Nationalist Index	Variable that captures the change in the Nationalist Index between year t and $t-1$. The data for the construction of the Nationalist Index is from the World Bank's Database of Political Institutions (DPI) database that identify a party as nationalist if the "primary component of its platform is the creation or defence of a national or ethnic identity". This index is computed as the sum of the following three nationalism dummy variables: "nationalist chief executive", "nationalist largest government party" and "nationalist largest opposition party".	Authors following Agur (2018)

Table B.1 Continued: Data sources

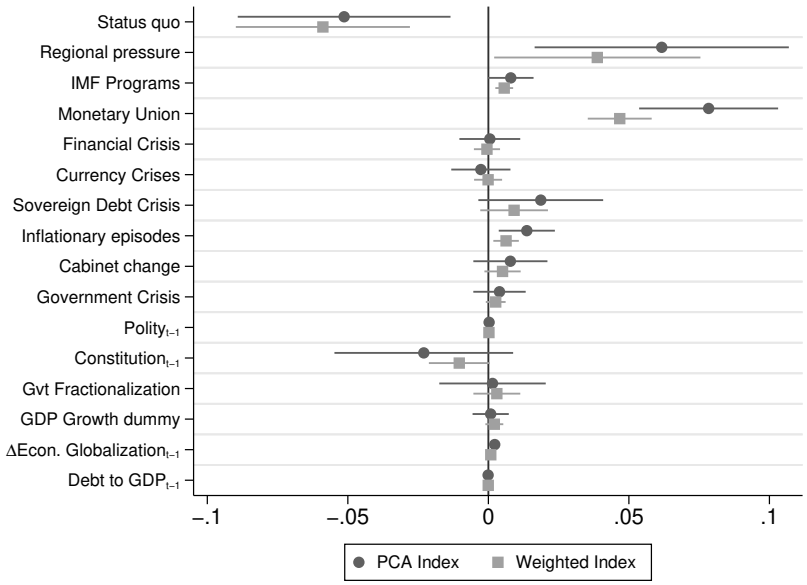
Variable	Definition	Data sources
Rule of law	Variable that reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Kaufmann et al. (2010)
GDP Growth dummy	Dummy variable that takes the value of 1 if GDP growth in the last two years has exceeded the average over the last 10 years.	Authors
Δ Econ. Globalization	Variable that captures the changes in the KOF Economic Globalisation Index between year t and $t-1$. This index measures the economic, social and political dimensions of globalisation.	Gygli et al. (2019)
Debt to GDP	Variable that captures level of gross government debt-to-GDP. Following Abbas et al. (2010), I have updated this measure up until 2017 using the data on Debt to GDP provided in the IMF World Economic Outlook (WEO).	Abbas et al. (2010) and authors
Δ Economic Freedom	First difference of the economic freedom index of the Frazer Institute.	Gwartney (2017)
Reserves to GDP	Variable that captures ratio of Foreign Exchange Reserves of a country scaled by GDP.	IMF International Financial Statistics

Table B.2: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Nr of obs
CBIE	0.548	0.173	0.099	0.929	5877
Δ CBIE	0.005	0.037	-0.335	0.568	5801
Reform	0.037	0.189	0	1	5877
Large Reform	0.015	0.12	0	1	5723
Reversal	0.110	0.105	0	1	5877
Large Reversal	0.003	0.058	0	1	5723
Δ Board	0.004	0.041	-0.582	0.809	5801
Δ Mon. Policy	0.003	0.041	-0.334	0.8	5801
Δ Objectives	0.009	0.08	-0.75	1	5801
Δ Lending	0.006	0.065	-0.635	1	5801
Δ Financial ind.	0.001	0.027	-0.431	0.5	5801
Δ Report and disclosure	0.004	0.041	-0.5	0.875	5801
Δ GMT	0.005	0.041	-0.437	0.625	5801
Δ CWN	0.006	0.05	-0.435	0.76	5801
Δ CWNE	0.006	0.044	-0.397	0.678	5801
Δ CBIU	0.006	0.047	-0.412	0.706	5801
Regional pressure	0	0.147	-0.395	0.452	5828
Financial Crisis	0.113	0.317	0	1	5877
Currency Crises	0.091	0.287	0	1	5877
Sovereign Debt Crisis	0.029	0.167	0	1	5877
Inflationary episodes	0.052	0.223	0	1	5877
IMF Programs	0.381	0.486	0	1	5761
Random IMF Programs	0.311	0.463	0	1	5761
IMF credit / GDP	0.028	0.044	0	0.47	3313
Monetary Union	0.023	0.149	0	1	5877
Cabinet change	0.072	0.258	0	1	5514
Government Crisis	0.142	0.434	0	5	5708
Polity	2.459	7.164	-10	10	5355
Democracy	0.597	0.491	0	1	5313
Democratic Reform	0.016	0.125	0	1	5296
Nationalist Index	0.091	0.217	0	1	3887
Constitution	0.079	0.27	0	1	5791
Government Fractionalization	0.214	0.275	0	1	4740
Rule of Law	-0.02	1.027	-2.487	2.06	3197
GDP Growth dummy	0.315	0.464	0	1	5549
Δ Econ. Globalization	0.547	2.351	-12.816	19.217	5505
Debt to GDP	55.621	42.271	0.025	523.382	5443
Δ Economic Freedom	0.02	0.156	-1.331	1.214	2113
ReserveGDP	12.102	16.248	0	293.584	5445

C Robustness tests

Figure C.1: Drivers of reform: robustness with alternative weights on the CBIE index



Notes: This figure shows the estimated coefficient for regressions run using, as the dependent variable, the changes in a modified version of the CBIE index obtained using two different weighting techniques based on a principal component analysis (PCA Index) and a weighted index (Weighted Index) following Jacome and Vazquez (2008).

Table C.3: Drivers of reforms: robustness using restricted versions of the CBIE index

	(1)	(2)	(3)	(4)	(5)	(6)
		Advanced	Developing		Advanced	Developing
Status quo	-0.059***	-0.200**	-0.036*	-0.052***	-0.170**	-0.031
	(0.018)	(0.093)	(0.020)	(0.018)	(0.083)	(0.020)
Regional pressure	0.036*	-0.126	0.079***	0.047**	-0.096	0.089***
	(0.021)	(0.092)	(0.022)	(0.023)	(0.083)	(0.024)
IMF Programs	0.005**	0.008*	0.004**	0.005**	0.005	0.004**
	(0.002)	(0.004)	(0.002)	(0.002)	(0.005)	(0.002)
Monetary Union	0.042***	0.046***	0.023*	0.043***	0.046***	0.023*
	(0.006)	(0.008)	(0.013)	(0.006)	(0.009)	(0.014)
Financial Crisis	-0.002	-0.001	-0.001	-0.001	0.001	0.001
	(0.003)	(0.004)	(0.003)	(0.002)	(0.004)	(0.003)
Currency Crises	-0.001	0.008	-0.002	-0.001	0.006	-0.001
	(0.002)	(0.009)	(0.003)	(0.002)	(0.010)	(0.003)
Sovereign Debt Crisis	0.009	0.006	0.009	0.009	0.004	0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Inflationary episodes	0.006**	-0.006	0.005*	0.005**	-0.007	0.005*
	(0.002)	(0.005)	(0.003)	(0.002)	(0.004)	(0.003)
Cabinet change	0.005	0.013*	0.002	0.004	0.014*	0.002
	(0.003)	(0.007)	(0.004)	(0.003)	(0.007)	(0.004)
Government Crisis	0.002	0.001	0.004	0.002	0.001	0.004
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
$\text{Polity}_{i,t-1}$	0.001	-0.002	0.001	0.001	-0.001	0.001
	(0.000)	(0.002)	(0.000)	(0.000)	(0.002)	(0.000)
$\text{Constitution}_{i,t-1}$	-0.010		-0.009	-0.009		-0.008
	(0.007)		(0.008)	(0.007)		(0.007)
Government Fractionalization	0.003	-0.015	0.010**	0.002	-0.017*	0.009*
	(0.004)	(0.009)	(0.005)	(0.004)	(0.010)	(0.005)
GDP Growth dummy	0.001	0.004	0.001	0.002	0.005*	0.001
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
Δ Econ. $\text{Globalization}_{i,t-1}$	0.001**	-0.001	0.001**	0.001**	-0.001	0.001**
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
$\text{Debt to GDP}_{i,t-1}$	-0.001	-0.001	-0.001	-0.001	0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,886	1,044	2,842	3,886	1,044	2,842
Number of countries	133	33	108	133	33	108
R-squared	0.118	0.336	0.106	0.116	0.307	0.106

The dependent variable is the change in the indices of Central Bank Independence, $\Delta\text{CBI}_{i,t}$. In Columns (1)-(3) we focus on a restricted version of the CBIE index which focuses on the first four dimensions of the index, i.e. board, monetary policy, objectives and lending. In Columns (4)-(6) the CBIE index is recomputed excluding the sub-category of the degree of central bank involvement in banking supervision. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. In Columns (2) and (5) the sample is restricted to advanced economies, while it focuses on developing countries in Columns (3) and (6). Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Table C.4: Drivers of reforms: robustness using alternative CBI indices

	(1) GMT	(2) CWN	(3) CWNE	(4) CBIU
Status quo	-0.038**	-0.046**	-0.048***	-0.045**
	(0.016)	(0.019)	(0.016)	(0.018)
Regional pressure	0.039**	0.049**	0.043**	0.048**
	(0.018)	(0.023)	(0.020)	(0.022)
IMF Programs	0.005***	0.008***	0.006***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Monetary Union	0.053***	0.054***	0.050***	0.052***
	(0.007)	(0.009)	(0.007)	(0.008)
Financial Crisis	-0.001	0.001	-0.001	-0.001
	(0.002)	(0.003)	(0.003)	(0.003)
Currency Crises	0.001	0.001	-0.001	0.001
	(0.002)	(0.003)	(0.003)	(0.003)
Sovereign Debt Crisis	0.006	0.006	0.007	0.006
	(0.005)	(0.008)	(0.006)	(0.007)
Inflationary episodes	0.005**	0.007**	0.006**	0.007***
	(0.002)	(0.003)	(0.002)	(0.003)
Cabinet change	0.003	0.004	0.004	0.004
	(0.003)	(0.004)	(0.003)	(0.004)
Government Crises	0.001	0.003	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)
$\text{Polity}_{i,t-1}$	0.001	0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
$\text{Constitution}_{i,t-1}$	-0.014***	-0.009	-0.009	-0.008
	(0.005)	(0.006)	(0.006)	(0.006)
GDP Growth dummy	0.001	0.003	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
$\Delta\text{Econ. Globalization}_{i,t-1}$	0.001*	0.001*	0.001**	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
Debt to GDP	-0.001***	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4,402	4,402	4,402	4,402
Number of countries	135	135	135	135
R-squared	0.110	0.098	0.107	0.101

The dependent variable is the change in the indices of Central Bank Independence, $\Delta\text{CBI}_{i,t}$. These alternative measure are the GMT (Grilli et al., 1991), CWN (Cukierman, 1992), CWNE (Jacome and Vazquez, 2008) and CBIU (Dincer and Eichengreen, 2014) indices of CBI. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Table C.5: Drivers of reforms in central bank design: robustness with interaction terms

	(1)	(2)	(3) Developing	(4)	(5)	(6) Developing
Status quo	-0.030**	-0.046***	-0.021	-0.020	-0.019	-0.021
	(0.013)	(0.017)	(0.025)	(0.020)	(0.026)	(0.027)
$\text{Polity}_{i,t-1}$ × Status quo				-0.002	-0.003	-0.004
				(0.002)	(0.002)	(0.003)
Regional pressure	0.086***	0.091***	0.138***	0.059***	0.078***	0.089***
	(0.023)	(0.029)	(0.039)	(0.022)	(0.029)	(0.029)
Status quo × Regional pressure	-0.081***	-0.099***	-0.104**			
	(0.027)	(0.036)	(0.044)			
$\text{Polity}_{i,t-1}$ × Regional Pressure				-0.001	-0.003	-0.001
				(0.002)	(0.003)	(0.004)
IMF Programs	0.013***	0.020***	0.017**	0.004***	0.005**	0.004*
	(0.005)	(0.006)	(0.008)	(0.001)	(0.002)	(0.002)
Status quo × IMF Programs	-0.018***	-0.028***	-0.024*			
	(0.007)	(0.009)	(0.012)			
$\text{Polity}_{i,t-1}$ × IMF Programs				0.001	0.001	0.001
				(0.000)	(0.000)	(0.000)
Monetary Union	0.168***	0.153***	0.475***	-0.163*	-0.169	-0.251***
	(0.028)	(0.025)	(0.120)	(0.090)	(0.117)	(0.090)
Status quo × Monetary Union	-0.186***	-0.167***	-0.565***			
	(0.035)	(0.031)	(0.145)			
$\text{Polity}_{i,t-1}$ × Monetary Union				0.021**	0.022*	0.029***
				(0.009)	(0.012)	(0.010)
$\text{Polity}_{i,t-1}$				0.001	0.002	0.002
				(0.001)	(0.001)	(0.001)
Controls :						
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
ϕ^{Crisis}		Yes	Yes		Yes	Yes
$\phi^{Politics}$		Yes	Yes		Yes	Yes
$\phi^{Economic}$		Yes	Yes		Yes	Yes
Observations	5,592	3,886	2,842	5,115	3,886	2,842
Number of Countries	151	133	108	137	133	108
R-squared	0.115	0.132	0.129	0.102	0.121	0.111

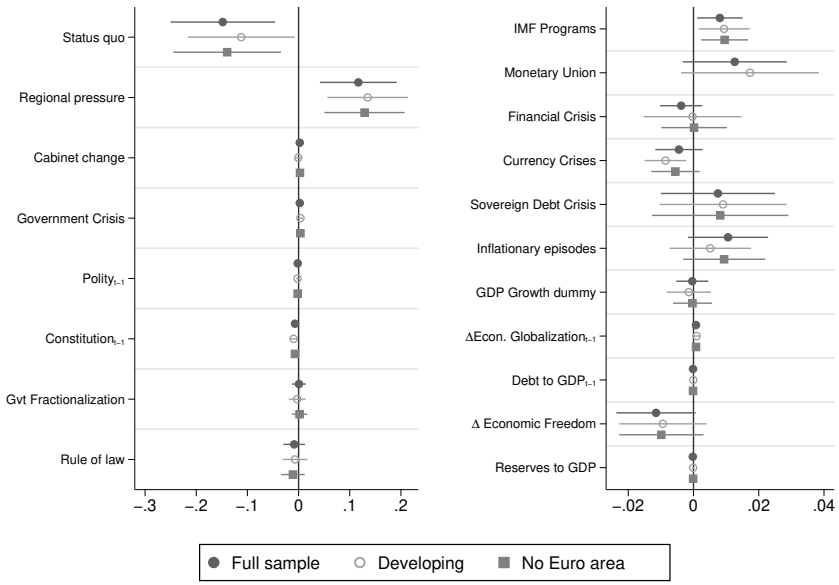
The dependent variable is $\Delta CBIE_{i,t}$. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. The ϕ^{Crisis}, $\phi^{Politics}$ and $\phi^{Economic}$ controls refer to the crisis, political and economic control variables, respectively. In Columns (3) and (6), the sample is restricted to developing countries only. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Table C.6: Drivers of reforms in central bank design: size of IMF Loan to GDP

	(1)	(2)	(3)	(4)
		Developing		Developing
Status quo	-0.037	-0.037	-0.054***	-0.037*
	(0.024)	(0.027)	(0.018)	(0.020)
Regional pressure	0.086***	0.084***	0.043*	0.080***
	(0.027)	(0.029)	(0.022)	(0.023)
IMF credit / GDP	0.085***	0.085***		
	(0.032)	(0.032)		
Random IMF Programs			0.001	0.001
			(0.002)	(0.002)
Monetary Union			0.041***	0.021
			(0.006)	(0.014)
Financial Crisis	0.002	0.001	-0.001	0.002
	(0.003)	(0.003)	(0.002)	(0.003)
Currency Crises	0.001	0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.002)	(0.003)
Sovereign Debt Crisis	0.010	0.010	0.009	0.009
	(0.007)	(0.007)	(0.006)	(0.006)
Inflationary episodes	0.006**	0.006**	0.005**	0.005*
	(0.003)	(0.003)	(0.002)	(0.003)
Cabinet change	0.002	0.001	0.005	0.002
	(0.004)	(0.004)	(0.003)	(0.004)
Government Crisis	0.005*	0.005*	0.002	0.004
	(0.002)	(0.003)	(0.002)	(0.002)
$\text{Polity}_{i,t-1}$	-0.001	-0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
$\text{Constitution}_{i,t-1}$	-0.007	-0.007	-0.009	-0.008
	(0.007)	(0.007)	(0.006)	(0.007)
Government Fractionalization	0.010**	0.009*	0.003	0.010**
	(0.005)	(0.005)	(0.004)	(0.005)
GDP Growth dummy	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Δ Econ. $\text{Globalization}_{i,t-1}$	0.001**	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
$\text{Debt to GDP}_{i,t-1}$	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,363	2,314	3,886	2,842
Number of countries	85	84	133	108
R-squared	0.117	0.117	0.117	0.106

The dependent variable is $\Delta CBIE_{i,t}$. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF credit / GDP* is the average ratio of IMF loans over the last two years over GDP. *Random IMF Programs* is a dummy that takes the value one in the two years following a randomly assigned date of an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*,*Currency*, *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. In Columns (2) and (4), the sample is restricted to developing countries only. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Figure C.2: Additional control variables



Notes: This figure shows the estimated coefficients for regressions run using the changes in the CBIE index as the dependent variable for the full sample of countries (Full sample), developing countries (Developing) only and excluding countries entering the euro area (No Euro area). Rule of law is the level of the rule of law measure obtained from the World Bank's Worldwide Governance Indicators. Reserves to GDP is the ratio of a country's Foreign Exchange Reserves scaled by GDP. Δ Economic freedom is an index of economic freedom computed by the Fraser Institute.

Table C.7: Drivers of reforms in a dynamic spatial panel estimation

	Level model: $CBIE_{it}$			Spatial first-difference		
				$\Delta CBIE_{it}$		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{CBIE}_{i,t-1}$	0.997***	1.028***	1.012***	-0.024	-0.025	-0.025
	(0.006)	(0.006)	(0.006)	(0.016)	(0.016)	(0.016)
W CBIE_t	0.826***	4.186***	2.463***	0.199***	0.395**	0.402**
	(0.075)	(0.166)	(0.169)	(0.075)	(0.166)	(0.169)
W CBIE_{t-1}	-0.430***	-2.053***	-1.208***	0	0.057	0.061
	(0.048)	(0.112)	(0.109)	(0.047)	(0.111)	(0.108)
IMF Programs	0.003*	0.003	0.003*	0.003**	0.004**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Monetary Union	0.055***	0.056***	0.055***	0.057***	0.057***	0.057***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Financial Crises	-0.003	-0.004**	-0.004*	-0.002	-0.002	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Currency Crises	-0.002	-0.001	-0.001	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Sovereign Debt Crises	0.006*	0.008**	0.007*	0.005	0.005	0.005
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Inflationary episodes	0.004*	0.004**	0.004*	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	3,740	3,740	3,740	3,740	3,740	3,740
Number of countries	85	85	85	85	85	85
p-value of Wald-test for spatial unit root	0.00	0.00	0.00	NR	NR	NR

The dependent variable is the $\text{CBIE}_{i,t}$ index in columns (1)-(3) and $\Delta\text{CBE}_{i,t}$ in (4)-(6). W is a spatial weight matrix based on regional group in columns (1) and (4) and inverse distances with a cut-off point at 2,000 in columns (2) and (5) and 4,000 km in columns (3) and (6), respectively. Regional pressure variables in columns (4)-(6) are in first difference. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. Time dummies are included. Standard errors in parentheses. NR = not relevant. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Table C.8: Drivers of reforms in central bank design: logit and cloglog estimations

	Logit			Complementary logarithmic model		
	(1)	(2)	(3)	(4)	(5)	(6)
		Advanced	Developing		Advanced	Developing
Status quo	-7.635***	-19.340**	-6.830**	-7.238***	-16.743**	-6.627**
	(2.071)	(9.456)	(3.284)	(1.949)	(8.132)	(3.028)
Regional pressure	-2.485	-13.188	-1.246	-2.540	-10.914	-1.572
	(2.131)	(9.084)	(3.336)	(2.020)	(7.856)	(3.089)
IMF Programs	0.483*	-0.090	0.537*	0.402*	0.042	0.460*
	(0.252)	(0.778)	(0.299)	(0.233)	(0.657)	(0.276)
Monetary Union	1.781***	2.438***	1.140*	1.621***	2.315***	0.976
	(0.372)	(0.724)	(0.692)	(0.340)	(0.632)	(0.616)
Financial Crisis	0.524**	0.999*	0.595**	0.447**	0.919*	0.561**
	(0.243)	(0.539)	(0.300)	(0.225)	(0.480)	(0.276)
Currency Crises	0.338	-0.188	0.472	0.242	-0.120	0.366
	(0.299)	(1.056)	(0.324)	(0.275)	(0.972)	(0.298)
Sovereign Debt Crisis	-0.385		-0.280	-0.291		-0.169
	(0.531)		(0.554)	(0.487)		(0.508)
Inflationary episodes	0.169	-1.169	0.076	0.183	-0.867	0.113
	(0.313)	(1.133)	(0.367)	(0.290)	(1.021)	(0.338)
Controls :						
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
ϕ^{Crisis}	Yes	Yes	Yes	Yes	Yes	Yes
$\phi^{Politics}$	Yes	Yes	Yes	Yes	Yes	Yes
$\phi^{Economic}$	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,202	643	2,142	3,202	643	2,142
Number of Countries	151	133	108	137	133	108

The dependent variable is a dummy variable taking value one in the year in which a change to the CBIE index took place. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. The ϕ^{Crisis}, $\phi^{Politics}$ and $\phi^{Economic}$ controls refer to the crisis, political and economic control variables, respectively. In Columns (2) and (5), the sample is restricted to advanced economies, while it focuses on developing countries Columns (3) and (6). Country and year fixed effects are included. Robust standard errors in parentheses. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Online Appendix

A Main guidelines for constructing the CBIE Index

- **Governor and central bank board**. In many countries the governor and other senior officials of the central bank are appointed through a governmental process. However, in order to assure some measures of balance, the *appointment* of the governor should be done by separate bodies. In an optimal institutional setting, the *term of office* of the governor and board members should be longer than the electoral cycle, while their *reappointment* should be limited in order to avoid the favoring of politicians who decide on reappointment. In order to foster continuity and renewal, the central bank legislation might also require a *staggering of terms* for senior central bankers. This requirement should reduce the short-term political influence on the central bank. An improper behavior of the central bank's governor and other board members can potentially damage the credibility of the institution in the financial markets and harm its reputation among the public. For this reason, most central bank statutes specify the circumstances or conditions for the dismissal of the governor and other board members. However, their *dismissal* should only occur in cases of personal misconduct or whether the member loses his/her qualification requirements. Indeed, the removal of central bankers for policy reasons might open the door to unwarranted pressure from the government. Similarly, the involvement of the governor and other board members in *other offices* of the government might create a conflict of interest between the two positions and this might pose some problems for the overall credibility of the central bank. Finally, the introduction in the legislation of *qualification* requirements can help to filter out those who might otherwise be selected on the basis of their political connections or simply as notable persons, but lacking any particular qualifications for the function. Given all these elements, central banks in which: i) the executive branch has little or no legal authority in appointing the governor and other board members; ii) the term of office exceeds the electoral cycle; iii) reappointment is limited; iv) dismissal is based on objective grounds; and v) parallel activities of management bodies are limited, can be considered to be more independent from the government.

- **Monetary policy and conflict resolution**. Central banks need the right to *determine and implement monetary policy* to achieve their objectives. To this end, in an optimal institutional design, the government should not interfere in monetary policy. Similarly, the central bank should have the authority to determine *interest rates* on its own, while *banking supervision* might be delegated to an autonomous agency to avoid this activity conflicting with monetary policy. In line with previous studies, I also assume that the central bank's role in *approving public sector budget and/or debt* represents useful instruments to help enforce fiscal discipline and strengthen monetary policy. Finally, whether any *conflict* might emerge between the central bank and the government, the central bank legislation should specify the procedure to follow and resolve such conflicts. In particular, to avoid that the monetary policy decisions adopted by the central bank are overruled by the government, the central bank should have the final authority over issues related to its objectives.

- **Objectives**. To strengthen the credibility of the monetary policy authority, its *objectives* need to be clearly defined. Given the social costs imposed by inflation in the long-run, the objective of price stability is a natural long-run goal for any central bank. Price stability is now the primary objective of most monetary policy institu-

tions. Yet, other goals such as aggregate output or employment might be taken into account. Moreover, especially since the onset of the 2008-09 financial crisis, there is a continuing debate about whether monetary policy frameworks focused on price stability should be amended to include financial stability. Smets (2014), for example, suggests that in order to avoid the time-inconsistency problem and to ensure clear accountability, it is important that price stability remains the monetary authorities' primary objective. He considers that a lexicographic *ordering* with the price stability objective coming before the financial stability objective will avoid an inflationary bias that may arise from the central bank's involvement in financial stability, while ensuring that financial stability concerns are still taken into account. Similar considerations hold if the central bank pursues multiple objectives. To a certain extent, the introduction of a more stringent price stability objective, i.e. the law prescribing what the central bank should do, might be considered as an element lowering the independence of a central bank. However, in our codification, we follow Cukierman et al. (1992) and de Haan and Eijffinger (2019) by assuming that this category captures both the degree of central bank independence and conservativeness embedded in the law.

- **Limitations on lending to the government**. Whenever the government can influence the quantity and conditions under which it borrows money from the central bank, it can also influence the creation of monetary base and lessen the economic independence of the central bank (Grilli et al., 1991). Therefore, in an optimal institutional design, temporary advances to the government should be prohibited. However, if direct credits are allowed, these may be moderate. For example, monetary financing of the government might be allowed if: (i) loans are provided with strict *limits*; (ii) the *terms of lending* are controlled by the central bank; (iii) the *beneficiary* is only the government and not also local administrations or public enterprises; (iv) the *maximum amount of advances* is quantified; (v) their *maturity* is limited and clearly specified in the central bank legislation; and (vi) loans are at market-related *interest rates*. Finally, the central bank should be prohibited to *underwrite* government securities in the primary market. Consequently, central banks in which the legislation introduces tighter limits on its lending to the public sector are considered more independent.

- **Financial Independence**. Even if central banks are not generally concerned with liquidity, central bank financial strength appears to be positively associated with good policy performance.[1] In extreme situations, financially weak central banks can generate losses that undermine macroeconomic stability and can put into question the credibility of the institution (Stella, 2010). Consequently, the central bank legislation should clearly address the elements directly related to the financial position of the central bank, such as the conditions for capitalization and recapitalization, the determination of the central bank budget and the arrangements for profit distribution and loss coverage. In order to ensure financial independence, the central bank statute should describe precisely the provisions relating to the *payment* and *level* of the initial authorized capital, as well as information on the obligation of the *government to re-capitalize the bank* and provide details on whereby recapitalizations are *subject to approval* by the executive power or the parliament. Moreover, financial independence should not depend on the government's budget. To strengthen this point,

[1] Milton and Sinclair (2010) provide a comprehensive and historical analysis of the issues on central banks' capital and financial strength.

the central bank's legislation should have a requirement to *uncouple the approval of the central bank budget* from the government's one. Similarly, the *adoption of the central bank balance sheet* should belong to its decision-making bodies and *financial accountability* might be ensured by requiring that the internal and external review of the bank's account is not conducted by the government or a state-owned auditing agency. Finally, the legal arrangements surrounding the distribution of central bank's profits and losses play a relevant role in guaranteeing long-term financial independence. Only realized net profits, after prudent provisioning by the central bank and appropriate allocation to general reserves, should be returned to the government. It follows that the central bank legislation should specify: a) how the *allocation of net profits* is conducted, b) how the allocation of a percentage the profits to the *general reserve* fund is handled by the central bank, c) that the government or the central bank's shareholders are prohibited from receiving *partial payments* before the end of the fiscal year, and d) that *unrealized profits* cannot be included in the calculation of distributable profits.

- **Reporting and disclosure**. Policy and financial reporting should be clearly established and, for this reason, the central bank should prepare formal statements on monetary policy performance at fixed time intervals, without prior approval of the government (Lybek, 1999). Jacome and Vazquez (2008) recognize financial accountability as an integral component of central bank independence. Indeed, holding central banks accountable strengthens institutional credibility and hence underpins monetary policy effectiveness. Following these guidelines, in an optimal institutional design, the central bank legislation might require that central banks report on a regular basis their *policy targets and achievements*, and publish *financial statements* that follow international accounting standards and are certified by an independent auditor.

B Coding rules for the index

This index provides an indicator of central bank *de jure* independence and disclosure.[2]

I. **Governor and central bank board**

I.1)	Who appoints the governor?	
	Central bank board / shareholders (if different from the government)	1.00
	A council of the central bank board, executive branch, and legislative branch	0.75
	By legislative branch (congress, King)	0.50
	By executive branch collectively (e.g. council of ministers)	0.25
	By one or more members of executive branch	0.00
I.2)	Term of office of the governor	
	More than 8 years	1.00
	6 to 8 years	0.75
	Equal to 5 years	0.50
	Equal to 4 years	0.25
	Less than 4 years or at the discretion of appointer (no limits or not mentioned)	0.00
I.3)	Is there any reappointment option for the governor?	
	No	1.00
	Restricted to two consecutive terms	0.50
	Yes	0.00
I.4)	Provisions for dismissal of governor	
	No provision for dismissal	1.00
	Only for non-policy reasons (e.g., incapability, or violation of law)	0.83
	At the discretion of central bank board	0.67
	For policy reasons at legislative branch's discretion	0.50
	At legislative branch's discretion	0.33
	For policy reasons at executive branch's discretion	0.17
	At executive branch's discretion	0.00
I.5)	May the governor hold other offices in government?	
	Prohibited by law	1.00
	Not allowed unless authorized by executive branch	0.50
	No prohibition for holding another office	0.00
I.6)	Is there any qualification requirement for the governor?	
	Yes	1.00
	No	0.00
I.7)	Who appoints the rest of the board?	
	Central bank board / shareholders (if different from the government)	1.00
	A council of the central bank board, executive branch, and legislative branch	0.75
	By legislative branch (congress, King)	0.50
	By executive branch collectively (e.g. council of ministers)	0.25
	By one or more members of executive branch	0.00
I.8)	Term of office of the rest of the board	
	More than 8 years	1.00
	6 to 8 years	0.75
	Equal to 5 years	0.50
	Equal to 4 years	0.25
	Less than 4 years or at the discretion of appointer (no limits or not mentioned)	0.00
I.9)	Is there any reappointment option for the rest of the board?	
	No	1.00
	Restricted to two consecutive terms	0.50
	Yes	0.00

[2]When setting the rules for interpreting the information presented in the central bank legislation, a clear strategy had to be established in order to codify missing data. For example, Cukierman et al. (1992) assumes that, "when an entry is not available for one or more variables within a subgroup, only the variables with meaningful entries are aggregated". This strategy might, however, overestimate the degree of central bank independence for countries in which the legislation is partially incomplete and the executive power could have complete power in deliberating on all the points not mentioned in the central bank charter. On the other hand, there might be cases in which the statute formally requires the approval of the central bank's monetary policy by the government even if this rarely results in the approval being denied (see Grilli et al., 1991, for the case of Italy before the 1990s). In order to guarantee a consistent interpretation of the central bank legislation, in all the cases in which certain information is not mentioned in the legislation or certain requirements are a mere formality, I assume the minimum level of independence, i.e. a value equal to 0 for the criteria of interest.

I.10) Provisions for dismissal of the rest of the board

No provision for dismissal	1.00
Only for non-policy reasons (e.g., incapability, or violation of law)	0.83
At the discretion of central bank board	0.67
For policy reasons at legislative branch's discretion	0.50
At legislative branch's discretion	0.33
For policy reasons at executive branch's discretion	0.17
At executive branch's discretion	0.00

I.11) May the rest of the board hold other offices in government?

Prohibited by law	1.00
Not allowed unless authorized by executive branch	0.50
No prohibition for holding another office	0.00

I.12) Is there any qualification requirement for the rest of the board?

Yes	1.00
No	0.00

I.13) Does the legislation require a staggering term of office for the appointment of board members?

Yes	1.00
No	0.00

I.14) No mandatory participation of government representatives in the board

Yes	1.00
No, but without voting rights	1.00
No	0.00

II. **Monetary policy and conflicts resolution**

II.1) Who formulates monetary policy?

Central bank alone	1.00
Central bank participates, but has little influence	0.67
Central bank only advises government	0.30
Central bank has no say	0.00

II.2) Is the central bank responsible for setting the policy rates?

Yes	1.00
No	0.00

II.3) Is there no responsibility of the central bank for overseeing the banking sector?

Banking supervision not entrusted to the central bank	1.00
Banking supervision not entrusted to the central bank alone	0.50
Banking supervision entrusted to the central bank alone	0.00

II.4) Central bank given active role in formulation of government's budget and/or debt

Approves government budget and/or debt	1.00
Legally required to provide opinion on technical aspects	0.50
No involvement at all	0.00

II.5) Who has final word in resolution of conflicts?

The central bank, on issues clearly defined in the law as its objectives	1.00
Government, on policy issues not clearly defined as the central bank's goals	0.80
A council of the central bank, executive branch, and legislative branch	0.60
The legislature, on policy issues	0.40
The executive branch on policy issues, subject to due process and possible protest by the bank	0.20
The executive branch has unconditional priority	0.00

III. **Objectives**

III.1) Price stability objective

Price stability is the single or primary objective	1.00
Price stability together with non-conflicting objectives but without priority	0.75
Price stability plus others goals including financial stability of financial system that may conflict with the former, without priority	0.50
Price stability together with economic growth/development with no priority	0.25
Objectives do not include price stability	0.00

IV. **Limitations on lending to the government**

IV.1) Limitations on advances

Advances to government prohibited	1.00
Advances permitted, but with strict limits (e.g., up to 15 percent of government revenue)	0.67
Advances permitted, and the limits are loose (e.g., over 15 percent of government revenue)	0.33
No legal limits on lending	0.00

IV.2) Lending to government

Not allowed	1.00
In the secondary market with restricted limits	0.75
In the secondary market with lax or without limits	0.50
In the primary market with limits or approved by central bank board with a qualified majority	0.25
In the primary market without limits	0.00

IV.3) Who decides financing conditions to government (maturity, interest, amount)?

Central bank defines terms and conditions	1.00
Specified by the bank charter	0.67
Agreed between the central bank and executive	0.33
Decided by the executive branch alone	0.00

IV.4) Potential borrowers from the central bank

Only the government	1.00
Government plus local governments	0.67
All of the above plus public enterprises	0.33
All of the above and to the private sector, also if it is not mentioned otherwise	0.00

IV.5) Limits on central bank lending defined

As an absolute cash amount	1.00
As a percentage of central bank capital or other liabilities	0.67
As a percentage of government revenues	0.33
As a percentage of government expenditure	0.00

IV.6) Maturity of advances

Within 6 months	1.00
Within 1 year	0.67
More than 1 year	0.33
No mention of maturity in the law	0.00

IV.7) Interest rates on advances

At market rates	1.00
Interest rates not specified in law	0.50
At below market rates	0.00

IV.8) Central bank prohibited from buying or selling government securities in the primary market

Yes	1.00
No	0.00

V. **Financial independence**

V.1) Does the statute describe precisely the provisions relating to the payment of the initial capital?

Yes	1.00
No	0.00

V.2) The Statute quantify precisely the authorized capital of the central bank

Yes	1.00
No	0.00

V.3) Financial autonomy

Government should maintain central capital integrity	1.00
Government is legally allowed to capitalize the central bank	0.67
The law does not allow the government to capitalize the central bank	0.33
The central bank conducts quasi-fiscal operations	0.00

V.4) Are there legal arrangements allowing for an automatic capital contribution upon the request by the central bank (automatic recapitalization)?

Yes	1.00
No	0.00

V.5) How are managed, from a legislative point of view, transfers of money from the treasury to the central bank?

The decision is based on technical criteria	1.00
The transfer requires approval by the Treasury	0.50
The transfer requires an act of the legislature	0.00

V.6) The central bank has the exclusive right to determine and approve its annual budget

Yes	1.00
Ex-post approval by the government	0.50
No	0.00

V.7) The adoption of the annual balance sheet of the central bank belongs exclusively to its decision-making bodies

Yes	1.00
No	0.00

V.8) The accounts of the central bank are subject to the control of a state agency of auditing

No	1.00
No, but the external audit agency is appointed by the government	0.50
Yes	0.00

V.9) Allocation of the net profits of the central bank

Prescribed by the statute / central bank charter	1.00
Left to the discretion of the central bank	0.67
A kind of negotiation between the government and the central bank	0.33
Left to the discretion of the government	0.00

V.10) How is the allocation of profits to the general reserve fund handled by the central bank?

The decision is just on objective criteria established precisely by the statute	1.00
The decision is left to the discretion of the central bank	0.67
The decision is made by the central bank in consultation with the government	0.33
Left to the discretion of the government	0.00

V.11) Can the state or the shareholders receive partial payments before the end of the fiscal year, based on an estimate for that year?

No	1.00
Yes	0.00

V.12) Are unrealized profits included in the calculation of distributable profits?

No	1.00
Yes	0.00

VI. **Reporting and disclosure**

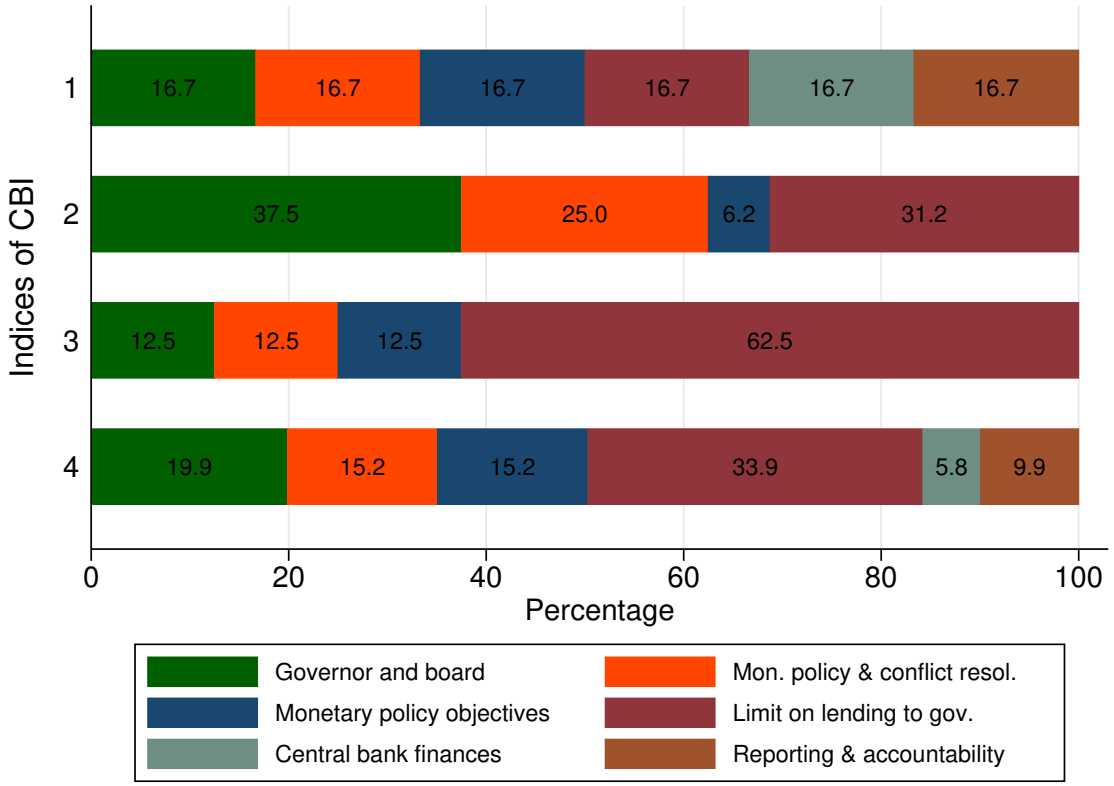
VI.1) Central Bank reporting

Reports to executive branch and informs at least annually to Congress.	1.00
Reports to the executive once a year and submits an annual report to Congress	0.75
Annual report to the executive. Informs to the executive branch whenever fundamental disequilibria emerge, or reports through the media without specific periodicity	0.50
Issues annual report at specific time	0.25
Distributes an annual report without establishing particular period of time	0.00

VI.2) Central bank financial statements

Discloses detailed financial statements at least once a year with a certification of an independent auditor	1.00
Discloses consolidated financial statements at least once a year with seal of the Banking Superintendent or other public sector authority	0.75
Discloses financial statements at least once a year, certified by an internal	0.50
Publishes partial financial statements	0.25
Does not publish financial statements or the law authorizes the central bank to deviate from international accounting standards	0.00

Figure OnlineApp.B.1: Weights assigned by the CBI indices to the different dimensions



Note: Each horizontal bar indicates the weight assigned by the CBI indices to the different dimensions. CBIE: CBI - Extended Index; GMT: Grilli et al. (1991); CWN: Cukierman (1992) and CWNE: Jacome and Vazquez (2008).

C Robustness tests

Table OnlineApp.C.1: Sign and magnitude of reforms

	(1) Reform	(2) Large Reform	(3) Reversal	(4) Large Reversal
Status quo	-10.595***	-16.104***	1.687	-8.543
	(2.522)	(5.160)	(4.251)	(7.007)
Regional pressure	-2.347	20.174***	-2.521	-18.241**
	(2.552)	(5.784)	(4.549)	(8.050)
IMF Programs	0.468*	1.090*	-0.195	-0.722
	(0.288)	(0.560)	(0.587)	(0.986)
Monetary Union	2.032***	2.659***	-0.754	
	(0.412)	(0.863)	(1.175)	
Financial Crisis	0.374	-0.410	0.855*	1.904***
	(0.282)	(0.510)	(0.479)	(0.694)
Currency Crises	0.264	0.822*	0.681	0.697
	(0.335)	(0.494)	(0.569)	(1.442)
Sovereign Debt Crisis	-0.468	1.220	-0.046	-1.564
	(0.611)	(1.265)	(1.013)	(1.950)
Inflationary episodes	0.434	1.351*	-0.908	
	(0.361)	(0.746)	(0.723)	
Cabinet change	0.362	0.808*		
	(0.292)	(0.473)		
Government Crisis	0.295	0.284	0.479	0.961
	(0.188)	(0.290)	(0.378)	(0.620)
$\text{Polity}_{i,t-1}$	-0.073*	-0.191***	-0.073	-0.454
	(0.039)	(0.072)	(0.075)	(0.310)
$\text{Constitution}_{i,t-1}$	-1.968**	-3.760**		
	(0.774)	(1.900)		
Government Fractionalization	-0.102	1.048	-0.001	-0.554
	(0.475)	(0.891)	(0.903)	(1.364)
GDP Growth dummy	0.013	-0.050	-0.290	0.223
	(0.204)	(0.344)	(0.417)	(0.595)
Δ Econ. $\text{Globalization}_{i,t-1}$	0.078**	0.044	-0.023	0.008
	(0.035)	(0.057)	(0.082)	(0.143)
$\text{Debt to GDP}_{i,t-1}$	-0.010**	-0.008	0.010	0.019*
	(0.004)	(0.007)	(0.006)	(0.010)
Observations	2,602	1,785	780	335
Number of countries	101	78	42	27

The dependent variable is a dummy that takes value one in years in which a reform that modified the degree of the CBIE index. Columns (1) only considers country-years in which a positive change to the level of the CBIE index took place, Columns (2) focuses on large reforms in CBI, i.e. on reforms that increases the level of the CBIE index by a value higher than the median increases in CBI among peer countries. The dependent variable in Columns (3) is a dummy that takes the value one only in years where reversals in independence occurred, while Column (4) only considers country-years observations in which the negative changes in the level of the CBIE index is greater than the median reduction in the index among peer countries. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. Country and year fixed effects are included. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Table OnlineApp.C.2: Sign and magnitude of reforms - Restricted index

	(1) Reform	(2) Large Reform	(3) Reversal	(4) Large Reversal
Status quo	-10.904***	-21.742***	1.487	-10.352
	(2.547)	(6.017)	(4.584)	(7.066)
Regional pressure	-3.211	19.239***	-2.935	-17.750**
	(2.552)	(5.974)	(4.845)	(8.010)
IMF Programs	0.486*	1.162**	-0.028	0.140
	(0.265)	(0.571)	(0.603)	(0.908)
Monetary Union	1.951***	2.533***	-0.652	
	(0.410)	(0.916)	(1.190)	
Financial Crisis	0.372	-0.069	0.846*	1.658**
	(0.280)	(0.527)	(0.490)	(0.666)
Currency Crises	0.302	0.839*	0.712	0.978
	(0.335)	(0.505)	(0.578)	(1.182)
Sovereign Debt Crisis	-0.468	0.622	-0.050	0.161
	(0.608)	(1.148)	(1.019)	(1.489)
Inflationary episodes	0.451	1.178*	-0.999	-2.220*
	(0.358)	(0.708)	(0.747)	(1.250)
Cabinet change	0.365	0.590		
	(0.292)	(0.474)		
Government Crisis	0.300	0.236	0.474	0.760
	(0.187)	(0.286)	(0.379)	(0.530)
$\text{Polity}_{i,t-1}$	-0.066*	-0.150**	-0.068	-0.297
	(0.039)	(0.074)	(0.076)	(0.188)
$\text{Constitution}_{i,t-1}$	-1.935**	-2.288		
	(0.778)	(1.392)		
Government Fractionalization	-0.168	0.647	0.169	-0.087
	(0.471)	(0.902)	(0.932)	(1.205)
GDP Growth dummy	0.041	-0.174	-0.266	0.257
	(0.204)	(0.347)	(0.425)	(0.548)
Δ Econ. $\text{Globalization}_{i,t-1}$	0.077**	0.079	-0.016	-0.009
	(0.035)	(0.056)	(0.085)	(0.142)
$\text{Debt to GDP}_{i,t-1}$	-0.011***	-0.007	0.010	0.013
	(0.004)	(0.008)	(0.007)	(0.010)
Observations	2,624	1,945	765	351
Number of countries	101	78	42	27

The dependent variable is a dummy that takes value one in years in which a reform that modified one of the elements that is a part of the first four dimensions of the CBIE index, i.e. governance, monetary policy, objectives and lending took place. Column (1) only considers country-years in which a positive change to the level of the CBIE index took place, Column (2) focuses on large reforms in CBI, i.e. on reforms that increases the level of the CBIE index by a value higher than the median increases in CBI among peer countries. The dependent variable in Column (3) is a dummy that takes the value one only in years where reversals in independence occurred, while Column (4) only considers country-years observations in which the negative changes in the level of the CBIE index is greater than the median reduction in the index among peer countries. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Financial*, *Currency* and *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking, currency or sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *Cabinet change* is a dummy that takes the value of one if a change of president or prime minister, or a replacement of at least 50% of the ministers takes place in year t. *Government crisis* is a dummy equal to one if a situation that threatens to bring the downfall of the present government happens in year t. *Polity* is the Polity2 index of democracy. *Constitution* is a dummy equal to one if central bank independence is entrenched in the country's constitution. *Government Fractionalisation* is a measure of the fragmentation of the government. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Econ. Globalization* is the change in the KOF Economic Globalisation Index. *Debt to GDP* is the Debt to GPD ratio of a country. Country and year fixed effects are included. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.

Table OnlineApp.C.3: Drivers of reforms in central bank design - Alternative measures of the Globalisation index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Status quo	-0.047***	-0.048***	-0.049***	-0.048***	-0.048***	-0.047***	-0.047***	-0.048***
	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Regional pressure	0.044**	0.044**	0.042**	0.043**	0.042**	0.043**	0.043**	0.042**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
IMF Programs	0.004***	0.004***	0.004***	0.004***	0.005***	0.004***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Monetary Union	0.043***	0.044***	0.043***	0.044***	0.044***	0.044***	0.044***	0.044***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Financial Crisis	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Currency Crises	-0.001	-0.001	-0.001	0.001	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Sovereign Debt Crisis	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Inflationary episodes	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Cabinet change	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Government Crises	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\text{Polity}_{i,t-1}$	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\text{Constitution}_{i,t-1}$	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.007	-0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
GDP Growth dummy	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$\Delta\text{KOF Globalization}_{i,t-1}$	0.001*							
	(0.001)							
$\Delta\text{Trade Globalization}_{i,t-1}$		0.001*						
		(0.000)						
$\Delta\text{Financial Globalization}_{i,t-1}$			0.001**					
			(0.000)					
$\Delta\text{Social Globalization}_{i,t-1}$				0.001				
				(0.001)				
$\Delta\text{Interpersonal Globalization}_{i,t-1}$					0.001			
					(0.000)			
$\Delta\text{Informational Globalization}_{i,t-1}$						0.001		
						(0.000)		
$\Delta\text{Cultural Globalization}_{i,t-1}$							-0.001	
							(0.000)	
$\Delta\text{Political Globalization}_{i,t-1}$								0.001
								(0.000)
Debt to GDP	-0.001	-0.001*	-0.001*	-0.001	-0.001*	-0.001	-0.001	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4,402	4,382	4,402	4,402	4,402	4,402	4,366	4,402
Number of countries	135	134	135	135	135	135	134	135
R-squared	0.110	0.111	0.111	0.109	0.109	0.110	0.109	0.109

The dependent variable is $\Delta CBIE_{i,t}$. *Status quo* is the lag of the dependent variable, while *Regional pressure* is computed as the average level of CBIE in the region minus the country's level. *Financial*, *Sovereign Debt Crisis* are dummy variables equal to one in the two years following a systemic banking/sovereign debt crisis. *Inflationary episodes* is a dummy equal to one if annual inflation rates higher than 20% are registered in the two years prior to a reform in year t. *IMF Programs* is a dummy equal to one in the two years following an IMF loan program. *Monetary union* is a dummy variable that takes value one in the five years prior to joining a currency union. *Left Government* is a dummy that takes the value of one if a left-wing party is in power in year t. *Polity* is the Polity2 index of democracy. *GDP Growth dummy* is a dummy equal to one if GDP growth in the last two years has exceeded the average over the last 10 years. Δ*Globalization Index* is the change in the KOF Globalisation Index. In Columns (4) and (5), the sample is restricted to advanced and developing countries, respectively. Country and year fixed effects are included. Robust standard errors in parentheses, adjusted for clustering by country. ***/**/* denote significance at 1, 5 and 10 percent levels, respectively.