# (In)dependent Central Banks*

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**Abstract**

Since the 1980s many countries have reformed the institutional framework governing their central banks to increase operational independence. Collecting systematic biographical information, international press coverage, and independent expert opinions, we find that over the same period appointments of central bank governors have become more politically motivated, especially after significant legislative reforms aiming to insulate central banks and their governors from political interference. We also show that politically-motivated appointments reflect lower de facto independence, and are associated with worse inflation and financial stability outcomes. Given the increase in central banks' powers worldwide, our findings inform the debate about their political accountability and credibility.

**JEL classification:** E58, G00, P16

**Keywords:** central banking, central bank independence, governor appointment, legislative reforms, political connections, inflation, financial stability

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# 1 Introduction

In the late 1980s, central bank independence (CBI) emerged as an institutional solution to the time inconsistency problem analysed by Kydland and Prescott (1977) and Calvo (1978).[1] The main idea was to wrest control of monetary policy away from elected politicians, whose re-election concerns could lead to inflation bias or political cycles (Barro and Gordon, 1983; Alesina and Roubini, 1992). By entrusting control of monetary policy to unelected technocrats, or even more dramatically, to a conservative central banker singularly focused on inflation (Rogoff, 1985), the U.S. experience of high inflation during the 1970s would not be repeated again.[2] This argument was used successfully around the world as many countries reformed the institutional framework governing their central banks to protect them from undue political influence. The resulting increase in legal or *de jure* CBI is evidenced by several studies (see, e.g., Grilli, Masciandaro, and Tabellini, 1991; Cukierman, Web, and Neyapti, 1992; Romelli, 2022).[3]

However, de jure CBI does not necessarily translate into actual or *de facto* CBI (Cukierman et al., 1992). Laws are incomplete, and even when explicit, actual practice may deviate, particularly when politicians' preferences differ from the central bank mandate (Ehrmann and Fratzscher, 2011). As laws are hard to reverse, and political processes exhibit a status quo bias (Fernandez and Rodrik, 1991), politicians might seek alternative avenues to circumvent enacted CBI legislation. This can give rise to a "seesaw effect": when a policy reform takes place in one dimension, but the political equilibrium remains largely unchanged, politicians may attempt to use a different instrument to attain the goal previously achieved with the instrument that is being reformed (Acemoglu, Johnson, Querubin, and Robinson, 2008).

One way in which politicians may seek to retain control of the central bank, which we bring to the data, is by getting "their own people" into the top job. Anecdotal evidence supporting this idea is plentiful.[4] In this paper, we collect systematic biographical information, international

[1] For an excellent overview of this literature, see Alesina and Stella (2010).

[2] In 1971, President Richard Nixon successfully pressured the Federal Reserve Chairman Arthur Burns to lower interest rates to help with his re-election. Americans paid dearly for Nixon's victory, however, as the low-interest rates helped fuel a double-digit inflation throughout most of the 1970s and hurt the value of the U.S. dollar. The diaries of Chairman Burns by Ferrell (2010) confirm President Nixon's key role in using the "float" to generate inflation through dollar depreciation right before the 1972 presidential election.

[3] After the Global Financial Crisis, the importance of CBI is reemphasized by Bernanke (2010) and Fischer (2015).

[4] For example, *The Economist* (April 13, 2019) notes that "President Donald Trump has demanded that interest rates should be slashed, speculated about firing the boss of the Federal Reserve [...] India's government

press coverage, and independent expert opinions to examine whether central bank governor appointments become more, or less political, following significant reforms aiming to insulate the central bank and its governor from political interference. This inquiry is especially important and timely amid the continued expansion of central bank powers worldwide. Since the global financial crisis, central bank powers have expanded considerably, especially in the area of financial stability.[5] Their powers are only expected to expand as they are developing policies towards climate finance and digital currencies (Skinner, 2021).

If the original goal of improving de jure CBI is to reduce political interference, it is natural to expect that as de jure CBI increases, politically-motivated central bank governor appointments become less frequent. After all, such reforms include, among others, provisions aiming precisely to insulate the appointment process from political interference. A politically-motivated governor appointment is defined as one where the appointment is skewed towards candidates who can be classified, through various metrics, as being more loyal to the executive making the appointment rather than the central bank mandate. Therefore, if the intended goal is to make the central bank more politically independent, then we should expect fewer politically-motivated governor appointments, so that de jure CBI more convincingly becomes de facto CBI. This intuition suggests that the correlation between metrics of de jure CBI and more independent governor appointments should be positive. This correlation, however, may disappear, or even turn negative, if politicians actively try to reverse institutional reforms by appointing central bank governors with close ties to the government.

The goal of this paper is to examine which of these two narratives better describes the data and examine whether political appointees are less independent during their tenure and whether they are associated with worse central bank policy outcomes (inflation and incidence of crises). We should clarify that our paper does not inform the debate concerning the appropriate, or even optimal, level of central bank independence. We take as given a certain level of existing de jure CBI and ask whether the central bank governor appointments are consistent with the initial motivation of enhancing central bank independence. We also take as given the need for a

has replaced a capable central-bank chief with a pliant insider who has cut rates ahead of an election [...] Rather than win by force of argument, they are seeking an edge by getting their own people into the top jobs".

[5]Over the same period, central bank balance sheets have grown exponentially from about 20% national GDP to more than 70%, on average (e.g., Ferguson, Martin, Paul, and Moritz, 2023).

well-functioning central bank as a key institution in the "pillars of prosperity" (Besley, Persson, and Dann, 2021) and ask whether politicians "undo" de jure CBI with political appointees.

We focus on central bank governors because of their disproportionate importance in running the central bank. However, an argument might still be made that central banks are run by boards of directors and/or monetary policy committees, and therefore focusing on one particular person on the board might be missing important elements of central bank independence. For example, Riboni and Ruge-Murcia (2010) argue that for five major central banks a model closer to a "consensus model, where a super majority is required for a policy change", captures the decisions of those central banks best. There are, however, a number of arguments that make us confident that focusing on the governor appointment is nevertheless a useful first step.

First, in many countries there is a disproportionate amount of attention on the political decision to appoint (or re-appoint) a governor, and this attention is much more prevalent than when appointing other members of the board.[6] Second, political pressures on central banks often concentrate on the governor. When pressures escalate and dismissals occur, they typically concern the governor rather than other members of the board.[7] Third, a key reason to focus on governors is the significantly important literature that leaders matter (e.g., Jones and Olken, 2005; Besley, Montalvo, and Reynal-Querol, 2011; Funke, Schularick, and Trebesch, 2023; Brown, 2022). In corporate finance, Bertrand and Schoar (2003) show that managers matter, and these empirical observations should also hold for central bank governors.

Even though the evidence on leadership may be more sparse for central banking, the idea is also supported by the narrative of the Great Depression in Friedman and Schwartz (1963): "[I]f Benjamin Strong could have had twelve months more of vigorous health, we might have ended

[6]For example, the recent article by the editorial board of *The Financial Times* on the re-appointment of Federal Reserve Chairman Jerome Powell supports this argument ("Jay Powell should get a second term at the Fed", November 9, 2021).

[7]President Trump's pressure on the Federal Reserve to keep interest rates low concentrated on Governors Yellen and Powell. In 2017, "[Trump] left open the possibility of renominating Federal Reserve Chairwoman Janet Yellen once her tenure is up next year, a shift from his position during the campaign that he would 'most likely' not appoint her to another term. 'I do like a low-interest rate policy, I must be honest with you,' Mr. Trump said at the White House, when asked about Ms. Yellen" (*The Wall Street Journal*, April 12 2017; *Reuters*, April 12 2017). Later in 2018, when the Federal Reserve raised interest rates, Trump repeatedly threatened to fire Powell, his own appointee, even if his legal authority to do so is not clear. In Turkey, President Erdogan's feud with the central bank about interest rate levels resulted in high central bank governor turnover; Murat Uysal's tenure lasted between July 6, 2019 and November 7, 2020 and Naci Agbal's between November 8, 2020 and March 20, 2021. Political pressure on central bank governors may also manifest itself in more indirect ways. In Greece, for example, the central bank governor's wife was prosecuted (and found not guilty after many years), a move that was widely interpreted as a way to put pressure on Governor Stournaras to resign. It is worth noting that these are all examples from countries with de jure independent central banks.

the depression in 1930, and with this the long drawn out world crisis that so profoundly affected the ensuing political developments" (p. 692). Benjamin Strong was the chairman of the New York Bank, the equivalent of the New York Federal Reserve Bank at the time. Given that this was the first major crisis that the recently established (1914) Federal Reserve was involved in, the importance of having someone with deep knowledge of the potential problems and solutions was extremely important, and Friedman and Schwartz emphasize essentially the importance of having the right person in charge at the right time. In addition, a recent study by Monnet and Puy (2020) shows that the identity and age of governors matter in the persistence of gold standard monetary practices under Bretton Woods. Mishra and Reshef (2019) also document the importance of central bank governors' personal characteristics in shaping financial policies.

These observations give us confidence that the choice of a central bank governor is materially important. Therefore, we hand-collect systematic information on 316 central bank governor appointments in 57 countries between 1985 and 2020. To determine whether a particular appointment was politically motivated, we combine three complementary sources of information. The first involves biographical information at the time of the appointment. This includes ties with the executive branch of the government through prior employment, shared ideology with the ruling party or personal links (e.g., known friendships and family ties) as well as information about the nature of succession (e.g., whether the governor replaces a governor who was forced to resign) and the formal credentials of the governor (e.g., education and prior work experience).[8] The second source of information captures the perception of the international press on the political independence (or lack thereof) of the appointed governor. The third source of information captures the opinions of independent academic experts about the perceived political independence of a particular governor at the time of appointment in their respective countries via a large-scale survey. We sent a survey to 587 academics with expertise in macroeconomics or finance and have received responses from 289 (a response rate of 49.2%).

We compile these three sources of information into an index, ranging from 0 to 1, characterizing whether, at the time of appointment, a governor was perceived as being independent from the executive and elected politicians. We first "validate" this index by confirming that it correlates

[8]Since each of these criteria capture conceptually different aspects, which may or may not necessarily all reflect political motives, we also study each criterion separately in our empirical analysis.

with central bank governor early departures, a measure used in the literature to proxy for lower de facto CBI (Cukierman et al., 1992). We then study how this index correlates with reforms that aim to insulate the governor from political interference and how this relation changes after central banks are given more operational independence. We also examine how the index relates to the governor's perceived political independence and policy outcomes while in office.

Our main empirical findings are as follows. First, we do not find support for the hypothesis that central bank governor appointments have become more independent over time, despite significant improvements in de jure CBI. There is no discernible relation between the governor independence index (or any of its components) and measures of de jure CBI, including specific institutional reforms targeting the appointment, term in office, and dismissal of central bank governors.[9] This result is robust to using an instrumental variables approach, employing regional diffusion as an instrument for de jure CBI (Acemoglu, Naidu, Restrepo, and Robinson, 2019).

Second, not only have central bank governor appointments not become more independent on average, but our results further show that they have become more political as central banks are given more operational independence. We find that the relation between the governor independence index and institutional reforms that aim to insulate the governor from political interference turns strongly negative when central banks are given more policy or financial independence and their operations become less transparent. These results indicate that governments may be actively seeking to undo institutional reforms and undermine de facto CBI by appointing their own people into the top job. Interestingly, we find that this is contained when external constraints are present (such as the European Union accession process or an IMF support program).

Third, we find that governors perceived as more independent at the time of appointment are also thought to have behaved more independently while in office (expert survey). This result suggests that political appointments may be informative about the *de facto* independence of central bank governors while in office. Consistent with this interpretation, we find that more politically independent governors (at the time of appointment) have lower average inflation rates and deviations from stated inflation targets during their tenure. They are also less likely to experience

[9]The results hold for both developed and developing countries and also when we exclude from the sample EU countries after joining the Eurozone. The results are also robust to replacing our index with the first principal component of the individual underlying criteria the index. The key advantage of also using a principal component approach is that we do not have to make any a priori subjective decisions about the relevance or relative importance (weights) of the different criteria. As similar approach is used, for example, in Ellul and Yerramilli (2013).

a sovereign debt crisis or a currency crisis during their term. As we show, political appointments are also more strongly associated with central bank policy outcomes than de jure CBI, underscoring that while de jure CBI is necessary, it is not sufficient to ensure price and financial stability as politicians may be able "undo" institutional reforms with political appointees.

Our findings illustrate that legal independence is not sufficient to guarantee that the central bank is not captured by political interests. Indeed, recent evidence shows that central banks are receptive to political pressures (e.g., Binder, 2021; Goncharov, Ioannidou, and Schmalz, 2023) and care actively about justifying their policies (e.g., Fabo, Jancokova, Kempf, and Pástor, 2021). The results of this paper illustrate one channel through which external pressure or interference may occur. As central bank powers increase, our results imply that incentives to appoint political allies, with the explicit or implicit aim to affect future central bank policies, will likely increase.

Our findings have important policy implications as central banks are becoming increasingly more powerful. First, undue political influence on central bank appointments reduces the credibility of a central bank and therefore potentially allows the time-inconsistency problem to resurface. As our results illustrate, de jure CBI is not sufficient to guarantee effective central bank independence. Second, the design of the central bank institutional architecture, decision making, and governor appointment processes will need to be further scrutinized to ensure central banks are best equipped to achieve their goals. The 2023 Review of the Reserve Bank of Australia provides specific recommendations to best safeguard operational central bank independence.[10] The ultimate objective should be to avoid situations where, as Tucker (2018) describes, the principal (politician) that is making the agent (governor) appointment has strong incentives to appoint someone more loyal to the principal than to the central bank mandate.

The rest of the paper is organized as follows. Section 2 describes our data and their sources, including the information we collect on central bank governor appointments. Section 3 discusses how governor appointments relate to de jure CBI. Section 3 also explores whether governor appointments relate to de facto CBI, whether de facto CBI changes after policy independence, and whether political appointees are less independent while in office. Finally, Section 3 studies the relation between de jure or de facto CBI and inflation and financial stability outcomes. Section 4 summarizes our findings and discusses their implications.

[10] See: `www.rba.gov.au/about-rba/review-of-the-rba/index.html` (last accessed: November 15, 2023).

# 2 Data Description

## 2.1 Governor appointments

We aim to assess whether a governor appointment is (or is perceived to be) politically motivated, that is, skewed towards a candidate who is more likely to be loyal to the executive making the appointment rather than the central bank mandate. To mitigate subjectivity concerns associated with one criterion or source of information in isolation, we rely on multiple sources of information. In particular, we combine information from three broad sources: biographical information, press coverage, and expert assessments for each governor appointment in our sample. Our sample consists of 316 governors' appointments in 57 countries between January 1985 and January 2020.[11] In what follows, we provide a detailed description of each of the three sources of information and how we combine them into an index characterizing each central bank governor appointment. Further in Table 1 we summarize the various criteria, including the information collected and coding rules, employed in constructing the index, and provide descriptive statistics.

**Biographical information** We first hand-collect biographical information for each appointee with respect to the following four criteria: (1) ties with the executive; (2) succession; (3) education; and (4) professional experience. We explain each in turn below.

First, we hypothesize that the loyalty of an appointee towards the executive branch of the government may increase in the strength of their *ties*. Such ties could emanate, for example, from past employment, shared ideology, or family links. To capture employment ties we compile information on whether the appointed governor's most recent employment was in the executive branch of the government. A typical example is a minister in office moving to the central bank governor position.[12] For ideological ties, we examine whether the new governor's ideology aligns with the ruling party or coalition. In particular, we assemble information about any political affiliation of the governor or publicly-known partisan relationship or friendship. Then, we check whether such ideological ties (if any) align with the ones of the ruling party or coalition.[13] We also

[11] Our initial set of countries was taken from Dreher, Sturm, and De Haan (2008, 2010). Table OA1 in the Online Appendix reports the sample countries, governor names and appointment dates.

[12] For example, Leszek Balcerowicz became chairman of the National Bank of Poland in 2001 while he was deputy prime minister. Similarly, in Greece, Yannis Stournaras was the minister of finance and left the post in June 2014, following a cabinet reshuffling, to take up the central bank governor post at the Bank of Greece.

[13] For example, in France, Francois Villeroy de Galhau was nominated governor of the Banque de France in

track family links between the appointee and any member of the ruling party or coalition.[14] These data on ties are compiled and cross-checked from various sources, including central bank reports and websites of central banks, the government, and the press. When we observe discrepancies, we always side with the most official or reputable sources. As can be observed in Table 1, we find that ideological ties are the most common at 45%, followed by employment ties at 27%, and family links at 3%. About 44% of appointees have instead no ties with the executive with respect to any of these sub-criteria. In the construction of our index, we classify such appointments as not politically-motivated based on the "Executive ties" criterion (see coding rule in Table 1).

Second, the nature of succession may also potentially signal political motivations behind a subsequent appointment. For example, if a predecessor resigns due to political disagreement or conflicts, the appointing authority may seek to replace them with an individual who aligns more closely with their political views and preferences. We thus collected information on whether the appointed governor was the "natural" successor for the position (e.g., deputy governor), whether the predecessor was compelled to resign prior the end of term or they were not re-appointed despite being eligible and willing to continue.[15] Again, we rely on various sources to obtain such information (mainly from websites of central banks, governments, and the press). In Table 1, we observe that in about 30% of the cases the appointee is not the natural successor and often the predecessor was forced to resign (37%) or was not reappointed despite being eligible and willing to continue (60%). In contrast, for 13% of appointments neither of these is true and we classify these appointments as not politically-motivated based on the "Succession" criterion (Table 1).

Third, formal qualifications are critical for central bank governors, as their position requires

2015 under the presidency of Francois Hollande (socialist party). During his career in the public sector, Villeroy de Galhau served as cabinet member or advisor of socialist ministers. In Belgium, the political leaning of most central bank governors is usually public knowledge (e.g., Alfons Verplaetse, christian democrat; Guy Quaden, socialist; Luc Coene, conservative liberal; Jan Smets, christian democrat; Pierre Wunsch, liberal).

[14] For example, in Spain, Miguel Angel Fernandez Ordonez was appointed governor of the Bank of Spain in July 2006. At this time, his wife (Ines Alberdi) was deputy for the Spanish social democratic party (Partido Socialista Obrero Espanol) in the Madrid Assembly.

[15] For example, in 2016, Raghuram Rajan announced that he would not be staying for a second term as governor of the Reserve Bank of India (RBI) after initially expressing interest in a second term. In a letter to colleagues, he implied that this decision was influenced by the preferences of prime minister Narendra Modi's government. Despite restoring India's standing in international markets, Rajan's tenure at the central bank drew criticism from frustrated conservatives and small business owners eager for deep interest rate cuts (see, e.g., Ellen Barry, "Raghuram Rajan Says He'll Step Down as Head of India's Central Bank", *The New York Times*, June 18, 2016). Urjit Patel who succeeded him as governor of the RBI, resigned abruptly prior to the end of his term. *The Economist*, in its December 15, 2018 edition, reports: "Urjit Patel, ... has been replaced by Shaktikanta Das, a career civil servant who is thought to be an ally of Narendra Modi, the prime minister."

a sound understanding of the economy (Romer and Romer, 2004).[16] We hypothesize that the absence of formal qualifications for the position likely reflects a selection process tainted by political considerations. To assess the qualifications of the appointed governor we collect data on education (i.e., whether the appointee has a PhD or post-graduate degree in economics or related studies) and professional experience (e.g., top-level positions in economics or finance areas at a central bank, government, international organization, university or the private sector). Our primary source of information is the database assembled by Mishra and Reshef (2019), which we supplement and extend from various online sources (e.g., central bank websites, biographies, curriculum vitae, press). We observe that 45% of appointees have a PhD degree in economics or finance, and 77% have professional experience in at least two top-level positions (Table 1). We consider these as more independent based on the "Education" and "Experience" criteria. However, since candidates with formal qualifications may sometimes build professional experience through political appointments, including in international organizations, we also reclassify each appointment excluding the "Education" and "Experience" criteria in robustness tests.

**Press coverage** We also rely on press coverage to assess political motivations behind a governor appointment. In particular, we record whether the international press perceives an appointment as politically-motivated in an attempt to weaken the de facto independence of the central bank.

Using Factiva, we search the digital archives of all major English-speaking newspapers in the three months surrounding each appointment to obtain articles that contain the last name of the governor and the terms "appointment" or "central banker" (including variants and synonyms such as "appointed", "central bank", "nomination", "chairman", "governor"). An article must contain words pertaining to appointment and central bank governor. After collecting all articles that appear related, we proceed with human readings.[17] We first read all articles and drop the ones that do not directly relate to the appointment event. We then carefully read the remaining articles and underscore any passages of the text indicating or suggesting that the appointment was driven by political motivations in an attempt to compromise central bank independence.

[16] Prior literature shows that governors' professional experience and characteristics correlate with their policy-making. Chappell Jr, Havrilesky, and McGregor (1995) and Malmendier, Nagel, and Yan (2021) provide U.S. evidence and Göhlmann and Vaubel (2007) and Mishra and Reshef (2019) cross-country evidence.

[17] To maximize the quality of the Factiva search, two persons independently collected the press articles and releases that appear related to the appointment of each governor in the sample. The results of the two searches were compared by a third person and were supplemented wherever required.

One potential concern is that press coverage and views may be biased in different ways. For example, English-speaking newspapers may disproportionately focus on larger Western economies, coverage may be better in more recent years, and different press outlets may harbor their own biased or partisan views. In this regard, it is important to note that although a "non-political" appointment in a small economy may be less likely to receive coverage by the international press, the reverse is probably not true when salient political motivations underlie an appointment. In other words, even in small countries, the press is often more likely to cover a politically-motivated appointment rather than non-controversial ones.[18] To mitigate coverage concerns, we do not impose a minimum article count-threshold in order to flag an appointment as politically motivated based on the press. The number of articles can vary from just a handful to dozens or even hundreds. We also rely on human judgement to determine the overall tone of the press coverage. This allows us to discard biased views of some (often less reputable) newspapers. We observe that 63% of appointments are not politically-motivated based on the "Press" criterion (Table 1).

Nevertheless, concerns remain as both the process and the views of the press are clearly subjective. In what follows, we thus also assess the informational value of this criterion (as well as all other criteria that make up our index) by examining whether they correlate with ex post measures of de facto CBI used in the extant literature, such as governor departures prior to the end of term. All else equal, we expect that if the "Press" criterion is not merely reflecting noise, it will correlate positively with measures of ex post de facto independence (i.e., countries where appointments are less political, are also countries where early terminations are less likely).

**Expert assessments** Academic experts can also be a valuable source of information. Using a survey, we collect information on the perceptions of independent academic experts about the appointment and the tenure of each governor in their respective countries of origin. We note that Blinder (2000) has previously used this approach to measure central bank credibility, but we deviate by not sending the survey to economists working at, or affiliated with, these central

[18] To give an example, the Czech Republic typically does not receive much international coverage when a governor is appointed (only a handful of articles). However, the appointment of Zdenek Tuma in December 2000 generated a large number of articles (we identified more than 160 press articles and releases) because political disputes surrounding the nomination. For instance, the *The Financial Times* (December 1, 2000) reported: "The government is fuming that the president [Mr Havel] ignored its recommendations [...]. Instead Mr Havel took advantage of the resignation of Josef Tosovsky, governor since 1990, to install his own candidate." The article goes on to emphasize: "Mr Tuma, 40, [...] is identified with the president's allies in the Four Party Coalition in parliament and the Lipa business lobby."

banks.

We select academics specializing in macroeconomics or finance. For both fields, we identify, as much as possible, academics with expertise in central banking and monetary economics. Our list of experts is primarily drawn from the RePEc database, complemented by the lists of NBER and CEPR affiliates, as well as affiliates from national research and policy institutions. These experts represent a diverse range of views and training backgrounds, and exclude academics and researchers with central bank employment contracts (Fabo et al., 2021). In total, we contacted 587 academics (on average 10 per country) and assured all participants that responses will only be used for aggregate analysis while maintaining individual confidentiality. The survey was sent out by email on February 7, 2020, followed by three reminders every two weeks. We received a total of 289 responses (3 to 8 per country), resulting in a 49.2% response rate.[19]

The survey comprises of two questions related to each governor's appointment and tenure. The first question (*"In your opinion, at the time of the appointment, was [Governor's name] a politically independent central bank governor?"*) aims to assess whether at the time of appointment the expert perceived the appointment as politically-motivated. The second question (*"In your opinion, with the benefit of hindsight, was [Governor's name] a politically independent central bank governor?"*) aims to capture whether the expert perceived the governor as independent based on their tenure. We use this second question to examine whether governors who were perceived as less independent at the time of their appointment (by the experts or based on any of our other criteria) were also thought to have behaved less independently while in office.

For both questions, experts must answer either "yes", "no", or "I do not know", and were also given the option to give a comment on each appointment. To quantify the results of the survey, accounting for divergence of opinions and the different numbers of responses, we use the standard balance statistic (Pesaran and Weale, 2006).[20] We require a minimum of three answers for each appointment. For each governor, we calculate the balance statistic as the share of the number of "yes" minus the number of "no" divided by the total responses. This yields a measure for every governor that varies between -1 and 1 (by construction), representing the opinion of

[19]The 289 responses include 22 partial responses. The response rate is similar to Blinder, Ehrmann, De Haan, and Jansen (2017), who in 2016 surveyed academics about the practice of monetary policy in several countries.

[20]Nardo (2003), Pesaran and Weale (2006), and Greenwood and Shleifer (2014), among others, favor the "balance statistic" approach to generate quantitative measures from categorical survey data.

the majority of respondents. "I do not know" answers are not treated as missing values, but take the (neutral) value of 0 and are counted as part of the total number of responses per governor. Hence, the higher number of "I do not know" per governor, the closer the value to zero. If the balance statistic has a value above 0, we classify that appointment as politically independent according to the experts' opinions. We find that 61% (58%) of governors were perceived by the experts as independent at the time of appointment (based on their tenure).[21] The "Experts" criterion in the construction of our index is based the first question (see Table 1).

**Governor independence index** To characterize each appointment, we combine the six criteria—"Executive ties", "Succession", "Education", "Experience", "Press", and "Experts"— into an overall index, which we refer to as the governor independence (GI) index, as follows:

$$\mathrm{GI}_{i,t} = \frac{1}{n}\sum_{j=1}^{n} C_{i,t}^{j}, \tag{1}$$

where $C_{i,t}^{j}$ equals 1 if the appointment of governor $i$ at time $t$ is viewed as independent of political motives according to criterion $j$, and equals 0 otherwise. The subscript $j$ can be $1, 2, \ldots, n$ with $n = 6$. For example, for $j = 1$ our first criterion is a dummy variable that equals 1 if the appointed governor does not have any executive ties (i.e., through either past employment, ideology, or family links), and equals 0 otherwise. The overall index, $\mathrm{GI}_{i,t}$, takes values between 0 and 1, with higher values indicating higher governor independence. Each of the six criteria is weighted equally. However, since each criterion captures conceptually different aspects, which may or may not necessarily all reflect political motives, in our empirical analysis we also study each criterion separately. In robustness tests, we also exclude the "Education" and "Experience" criteria from the computation of the $\mathrm{GI}_{i,t}$ index or use the first principal component of the 16 sub-criteria forming the GI index. The main advantage of using the principal component instead of the index is that we do not have to subjectively eliminate any criteria, or make any subjective judgements about their relative importance or groupings (see, e.g., Ellul and Yerramilli, 2013).

We are able to compute the GI index for 257 out of the 316 governors in the sample (information for the various criteria is sometimes missing for a different set of observations). Table 1

[21] Figure OA1 in the Online Appendix shows for each country the extent to which experts perceive governor independence differently at their appointment (first question) and at the end of their tenure (second question).

shows that the GI index averages at 0.50 with a standard deviation of 0.25. The GI index tends to be higher, on average, in developed countries compared to developing ones.[22]

**Index validation** In Table 2, we confirm that the GI index correlates with commonly used measures of de facto CBI in the literature. In particular, high turnover rates and departures prior to the end of term have long been regarded as indicators of low de facto CBI (Cukierman et al., 1992; Cukierman and Webb, 1995; Crowe and Meade, 2007; Dreher et al., 2008; Artha and de Haan, 2015). Hence, employing a Cox (1972) hazard model, we study how the GI index and each of its six criteria relate to early departures. We find that more independent appointments (i.e., with higher GI values) are associated with a lower hazard rate, indicative of higher de facto CBI, after controlling for time-varying country characteristics and country- and decade-fixed effects (see column 1).[23] The estimated coefficient indicates that a one-standard deviation increase in the GI index (i.e., by 0.252), is associated with a 39.1% lower probability that a governor leaves the office prior the end of their term (i.e., $\exp(1.311 \times 0.252) = 1.391$). Further in columns (2)-(7), we show that four out of six criteria ("Succession", "Experience", "Press", and "Experts") are associated with a lower likelihood of early departures (i.e., have negative and statistically significant coefficients). Overall, these findings support the informational value embedded in the GI index (i.e., GI does not merely capture noise) and suggest that more independent appointments based on GI are generally associated with higher de facto CBI.

In column (8) of Table 2, we also report a similar validation test for "Experts (hindsight)" — the variable we use to examine whether more independent appointees are also thought to have behaved more independently during their time in office. Results are similar.

[22] We find that in developed countries the average GI index is 0.55, while in developing countries, it is only 0.44. The difference between the two groups is statistically significant at the 1% level, with a $t$-test = 3.55. For this comparison, we use the World Bank's income classification and classify high-income countries as "developed countries" and low, lower-middle, and upper-middle countries as "developing countries".

[23] The hazard rate indicates the likelihood that a governor leaves office at a specific time during their term, conditional on not having left the office by that time. Figure OA2 in the Online Appendix shows additional information on how the estimated hazard rate varies over the term of a governor. We find that the baseline hazard function is U-shaped (i.e., at the beginning of the term, the hazard rate decreases as time passes, but this reverses as governors approach the end of their term). We also observe from the Kaplan-Meier survival curve, that the estimated likelihood of a governor surviving decreases quickly after the first two years into their term.

## 2.2 De jure CBI and other country characteristics

To measure de jure CBI we rely on indexes from the existing central banking literature. We use three such indexes: (1) Cukierman et al. (1992) (henceforth CWN); (2) Grilli et al. (1991) (henceforth GMT); and (3) Romelli (2022) (henceforth ROM).

Each of these indexes encompasses a broad spectrum of central banks' institutional aspects, including procedures for appointing and removing central bank governors and board members, central bank policy objectives, independence in setting monetary policy, and restrictions on lending to the government. ROM, the most recent index, extends CWN and GMT by incorporating two critical dimensions, "financial independence" and "accountability", and introduces time-variation. Data for all these three indexes are taken from Romelli (2022) who extended the CWN and GMT indexes until 2017, and introduced time-variation. In our empirical analysis, we use this time-variation to identify the timing of the different legislative reforms introduced in each country in order to strengthen the institutional independence of its central bank.

Each of the three de jure CBI indexes ranges from 0 (indicating no independence) to 1 (representing full independence). Table OA2 in the Online Appendix reports descriptive statistics for these indexes. As can be seen, the ROM index has an average value of 0.623, ranging widely from 0.146 to 0.929. Descriptive statistics (unreported) for CWN and GMT are very similar as the three indexes are highly correlated (pairwise correlations range from 0.87 to 0.92). In our empirical analysis, we employ the ROM index as our baseline measure of de jure CBI (extrapolated to 2020) and provide robustness tests using the CWN and GMT indexes. Hence, unless explicitly stated otherwise, the label "de jure CBI" in our tables refers to the ROM index.

We also complement the data on the institutional design of central banks with data on the broader quality of institutions in each country, such as "democratic accountability", "law and order", and "government stability" from the International Country Risk Guide (ICRG). As shown in Table OA2, there is substantial variation in the quality of institutions in the sample.

In Figure 1 we report the average difference ("gap") between the de jure CBI index and the GI index for each country. The red bars indicate the average gap between the two indexes. Positive gaps (red bars above zero) signify countries where the de jure index suggests a higher degree of central bank independence than the GI index. The opposite is true for countries with

negative gaps. Countries are sorted based on the size of the gap. Bolivia and Venezuela top the list with the largest positive gaps, followed by Austria, Lithuania, Luxembourg, Cyprus, China, Romania, and Bulgaria. On the other end of the spectrum, the United Kingdom, Australia, and Switzerland have the largest negative gaps. The average "gap" in Figure 1 is 0.15 and tends to be lower in developed countries compared to developing countries (0.11 vs. 0.20).

# 3 Results

## 3.1 Governor appointments and de jure CBI

The original motivation for granting central bank independence was to shield central banks from political interference. If these reforms are effective, we would expect that appointments at the top position would become—and perceived to be—more politically independent as de jure CBI increases. After all, such reforms include, among other things, provisions to safeguard both the appointment and the tenure of the central bank governor from political interference. This narrative predicts a positive correlation between the GI index and measures of de jure CBI. If, instead, politicians try to retain control by appointing allies, we would expect either no correlation, or even a negative correlation between both GI and de jure CBI indexes.

The results in Figure 2 and Table 3 suggest that this second narrative fits the data better. In Figure 2, we observe a significant increase in de jure CBI indexes after 1997 when many countries began granting more independence to their central banks. In contrast, the GI index remains relatively stable and even decreases slightly until the Global Financial Crisis when it shows a temporary moderate increase. Furthermore, in Table 3 we observe that the GI index and all its criteria do not exhibit strong correlations with de jure CBI index, both in terms of economic and statistical significance. Based on these results, it does not appear that more independent governors are appointed as de jure CBI increases.

However, as observed in Table 3, de jure CBI and the GI index also correlate with other country characteristics. Hence, to more formally examine their relationship, we estimate the following baseline model with controls, relying primarily on within-country variation:

$$\text{GI}_{i,k,t} = \beta \cdot \text{de jure CBI}_{i,t} + \gamma \cdot X_{i,t}^{'} + \alpha_i + \mu_t + \epsilon_{i,k,t}, \tag{2}$$

where $\text{GI}_{i,k,t}$ indicates whether the appointment of governor $k$ in country $i$ at time $t$ was perceived as politically independent, based on the GI index or each of its six criteria individually. As mentioned earlier, higher GI values signify more independent appointments. The variable de jure $\text{CBI}_{i,t}$ measures the institutional independence of the central bank in country $i$ at time $t$. The matrix $X_{i,t}^{'}$ includes other country characteristics reflecting the broader quality of institutions in a country, such as democratic accountability, law and order, and government stability (see Appendix A for detailed variable definitions and data sources).

Importantly, in the most saturated specifications, the model includes country-fixed effects, $\alpha_i$, which help account for any unobserved, time-invariant country characteristics not captured by the institutional controls. This allows us to identify the coefficient of interest, $\beta$, using within-country variation. Furthermore, the model also includes decade-fixed effects, $\mu_t$, which further control for aggregate time trends that are common across countries. Lastly, the model is estimated at the governor appointment level using ordinary least squares (OLS). The standard errors are corrected for heteroskedasticity and clustered at the country level.

Results are reported in Table 4.[24] We begin in column (1) with a specification without any control variables. In line with Table 3, we find that the coefficient $\beta$ is statistically insignificant and economically very close to zero. The point estimate is $-0.031$ indicating no discernible relationship between the GI index and the de jure CBI index. In column (2), we introduce controls for other institutional country characteristics. Notably, the coefficient of interest, $\beta$, remains virtually unchanged. Among the control variables, we find that democratic accountability has a positive and statistically significant coefficient. This suggests that in countries with free and fair elections, where governments are responsive to their people, central bank governor appointments are more independent. Further in column (3), we include country-fixed effects, which means that the coefficients are identified using within-country variation. The coefficient of interest, $\beta$, is economically somewhat larger (0.097), but remains statistically insignificant. The introduction

[24] As mentioned earlier, the label de jure CBI refers to the ROM index, our baseline indicator of de jure CBI. Results are very similar if we use GWN or GMT instead of ROM (see Table OA3 in the Online Appendix.)

of decade-fixed effects in column (4) does not alter this key result.[25]

Further in columns (5)-(10) of Table 4, we open up the GI index into its six criteria. This enables us to examine the relation between de jure CBI and each of criterion. This investigation is important because the choice of the various criteria is inherently subjective, and while these criteria are positively correlated, they often capture different aspects.[26] Importantly, even when we explore each criterion separately, we find no discernible relation with any criterion. This result is further maintained in column (11) when we replace the GI index with the first principal component of the 16 sub-criteria that contribute to the GI index, GI PCA.[27] The key advantage of using the GI PCA is that we do not need to make any subjective decision about the relative weight or grouping of each of the 16 sub-criteria that determine the overall GI index. As shown in column (12), results remain very similar if we also exclude the "Education" and "Experience" criteria from the computation of the $\text{GI}_{i,k,t}$ index.

Further, in Table 5, we estimate similar specifications of Eqn. 2 where we replace the overall de jure CBI index with its first component (i.e., the first component of ROM), which pertains to institutional provisions aiming precisely to enhance personal independence by safeguarding the appointment, tenure, and dismissal of governors and their boards from political interference. If central bank institutional reforms are effective in reducing political appointments, we should, at the very least, observe a positive relation between GI and de jure CBI governance (i.e., the first component of ROM). However, as shown in column (1), no such relation is evident. The estimated coefficient of the de jure CBI governance is statistically insignificant and economically negligible at 0.002. For completeness, in the remaining columns of Table 5, we report results of corresponding specifications for each component of the de jure CBI index. We find again no systematic relation between GI and each component, both individually and jointly.

[25] Figure OA3 in the Online Appendix reports the estimated $\beta$ for each country separately.

[26] As evident from Table 3 the pairwise correlations between the GI index and each of its six criteria are often positive and statistically significant, but never near 1 indicating that each criterion reflects distinct sources of information. Notably, "Executive ties" exhibits the strongest positive correlation with "Press". This indicates that the presence of executive ties may be an important factor behind the press's views.

[27] We perform a singular value decomposition of the correlation matrix of the individual sub-criteria that form the index. We use the eigenvector from this decomposition with the highest eigenvalue (i.e., the first principal component, which we refer to as "GI PCA") as the dependent variable instead of GI. Table OA4 in the Online Appendix reports the correlation between the GI PCA and GI indexes (Panel A) as well as the loadings of the original 16 sub-criteria on GI PCA (Panel B). The correlation is 0.81 and the criteria have positive loadings.

**Instrumental variable approach** A potential concern regarding these results is the possibility that omitted time-varying country characteristics, correlated with both de jure CBI and governor appointments, are biasing our estimates. Hence, to explore whether such endogeneity concerns are responsible for the lack of correlation between the GI index and de jure CBI indexes, we employ an instrumental variable approach. The adoption of CBI reforms is highly clustered, both temporally and spatially, consistent with the idea that adoption is the result of information spreading across neighboring countries (Simmons and Elkins, 2004; Abiad and Mody, 2005). Hence, exploiting the regional CBI diffusion and following Acemoglu et al. (2019), we define our instrument as the jackknife average of CBI in a region in a given year, excluding the observation for the country of interest. This instrument likely satisfies the exclusion restriction because de jure CBI in other countries, within the same region, should not be correlated with a governor appointment in the focal country for reasons other than affecting its de jure CBI reforms.

Using the regional diffusion measure as an instrument for de jure CBI, we estimate specifications of Eqn. 2 that are similar to those presented in Table 5 using two-stage least squares (2SLS). The results are reported in Table 6. In Panel A, we provide the second-stage results, while in Panel B, we present the results of the first-stage regression, along with the corresponding F-statistic values that indicate the strength of the instrument in the first-stage regression. The F-statistic values range from 19 to 29, comfortably passing the "weak instrument" test. Importantly, the 2SLS estimates in Panel A are consistent with the OLS estimates from Table 4. Across all ten specifications, we consistently find no systematic relationship between de jure CBI and the GI index or any of its six components. As previously discussed, our results do not support the notion that central bank governor appointments become more independent as countries enact reforms to insulate their central banks and their agents from political interference.

**Additional robustness checks** In robustness tests, reported in Table OA5 in the Online Appendix, we confirm that our baseline results hold for both developed and developing countries. Specifically, we find no systematic association between the GI index and the de jure CBI index for either set of countries. Further in Table OA5, we also confirm that results are robust to excluding Eurozone central banks from the sample. Although Eurozone central bank governors are members of the ECB's governing council, the ECB's main decision body, and vote on monetary policy and

financial stability decisions, one could argue that their influence (and thus incentives to appoint political allies) may be lower compared to when these decisions are made at a national level. Once again, we do not find any systematic association between de jure CBI and the GI index, indicating that the lack of a systematic relationship between de jure CBI and the GI index is not driven by the inclusion of Eurozone central banks in the sample.

### 3.2 Are appointments more political after policy independence?

Our findings thus far do not support the idea that central bank governor appointments become, or are perceived to be, more independent as countries pass reforms to insulate their central banks and their agents from political interference. One could in fact argue that politicians' incentives to appoint governors who are less likely to act independently may become stronger when the decision-making individuals are insulated from external pressure. As Aklin and Kern (2021) point out "CBI solves the time inconsistency problem faced by policy-makers with respect to monetary policy [...] it does not solve their underlying incentives to manipulate the economy for political gains [...]". Policy reforms may thus give rise to a "seesaw effect": when a policy reform takes place in one dimension, but the political equilibrium remains largely unchanged, politicians may try to use a different instrument to attain the goal previously targeted with the instrument that is being reformed (Acemoglu et al., 2008).

To retain control, politicians' incentives to "undo" independence through political appointments may thus become stronger when a central bank and its agents become more independent (Adolph, 2013). To bring this hypothesis to the data, we examine how the within-country relationship between GI and de jure CBI governance changes after a central bank is granted policy independence by estimating the following specification:

$$\begin{aligned} \text{GI}_{i,k,t} = \beta_1 \cdot \text{de jure CBI governance}_{i,t} + \beta_2 \cdot \text{de jure CBI governance}_{i,t} \cdot \text{Main policy reform}_{i,t} \\ + \beta_3 \cdot \text{Main policy reform}_{i,t} + \gamma \cdot X_{i,t}^{'} + \alpha_i + \mu_t + \epsilon_{i,k,t}, \end{aligned} \tag{3}$$

where the variable, de jure CBI governance$_{i,t}$, indicates the first component of de jure CBI

(ROM index) in country $i$ at time $t$. The variable, Main policy reform$_{i,t}$, takes the value of 1 after the first significant legislative reform granting policy independence to the central bank in country $i$, and 0 otherwise. For instance, in the case of the United Kingdom, the variable, Main policy reform$_{i,t}$, equals 1 from 1998 onward, corresponding to the time when the Bank of England was given policy independence for the purpose of maintaining price stability.[28] All other variables are the same as in Eqn. 2. A positive $\beta_1$ indicates that prior to policy independence, reforms aiming at improving the appointment and tenure of the governor and its board are also reflected in more independent governor appointments. A negative $\beta_2$ indicates that after a central bank is granted independence the relation weakens or even reverses if the combined coefficient, $\beta_1 + \beta_2$, becomes negative and statistically significant, consistent with our hypothesis.

The results are reported in Table 7. In column (1), we estimate a specification for the overall GI index. We find that $\beta_1$ is close to zero (0.051) and statistically insignificant, while $\beta_2$ is strongly negative ($-1.074$) and statistically significant. The combined coefficient is negative and statistically significant, indicating that as countries undertake reforms to safeguard their central bank governors and their boards from political interference, governor appointments become less independent if the central bank enjoys independence in setting policy. In columns (2)-(7) of Table 7 we open up the GI index into its six criteria. We find that the negative relation is primarily driven by "Executive ties", "Education", "Experience", and "Experts". "Press" has a negative but statistically insignificant coefficient, $\beta_2$. The only criterion that has a positive and statistically significant $\beta_2$ is "Succession", indicating that the "graduation" of the deputy to the top post becomes more frequent after central banks are given policy independence. Further in column (8) of Table 7, we replace the GI index with the first principal component of its 16 sub-criteria, GI PCA. The same pattern holds in column (9) when we exclude the "Education" and "Experience" criteria from the computation of the GI$_{i,k,t}$ index.

**Robustness analysis and interpretation** While the variable, Main policy reform, is defined based on the timing of policy independence, this should not be interpreted narrowly as indicating solely policy independence, but rather as reflective of a broader increase in de jure independence. Often, when central banks are given independence in setting policy, other institutional reforms

[28] Table OA6 in the Online Appendix reports the corresponding specific year for each central bank in the sample.

are introduced to support the central bank in its policy objectives (Romelli, 2022). As these broader reforms correlate and interact with policy independence, it is virtually impossible to attribute the results to one specific reform. A broader interpretation is warranted.

In Table 8, we nevertheless report robustness analysis using alternative definitions of the variable, Main policy reform, based on the timing of other related reforms. While using these alternative definitions cannot pinpoint the results to any specific reform, they can help reveal which other reforms produce similar results (i.e., contain similar explanatory power) and thus are potentially significant. We examine four sets of reforms supporting de jure CBI: policy objectives, limits on lending to the government, financial independence, and accountability.[29] We find that policy objectives and lending limits have no explanatory power, while financial independence, and, to a lesser extent, accountability, yield results similar to Table 7, indicating that the reforms may also be potentially important (see e.g., Goncharov et al., 2023).

**External constraints: EU and IMF** We also study whether external constraints strengthen the relationship between GI and de jure CBI indexes. In particular, we examine instances where a country faces external pressure to grant more independence to its central bank—that is, situations where the divergence between both indexes should theoretically be lower. Employing specifications similar to Eqn. 3, we consider two forms of external constraints: EU accession and IMF conditionality for financial assistance. Regarding EU accession, we replace the dummy variable, Main policy reform$_{i,t}$, with a dummy variable equal to 1 starting from five years before a country joins the EU to capture the preparation process, and equal to 0 otherwise. Concerning IMF conditionality, we replace the dummy variable, Main policy reform$_{i,t}$, with a dummy variable equal to 1 when a country is under an IMF assistance program, and equal to 0 otherwise. As can be observed in Table 9, we find that greater de jure independence correlates positively with more independent appointments only when countries are subject to external constraints.

Overall, our findings thus far suggest that as countries enhance the institutional independence of central banks, central bank governor appointments do not become more independent. This holds even when institutional reforms aim specifically to insulate the appointment process and

[29]To avoid multicollinearity, we consider each of these additional reforms separately. For each of these four main reforms, we construct a dummy variable defined similarly to the variable, Main policy reform$_{i,t}$, in Eqn. 3. The Appendix A provides detailed definitions of these variables and Table OA6 in the Online Appendix reports the relevant year for each set of additional reforms in each country.

the tenure of central bank governors from political interference. In contrast, we observe a strong negative relationship between independent governor appointments and institutional reforms that shield governors from political interference, particularly as central banks gain policy or financial independence and increase transparency. However, this negative correlation does not apply when local politicians face external constraints from the EU or the IMF.

### 3.3 Are political appointees less independent in office?

An important question that arises is whether appointees thought to be less independent at the time of their appointment are also thought to behave less independently while in office. To address this question, we leverage the questionnaire sent to independent experts. While the first question of the questionnaire is related to the appointment event itself, the second question asks whether, with hindsight, the governor acted independently while in office. We create a variable based on the second question, which we refer to as "Experts (hindsight)", using the balance statistics approach described earlier. We then examine whether this variable correlates with our GI index and its criteria using specifications similar to Eqn. 2. If appointees who are perceived as less independent at the time of their appointment are also viewed to have behaved independently while in office, we should observe a positive and statistically significant relationship between "Experts (hindsight)" and the GI index and its criteria.[30]

The results are reported in Table 10. Starting in column (1), we report the most parsimonious specification without control variables or fixed effects, and progress to column (4), with the full set of control variables and fixed effects. Across these columns, we consistently find a strong and positive relationship between "Experts (hindsight)" and the GI index.[31] In columns (5) to (10), we also estimate corresponding specifications for each of the criteria of the GI index. We find a positive and statistically significant relationship with each of the six criteria, except for "Succession", whose coefficient is positive but not statistically significant.

Overall, the positive relation observed between perceived independence at the time of appoint-

[30] Figure OA4 in the Online Appendix reports this evolution across space. It shows co-movement patterns between the GI index and the Experts (hindsight) variable for each country.

[31] One concern that arises is that the positive correlation may be due to the fact that the sixth criterion, "Experts", of the GI index is constructed from the opinions of the same individuals. To investigate this possibility in Table OA7 in the Online Appendix, we exclude the "Experts" criterion from the GI index construction and replicate the analysis of Table 10. The results remain unchanged indicating that the positive relation between "Experts (hindsight)" and the GI index is not simply driven by its sixth criterion.

ment (as measured by the GI index and each of its criteria) and the retrospective perceptions of independence by experts during the governors' tenure indicates that the GI index is informative about the de facto independence of central bank governors.

### 3.4 Are political appointees associated with worse policy outcomes?

Alesina and Summers (1993) present evidence that independent central banks tend to be associated with lower inflation rates, but later studies challenge this association (see, e.g., Barro, 1997; Balls, Howat, and Stansbury, 2018; Haldane, 2020). One possible reason is that the Alesina and Summers (1993) finding is not robust, or disappears once central banks begin targeting inflation. Another possible explanation is that de jure CBI does not necessarily reflect de facto CBI.

To investigate this hypothesis, we study the cross-country relationship between de jure CBI and GI with the average inflation rates (or inflation gaps) in each country. As can be observed in Figure 3, Panel A, the relation between de jure CBI and inflation rates is weak with a correlation very close to zero (0.043).[32] Using the GI index instead of the de jure CBI index in Panel B yields instead a stronger negative relationship (-0.215). This result is maintained if instead of the average inflation rates in each country we use the average inflation gaps for central banks with explicit inflation targets (Bernanke, Laubach, Mishkin, and Posen, 1999). Following Goncharov et al. (2023), we compute the "inflation gap" between the level of inflation and the central bank's stated inflation target (25 countries). As can be observed in Panel C, the correlation between the de jure CBI index and the inflation gap is negligible (-0.085), while the correlation in Panel D between the GI index and the inflation gap is strongly negative (-0.587).

We also study these relationships using a multivariate regression framework at the governor appointment level. In particular, we regress the average inflation rate during the tenure of a governor on the governor's GI score or the country's de jure CBI at the time of appointment. The results are reported in Table 11.[33] We find that the average inflation rate during a governor's tenure is lower when the central bank enjoys stronger de jure independence (column 1). We also find that more independent appointees (i.e., with higher GI values) attain lower inflation rates during their tenure (column 2). This key result is maintained if we control for de jure CBI

[32]Results are the same results if instead of average inflation rates we use median inflation rates.

[33]We use the logarithmic transformation of the average inflation rate (following, e.g., Lane, 1997; Kang and Pflueger, 2015).

(column 3) or other country characteristics (column 4) or if we exclude Eurozone central banks (column 5). Instead, de jure CBI looses its statistical insignificance when we control for other country characteristics (column 4). Further, in columns (6)-(9), we also report results on inflation gaps for the sub-sample of central banks with explicit inflation targets. We find that that more independent appointees attain inflation gaps during their tenure. This result is robust across all specifications. De jure CBI is instead statistically insignificant in all specifications.

In a final set of tests in Table 12, we also explore the relationship between de jure CBI and the GI index with broader outcomes of financial stability. In particular, using similar multivariate regression models, we examine whether the de jure CBI and GI indexes relate to the likelihood of a country experiencing a sovereign, currency, or banking crisis during a governor's term. We find that de jure CBI does not have a statistically significant relationship with the likelihood of crises of any type (columns 1-3), suggesting that legal independence alone does not have a discernible impact on financial stability. In contrast, the coefficient of the GI index indicates that more independent governors are less likely to experience a sovereign debt crisis or a currency crisis during their term. We find instead no systematic relationships with banking crises.[34] As shown in columns (4)-(6), results are robust to excluding Eurozone countries from the sample.

Overall, de facto central bank independence, as captured by the GI index, is more strongly associated with inflation and financial stability outcomes than de jure independence. Our preferred interpretation of these findings is that de jure independence is necessary, but not sufficient to ensure attaining inflation targets and maintaining financial stability.

# 4 Conclusions

Our work adds to the literature on political economy and central banking by presenting systematic evidence on central bank governor independence in a large set of countries in the past few decades. We do not find that governor appointments become more independent as the legal framework determining the degree of central bank independence improves; if anything, governor appointments appear to become more political following reforms granting central banks operational independence. Additional results indicate that politically-motivated governor ap-

[34]In unreported robustness tests, we confirm that this result holds for central banks with and without bank supervisory responsibilities or if allow for a time-lag in the build up of imbalances in the banking sector.

pointments are associated with lack of de facto central bank independence and worse inflation and financial stability outcomes. Our findings suggest that governments actively seek to undo the goal of these institutional reforms by using the appointment process politically.

Central banks are increasingly becoming more powerful, especially after the Global Financial Crisis and Covid Pandemic. Their objectives have expanded from inflation targeting to financial stability, and their instruments now include not just overnight bank-lending interest rates but also liquidity provisions and quantitative easing that have increased their balance sheets to historical records. Central banks have also taken over new responsibilities in banking supervision and bank resolution. Therefore, the design of central bank institutional architecture is becoming an even more important issue, especially as the central bank mandate is changing to include developing policies towards climate finance, stress tests, and digital currencies.

This change has recently been described as "mission creep" by Senator Toomey and is therefore controversial. Specifically, in a recent letter to Federal Reserve Bank of San Francisco (FRSBF) President Mary Daly, Senator Toomey emphasized that extending the mission of central banks to social issues like climate change will essentially endanger the independence of central banking in the United States.[35] The letter illustrates that the selection of a central banker who will strictly follow the central bank's mandate and will not deviate to other policies outside the central bank's mandate becomes a critical issue. Equivalently, selecting a central bank governor who may deviate from the central bank's mandate in a particular political direction can be a cause for concern for legislators worried about de jure independence.

Our findings indeed illustrate that legal independence is not sufficient to guarantee that the most suitable appointment will be made, or the appointment will not to be captured by political interests (a point that Senator Toomey's letter explicitly makes). As central bank power increases, and is recognized more widely to be increasing, it is likely that political pressure or political interference can occur during a governor's appointment process, with the explicit or implicit aim to affect future central bank policy. Such interference will essentially prevent de jure central bank independence from resolving any time inconsistency problems that politicians may be facing. Moreover, our results also apply to any other institution that has de jure independence; ensuring that de jure translates to de facto independence becomes an important concern in areas

[35]See: `www.banking.senate.gov/newsroom` (last accessed: February 28, 2022).

beyond central banking (a judge or an independent auditor general, for example).

How can societies ensure that de facto independence is safeguarded? This is not an easy question to answer. As Tucker (2018) points out, the principal (government) making the agent (governor) appointment has incentives to appoint someone loyal to the principal rather than the mandate. This automatically creates barriers to true (as opposed to legal) central bank independence. Moreover, at the same time, such pressures create an adverse selection problem where candidates who feel strongly aligned with the central bank mandate are deterred from applying for the governor job. Overall, our findings suggest that the governor appointment process and its final outcome are extremely important in selecting a candidate who are, and are perceived to be, independent from political constraints.

Given the large amount of unelected power vested to the central bank governor, it is vital to maintain some form of accountability to elected politicians. Such accountability could include formally having to regularly inform parliament of developments in all areas of central bank policy (Fraccaroli, Giovannini, and Jamet, 2021; Masciandaro, Ferrara, Moschella, and Romelli, 2021). Moreover, designing central banks where decisions are made by committees (Blinder et al., 2017), rather than by one individual, could improve trust between politicians and the independent central bank, or introduce checks and balances that improve final outcomes (Persson, Roland, and Tabellini, 1997). Publishing verbatim transcripts or minutes of decisions, when this is legally possible, could also address trust deficits as increased transparency may have the virtue of disciplining policy decision-making (Hansen, McMahon, and Prat, 2018). In fact, accountability is a way to allay the fears of elected politicians that unelected central bank governors are a threat requiring ex ante interference in the appointment process. Therefore, not only do institutions need to be created to safeguard the attraction and appointment of the most suitable candidates, societies need to simultaneously pay attention to the accountability process.

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Table 1: Coding rules and descriptive statistics for the GI index and its (sub-)criteria

| | N | Mean | SD |
|---|---|---|---|
| **C1. Executive ties** | **292** | **0.442** | **0.497** |
| C1.1. The latest position of the appointee is in the executive branch of the government | 297 | 0.269 | 0.444 |
| C1.2. The appointee has a prior link to the ruling political party/parties via any of the following: prior electoral mandate, publicly known partisan relationship/friendship | 294 | 0.446 | 0.498 |
| C1.3. The appointee has a prior link to the ruling political party/parties via family ties (up to third-degree family members) | 299 | 0.030 | 0.171 |
| *Coding rule:* If none of the above = 1, then "Executive ties" = 1 (i.e., independent based on criterion C1) | | | |
| **C2. Succession** | **296** | **0.132** | **0.339** |
| C2.1. The appointee is not the 'natural' successor (deputy governor) | 298 | 0.295 | 0.457 |
| C2.2. The appointee replaces a governor who was forced to leave prior to the end of term | 297 | 0.370 | 0.484 |
| C2.3. The appointee replaces a governor who was not reappointed, despite being eligible and willing to continue | 297 | 0.599 | 0.491 |
| *Coding rule:* If none of the above = 1, then "Succession" = 1 (i.e., independent based on criterion C2) | | | |
| **C3. Education** | **307** | **0.450** | **0.498** |
| C3.1. The appointee has a PhD degree in Economics or Finance | | | |
| *Coding rule:* If C3.1. = 1, then "Education" = 1 (i.e., independent based on criterion C3) | | | |
| **C4. Experience** | **297** | **0.778** | **0.416** |
| C4.1. In the past, the appointee held a top-level position (i.e., deputy governor, executive or non-executive member of the board of directors) at a central bank | 306 | 0.461 | 0.499 |
| C4.2. In the past, the appointee held a top-level position in international organizations promoting economic, monetary, and financial stability (e.g., IMF, WB, BIS, OECD, EBRD, EIB, IDB) | 297 | 0.215 | 0.412 |
| C4.3. In the past, the appointee held a top-level position in branches of the government in charge of economic affairs (e.g., treasury, ministry of finance, ministry of economic affairs, central planning bureau) | 299 | 0.575 | 0.495 |
| C4.4. In the past, the appointee held a high-level position in a related discipline at an academic institution (e.g., university professor in Economics, Finance, Law or other related discipline) | 299 | 0.455 | 0.499 |
| C4.5. In the past, the appointee was member of the council of economic advisors or an equivalent body providing independent advice to the government | 297 | 0.111 | 0.315 |
| C4.6. In the past, the appointee held a top management position in the private financial sector | 297 | 0.293 | 0.456 |
| C4.7. In the past, the appointee held a position other than deputy governor or member of the board of directors of a central bank | 297 | 0.303 | 0.460 |
| *Coding rule:* If at least two of the above = 1, then "Experience" = 1 (i.e., independent based on criterion C4) | | | |
| **C5. Press** | **316** | **0.630** | **0.484** |
| C5.1. The international (English-speaking) press explicitly reports the appointment as "political" | | | |
| *Coding rule:* If C5.1 = 0, then "Press" = 1 (i.e., independent based on criterion C5) | | | |
| **C6. Experts** | **293** | **0.611** | **0.488** |
| C6.1. The majority of academics surveyed indicates that the appointment is "political" | | | |
| *Coding rule:* If C6.1 = 0, then "Experts" = 1 (i.e., independent based on criterion C6) | | | |
| **Governor Independence (GI) index** | **257** | **0.499** | **0.252** |
| *Coding rule:* GI index = $(C1 + C2 + C3 + C4 + C5 + C6)/6$ (i.e., Eqn. 1) | | | |

| | |
|---|---|
| Sample period | Jan 1985 – Jan 2020 |
| Number of countries | 57 |
| Number of governors | 316 |

Note: The table presents details about the construction of the GI index and descriptive statistics for all criteria and sub-criteria used in its construction. The GI index aggregates six main criteria (i.e., "Executive ties", "Succession", "Education", "Experience", "Press", and "Experts") characterizing the extent of independence of central bank governors at the time of their appointment. Each criterion is based on sub-criteria about governors' biography (criteria 1 to 4) or perception of the press and experts about their independence (criteria 5 and 6). We construct the GI index using the coding rules as explained in the table. The GI index is the sum the six main criteria, divided by 6. The GI index thus ranges between 0 and 1, with higher value indicating higher governor independence.

Table 2: Survival analysis

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Dependent variable: | $h_k(t)$ | | | | | | | |
| GI | -1.311*** | | | | | | | |
| | [-3.022] | | | | | | | |
| Executive ties | | -0.275 | | | | | | |
| | | [-1.095] | | | | | | |
| Succession | | | -0.751** | | | | | |
| | | | [-2.004] | | | | | |
| Education | | | | 0.093 | | | | |
| | | | | [0.333] | | | | |
| Experience | | | | | -0.460** | | | |
| | | | | | [-2.088] | | | |
| Press | | | | | | -0.567** | | |
| | | | | | | [-2.395] | | |
| Experts | | | | | | | -0.682** | |
| | | | | | | | [-2.496] | |
| Experts (hindsight) | | | | | | | | -1.297*** |
| | | | | | | | | [-3.108] |
| Democratic accountability | -0.236** | -0.349*** | -0.355*** | -0.272** | -0.253** | -0.252** | -0.205 | -0.119 |
| | [-2.029] | [-3.202] | [-3.344] | [-2.212] | [-2.040] | [-2.135] | [-1.634] | [-0.857] |
| Law and order | -0.214* | -0.141 | -0.135 | -0.173* | -0.181* | -0.155 | -0.190* | -0.223** |
| | [-1.873] | [-1.321] | [-1.301] | [-1.707] | [-1.765] | [-1.570] | [-1.815] | [-2.152] |
| Government stability | -0.210** | -0.222*** | -0.191** | -0.153** | -0.145** | -0.162** | -0.172** | -0.148** |
| | [-2.384] | [-2.653] | [-2.214] | [-2.257] | [-2.143] | [-2.303] | [-2.527] | [-2.203] |
| Country FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Decade FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 241 | 270 | 275 | 284 | 278 | 291 | 269 | 269 |
| Early departures | 64 | 78 | 80 | 82 | 78 | 86 | 78 | 78 |

Note: This table presents estimates of the effect of governor appointments on the likelihood that a governor leaves office prior to the end of the term based on a survival analysis. The period from the beginning of a governor's term in office until early departures is the "term duration". In the model, the hazard rate, $h_k(t)$, is the likelihood that a governor $k$ leaves office at time $t$, conditional on not having left office by that time. The proportional hazard specification is such that:

$$h_k(t) = h_0(t) \exp(\beta \mathrm{GI}_{i,k,t} + \gamma X_{i,t}^{'} + \alpha_i + \mu_t).$$

In this model, $h_k(t)$ represents the hazard, or the instantaneous risk of early departure, at time $t$ for governor $k$, conditional on survival to $t$; $h_0(t)$ is the baseline hazard; $\mathrm{GI}_{i,k,t}$ is the GI index or one of its criteria, and $X_{i,t}^{'}$ includes observable time-varying country characteristics measuring democratic accountability, law and order, and government stability; and $\alpha_i$ and $\mu_t$ denote country- and decade-fixed effects, respectively. The Cox (1972) partial likelihood model is used to base estimation of $\beta$ (the coefficient of interest) on the ordering of the duration spells. Because the model makes no assumptions about the baseline hazard, $h_k(t)$, the Cox partial likelihood model is referred to as "semi-parametric". Figure OA2, Panel A, shows the baseline hazard function, while Panel B exhibits the Kaplan-Meier survival curve. All columns report results of the survival analysis. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 3: Correlation matrix

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) GI | 1.000 | | | | | | | | | | |
| (2) Executive ties | 0.661*** | 1.000 | | | | | | | | | |
| (3) Succession | 0.376*** | 0.180*** | 1.000 | | | | | | | | |
| (4) Education | 0.532*** | 0.132** | -0.134** | 1.000 | | | | | | | |
| (5) Experience | 0.459*** | 0.067 | 0.102* | 0.228*** | 1.000 | | | | | | |
| (6) Press | 0.578*** | 0.355*** | 0.145** | 0.020 | -0.003 | 1.000 | | | | | |
| (7) Experts | 0.641*** | 0.271*** | 0.129** | 0.286*** | 0.101* | 0.181*** | 1.000 | | | | |
| (8) De jure CBI | -0.024 | -0.026 | -0.013 | 0.066 | 0.053 | -0.089 | -0.085 | 1.000 | | | |
| (9) Democratic accountability | 0.275*** | 0.102* | 0.107* | 0.074 | 0.112* | 0.120** | 0.153** | 0.215*** | 1.000 | | |
| (10) Law and order | 0.231*** | 0.120* | 0.170*** | 0.103* | 0.082 | 0.064 | 0.132** | 0.016 | 0.578*** | 1.000 | |
| (11) Government stability | 0.039 | -0.010 | 0.085 | 0.045 | 0.060 | 0.009 | -0.009 | 0.058 | 0.265*** | 0.333*** | 1.000 |

Note: This table presents the correlation matrix for the key variables used in the analysis. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 4: Governor appointments and de jure CBI

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | GI | | | | Executive ties | Succession | Education | Experience | Press | Experts | GI PCA | GI ExEE |
| De jure CBI | -0.031 | -0.046 | 0.097 | 0.126 | 0.330 | 0.115 | 0.070 | -0.095 | 0.033 | 0.307 | 0.161 | 0.218 |
| | [-0.291] | [-0.505] | [0.746] | [0.900] | [1.016] | [0.579] | [0.196] | [-0.382] | [0.104] | [1.008] | [0.962] | [1.120] |
| Democratic accountability | | 0.052** | 0.006 | 0.007 | 0.089* | -0.036 | 0.038 | 0.005 | 0.002 | -0.056 | 0.000 | -0.008 |
| | | [2.559] | [0.335] | [0.369] | [1.742] | [-0.924] | [0.825] | [0.084] | [0.039] | [-1.219] | [0.002] | [-0.343] |
| Law and order | | 0.018 | 0.027 | 0.028 | 0.018 | -0.021 | 0.121** | 0.026 | 0.044 | -0.021 | 0.018 | 0.008 |
| | | [1.009] | [1.342] | [1.206] | [0.264] | [-0.424] | [2.088] | [0.491] | [0.839] | [-0.484] | [0.688] | [0.265] |
| Government stability | | -0.003 | -0.001 | 0.001 | -0.019 | -0.006 | 0.003 | 0.022 | 0.014 | -0.007 | 0.002 | -0.005 |
| | | [-0.259] | [-0.123] | [0.091] | [-0.793] | [-0.346] | [0.126] | [1.020] | [0.497] | [-0.460] | [0.187] | [-0.357] |
| Country FE | | | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Decade FE | | | | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 239 | 224 | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 226 | 223 |
| R-squared | 0.001 | 0.0870 | 0.415 | 0.416 | 0.343 | 0.468 | 0.359 | 0.259 | 0.389 | 0.534 | 0.376 | 0.417 |

Note: This table presents estimates of the effect of de jure CBI on governor appointments based on the model in Eqn. 2. Columns (1)-(4) report results using the GI index as dependent variable. Columns (5)-(10) report results using a criterion of the GI index (specified in the column label) as dependent variable. Column (11) reports results using GI PCA as dependent variable, that is, the first principal component of the 16 sub-criteria forming the GI index. Column (12) reports results using the GI index excluding Education and Experience criteria (*GI ExEE*). Robust standard errors are clustered at the country level. *t*-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 5: Governor appointments and de jure CBI components

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Dependent variable: | | | | GI | | | |
| De jure CBI governance | 0.002 | | | | | | -0.024 |
| | [0.018] | | | | | | [-0.149] |
| De jure CBI policy | | 0.220 | | | | | 0.239 |
| | | [1.607] | | | | | [1.101] |
| De jure CBI objectives | | | 0.118 | | | | 0.075 |
| | | | [1.440] | | | | [0.502] |
| De jure CBI lending | | | | 0.053 | | | 0.121 |
| | | | | [0.567] | | | [0.792] |
| De jure CBI finances | | | | | -0.120 | | -0.294 |
| | | | | | [-0.634] | | [-1.308] |
| De jure CBI accountability | | | | | | 0.027 | -0.210 |
| | | | | | | [0.219] | [-1.077] |
| Democratic accountability | 0.008 | 0.006 | 0.006 | 0.008 | 0.010 | 0.008 | 0.013 |
| | [0.431] | [0.340] | [0.341] | [0.441] | [0.542] | [0.423] | [0.636] |
| Law and order | 0.026 | 0.026 | 0.030 | 0.026 | 0.025 | 0.026 | 0.022 |
| | [1.121] | [1.143] | [1.190] | [1.144] | [1.090] | [1.152] | [0.779] |
| Government stability | 0.002 | 0.001 | 0.001 | 0.001 | 0.002 | 0.002 | 0.003 |
| | [0.156] | [0.121] | [0.083] | [0.123] | [0.184] | [0.131] | [0.280] |
| Country FE | YES | YES | YES | YES | YES | YES | YES |
| Decade FE | YES | YES | YES | YES | YES | YES | YES |
| Observations | 223 | 223 | 223 | 223 | 223 | 223 | 223 |
| R-squared | 0.414 | 0.420 | 0.421 | 0.415 | 0.415 | 0.414 | 0.429 |

Note: This table presents estimates of the effect of the components of de jure CBI on governor appointments based on the model in Eqn. 2. All columns report results using the GI index as dependent variable. Robust standard errors are clustered at the country level. *t*-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 6: Governor appointments and de jure CBI: IV estimates

**Panel A: 2SLS estimates**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | GI | | | | Executive ties | Succession | Education | Experience | Press | Experts |
| De jure CBI | 0.174 | -0.041 | -0.033 | -0.087 | 0.453 | -0.527 | -0.679 | 0.278 | -0.556 | 0.506 |
| | [0.901] | [-0.213] | [-0.151] | [-0.188] | [0.462] | [-0.860] | [-0.496] | [0.330] | [-0.572] | [0.567] |
| Democratic accountability | | 0.052** | 0.013 | 0.009 | 0.088* | -0.030 | 0.045 | 0.001 | 0.008 | -0.058 |
| | | [2.568] | [0.658] | [0.470] | [1.755] | [-0.695] | [0.906] | [0.018] | [0.141] | [-1.302] |
| Law and order | | 0.018 | 0.019 | 0.024 | 0.020 | -0.032 | 0.108 | 0.033 | 0.034 | -0.018 |
| | | [1.054] | [0.851] | [1.040] | [0.313] | [-0.667] | [1.604] | [0.628] | [0.603] | [-0.422] |
| Government stability | | -0.003 | -0.000 | 0.002 | -0.020 | -0.002 | 0.008 | 0.020 | 0.018 | -0.008 |
| | | [-0.265] | [-0.037] | [0.196] | [-0.804] | [-0.115] | [0.283] | [0.804] | [0.576] | [-0.505] |
| Country FE | | | YES | YES | YES | YES | YES | YES | YES | YES |
| Decade FE | | | | YES | YES | YES | YES | YES | YES | YES |
| Observations | 239 | 224 | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 |

**Panel B: First-stage estimates**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | De jure CBI | | | | De jure CBI | | | | | |
| Regional CBI diffusion | 0.622*** | 0.662*** | 0.649*** | 0.432*** | 0.432*** | 0.432*** | 0.432*** | 0.432*** | 0.432*** | 0.432*** |
| | [5.42] | [5.69] | [6.78] | [4.36] | [4.36] | [4.36] | [4.36] | [4.36] | [4.36] | [4.36] |
| Partial R-squared | 0.148 | 0.158 | 0.302 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 |
| Excluded instruments (F-statistic) | 29.418 | 32.355 | 45.944 | 19.043 | 19.043 | 19.043 | 19.043 | 19.043 | 19.043 | 19.043 |

Note: This table presents 2SLS estimates of the effect of de jure CBI on governor appointments based on the model in Eqn. 2. Panel A presents 2SLS estimates instrumenting De jure CBI with Regional CBI diffusion. In Panel A, columns (1)-(4) report second-stage results using the GI index as dependent variable, and columns (5)-(10) report second-stage results using a criterion of the GI index (specified in the column label) as dependent variable. Panel B presents the corresponding first-stage results, the partial R-squared of the excluded instruments in explaining the variation in the endogenous variable, and the excluded instruments F-statistic. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 7: Governor appointments, de jure CBI (governance), and main policy reforms

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | GI | Executive ties | Succession | Education | Experience | Press | Experts | GI PCA | GI ExEE |
| De jure CBI governance | 0.051 | 0.444 | 0.075 | 0.247 | -0.019 | -0.077 | 0.197 | -0.008 | 0.127 |
| | [0.395] | [1.594] | [0.508] | [0.824] | [-0.095] | [-0.265] | [0.717] | [-0.056] | [0.752] |
| Main policy reform | 0.636*** | 0.046 | -0.482*** | 2.034*** | 0.986*** | 0.180 | 0.890 | 0.554*** | 0.214*** |
| | [10.674] | [0.303] | [-4.236] | [9.161] | [5.111] | [1.091] | [1.083] | [7.692] | [2.723] |
| De jure CBI governance × Main policy reform | -1.074*** | -0.974*** | 0.883*** | -3.056*** | -1.518*** | -0.058 | -2.084* | -0.829*** | -0.539*** |
| | [-15.589] | [-5.941] | [8.228] | [-11.339] | [-6.704] | [-0.250] | [-1.886] | [-9.392] | [-5.544] |
| Democratic accountability | 0.005 | 0.053 | -0.025 | -0.012 | 0.005 | -0.030 | -0.070* | -0.001 | -0.008 |
| | [0.281] | [1.263] | [-0.830] | [-0.311] | [0.128] | [-0.558] | [-2.005] | [-0.020] | [-0.339] |
| Law and order | 0.029 | 0.020 | -0.019 | 0.117** | 0.012 | -0.004 | -0.002 | 0.017 | 0.008 |
| | [1.296] | [0.347] | [-0.499] | [2.472] | [0.251] | [-0.080] | [-0.050] | [0.651] | [0.284] |
| Government stability | 0.003 | -0.013 | -0.005 | 0.016 | 0.023 | 0.004 | 0.009 | 0.004 | -0.003 |
| | [0.269] | [-0.549] | [-0.352] | [0.658] | [1.145] | [0.176] | [0.746] | [0.308] | [-0.178] |
| Country FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Decade FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 223 | 250 | 255 | 265 | 260 | 270 | 248 | 226 | 228 |
| R-squared | 0.421 | 0.353 | 0.467 | 0.313 | 0.275 | 0.381 | 0.511 | 0.376 | 0.417 |

Note: This table presents estimates of the effect of de jure CBI (governance component) following main policy reforms on governor appointments based on the model in Eqn. 3. Column (1) reports results using the GI index as dependent variable. Columns (2)-(7) report results using a criterion of the GI index (specified in the column label) as dependent variable. Column (8) reports results using GI PCA as dependent variable, that is, the first principal component of the 16 sub-criteria forming the GI index. Column (9) reports results using the GI index excluding Education and Experience criteria (*GI ExEE*). Robust standard errors are clustered at the country level. *t*-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 8: Governor appointments, de jure CBI (governance), and main legislative reforms

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dependent variable: | GI | | | |
| De jure CBI governance | -0.027 | 0.036 | 0.076 | 0.046 |
| | [-0.228] | [0.287] | [0.603] | [0.372] |
| Main objectives reform | -0.395 | | | |
| | [-1.547] | | | |
| De jure CBI governance × Main objectives reform | 0.401 | | | |
| | [1.099] | | | |
| Main lending reform | | 0.176 | | |
| | | [0.851] | | |
| De jure CBI governance × Main lending reform | | -0.289 | | |
| | | [-1.173] | | |
| Main finances reform | | | 0.270*** | |
| | | | [4.717] | |
| De jure CBI governance × Main finances reform | | | -0.700*** | |
| | | | [-5.698] | |
| Main accountability reform | | | | 0.258 |
| | | | | [1.395] |
| De jure CBI governance × Main accountability reform | | | | -0.400* |
| | | | | [-1.809] |
| Democratic accountability | 0.005 | 0.009 | 0.005 | 0.011 |
| | [0.260] | [0.405] | [0.281] | [0.516] |
| Law and order | 0.039 | 0.024 | 0.029 | 0.023 |
| | [1.518] | [0.972] | [1.328] | [0.977] |
| Government stability | 0.005 | 0.002 | 0.004 | 0.002 |
| | [0.363] | [0.194] | [0.297] | [0.177] |
| Country FE | YES | YES | YES | YES |
| Decade FE | YES | YES | YES | YES |
| Observations | 222 | 223 | 223 | 223 |
| R-squared | 0.428 | 0.416 | 0.423 | 0.417 |

Note: This table presents estimates of the effect of de jure CBI (governance component) following main legislative reforms on governor appointments based on the model in Eqn. 3. All columns report results using the GI index as dependent variable. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 9: Governor appointments and external constraints

| | (1) | (2) |
|---|---|---|
| Dependent variable: | GI | |
| De jure CBI | 0.090 | 0.164 |
| | [0.570] | [1.195] |
| EU accession | -0.366 | |
| | [-1.353] | |
| De jure CBI × EU accession | 0.736* | |
| | [1.891] | |
| IMF program | | -0.288 |
| | | [-1.460] |
| De jure CBI × IMF program | | 0.785*** |
| | | [3.126] |
| Democratic accountability | 0.002 | 0.007 |
| | [0.117] | [0.373] |
| Law and order | 0.036 | 0.025 |
| | [1.494] | [1.005] |
| Government stability | -0.001 | -0.003 |
| | [-0.065] | [-0.306] |
| Country FE | YES | YES |
| Decade FE | YES | YES |
| Observations | 223 | 218 |
| R-squared | 0.431 | 0.432 |

Note: This table presents estimates of the effect of de jure CBI when there are external constraints on governor appointments based on a version of the model in Eqn. 3. All columns report results using the GI index as dependent variable. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 10: Experts' hindsight opinion and governor appointments

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | Experts (hindsight) | | | | | | | | | |
| GI | 0.782*** | 0.747*** | 0.617*** | 0.618*** | | | | | | |
| | [10.703] | [11.211] | [8.199] | [7.977] | | | | | | |
| Executive ties | | | | | 0.171*** | | | | | |
| | | | | | [4.853] | | | | | |
| Succession | | | | | | 0.033 | | | | |
| | | | | | | [0.782] | | | | |
| Education | | | | | | | 0.130** | | | |
| | | | | | | | [2.606] | | | |
| Experience | | | | | | | | 0.115** | | |
| | | | | | | | | [2.398] | | |
| Press | | | | | | | | | 0.139*** | |
| | | | | | | | | | [3.406] | |
| Experts | | | | | | | | | | 0.457*** |
| | | | | | | | | | | [12.255] |
| Democratic accountability | | 0.041 | 0.015 | 0.014 | 0.007 | 0.005 | -0.003 | -0.002 | 0.004 | 0.008 |
| | | [1.444] | [0.645] | [0.459] | [0.233] | [0.190] | [-0.094] | [-0.065] | [0.140] | [0.522] |
| Law and order | | 0.001 | -0.009 | -0.015 | -0.002 | 0.015 | -0.019 | -0.008 | -0.011 | 0.013 |
| | | [0.052] | [-0.523] | [-0.652] | [-0.085] | [0.635] | [-0.691] | [-0.327] | [-0.418] | [0.748] |
| Government stability | | 0.004 | 0.009 | -0.001 | -0.001 | 0.003 | -0.004 | -0.004 | -0.001 | 0.002 |
| | | [0.269] | [0.806] | [-0.101] | [-0.113] | [0.331] | [-0.411] | [-0.421] | [-0.080] | [0.187] |
| Country FE | | | YES | YES | YES | YES | YES | YES | YES | YES |
| Decade FE | | | | YES | YES | YES | YES | YES | YES | YES |
| Observations | 258 | 242 | 240 | 240 | 248 | 252 | 262 | 256 | 269 | 269 |
| R-squared | 0.366 | 0.411 | 0.682 | 0.690 | 0.599 | 0.552 | 0.528 | 0.521 | 0.527 | 0.742 |

Note: This table presents estimates of the effect of governor appointments on experts' hindsight opinion based on a version of the model in Eqn. 2. All columns report results using Experts (hindsight) as dependent variable. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 11: Governor appointments and inflation

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Dependent variable: | Mean inflation (log) | | | | | Inflation gap | | | |
| Group: | | | | | Non-EZ countries | | | | |
| De jure CBI | -1.353*** | | -1.282** | -0.300 | 0.286 | -0.100 | | 0.215 | -0.971 |
| | [-2.756] | | [-2.265] | [-0.690] | [0.512] | [-0.077] | | [0.163] | [-0.723] |
| GI | | -1.720*** | -1.682*** | -0.843** | -0.768** | | -2.502** | -2.409** | -2.715** |
| | | [-3.893] | [-3.525] | [-2.470] | [-2.014] | | [-2.333] | [-2.160] | [-2.218] |
| Democratic accountability | | | | -0.282** | -0.267** | | | | -1.080 |
| | | | | [-2.396] | [-2.247] | | | | [-1.365] |
| Law and order | | | | -0.537*** | -0.504*** | | | | 0.010 |
| | | | | [-6.545] | [-6.008] | | | | [0.049] |
| Government stability | | | | -0.148** | -0.171*** | | | | 0.231 |
| | | | | [-2.452] | [-2.718] | | | | [1.331] |
| Decade FE | | | | YES | YES | | | | YES |
| Observations | 307 | 268 | 246 | 219 | 188 | 59 | 57 | 54 | 50 |
| R-squared | 0.024 | 0.0607 | 0.081 | 0.478 | 0.439 | 0.000 | 0.092 | 0.083 | 0.268 |

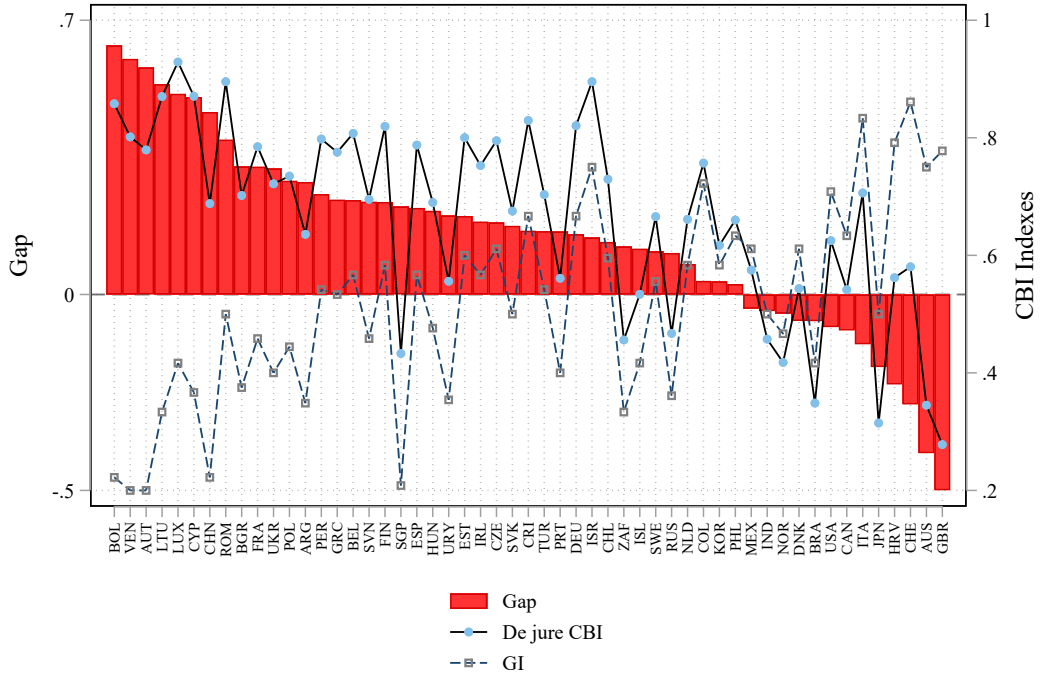
Note: This table presents estimates of the effect of de jure CBI and governor appointments on inflation. Columns (1)-(5) report results using the mean inflation (log) as dependent variable. Columns (6)-(9) report results using the inflation gap as dependent variable. All columns include all sample countries, except column (5) that excludes Eurozone (EZ) countries. Standard errors are robust to heteroskedasticity. *t*-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12: Governor appointments and crises

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable: | Sovereign debt | Currency | Banking | Sovereign debt | Currency | Banking |
| Group: | | | | Non-EZ countries | | |
| De jure CBI | 0.032 | -0.008 | 0.197 | 0.015 | 0.083 | 0.060 |
| | [0.533] | [-0.090] | [1.460] | [0.234] | [0.739] | [0.407] |
| GI | -0.141*** | -0.194** | -0.011 | -0.124*** | -0.238** | -0.018 |
| | [-3.078] | [-2.057] | [-0.113] | [-2.711] | [-2.353] | [-0.175] |
| Democratic accountability | -0.003 | -0.005 | 0.001 | -0.007 | 0.000 | -0.005 |
| | [-0.273] | [-0.260] | [0.050] | [-0.655] | [0.023] | [-0.179] |
| Law and order | -0.029** | -0.036** | 0.028 | -0.029** | -0.032* | 0.034 |
| | [-2.482] | [-2.187] | [1.403] | [-2.318] | [-1.737] | [1.629] |
| Government stability | -0.003 | -0.020* | -0.003 | -0.001 | -0.022* | -0.008 |
| | [-0.468] | [-1.774] | [-0.187] | [-0.107] | [-1.796] | [-0.516] |
| Decade FE | YES | YES | YES | YES | YES | YES |
| Observations | 227 | 227 | 227 | 192 | 192 | 192 |
| R-squared | 0.119 | 0.076 | 0.108 | 0.137 | 0.071 | 0.063 |

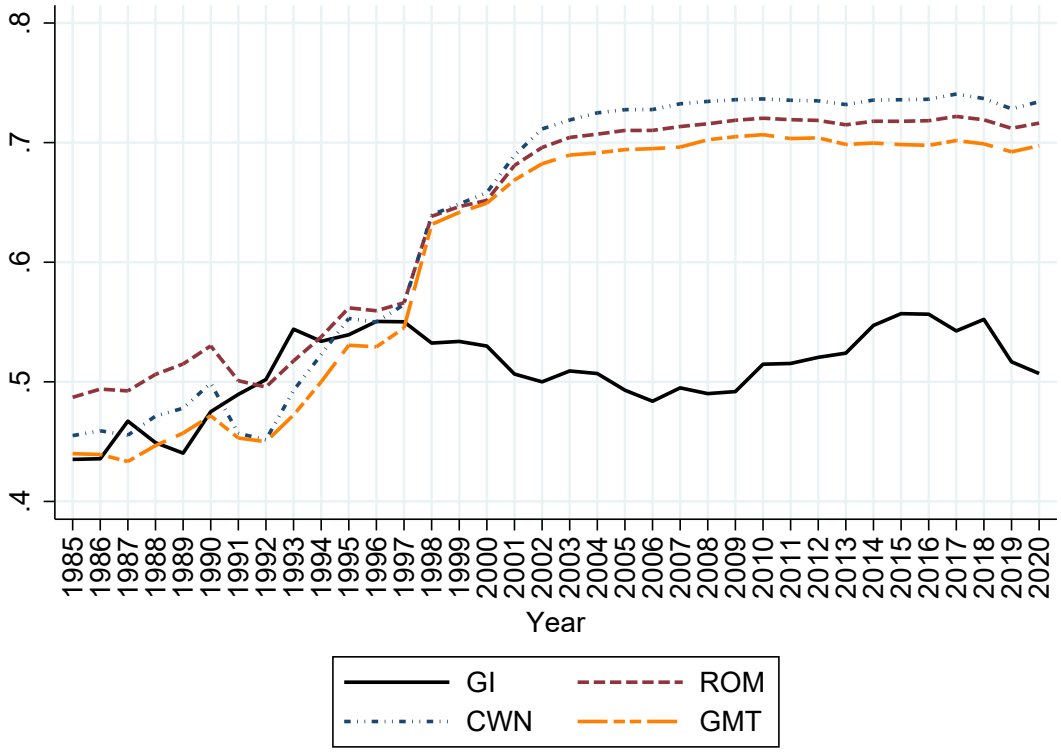
Note: This table presents estimates of the effect of de jure CBI and governor appointments on the propensity of several types of crises. Columns (1)-(3) report results using the incidence of, respectively, sovereign debt, currency, and banking crises during a governor's tenure as dependent variable. Columns (1)-(3) include all sample countries, while columns (4)-(6) exclude Eurozone (EZ) countries. Standard errors are robust to heteroskedasticity. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Figure 1: GI and de jure CBI indexes across countries



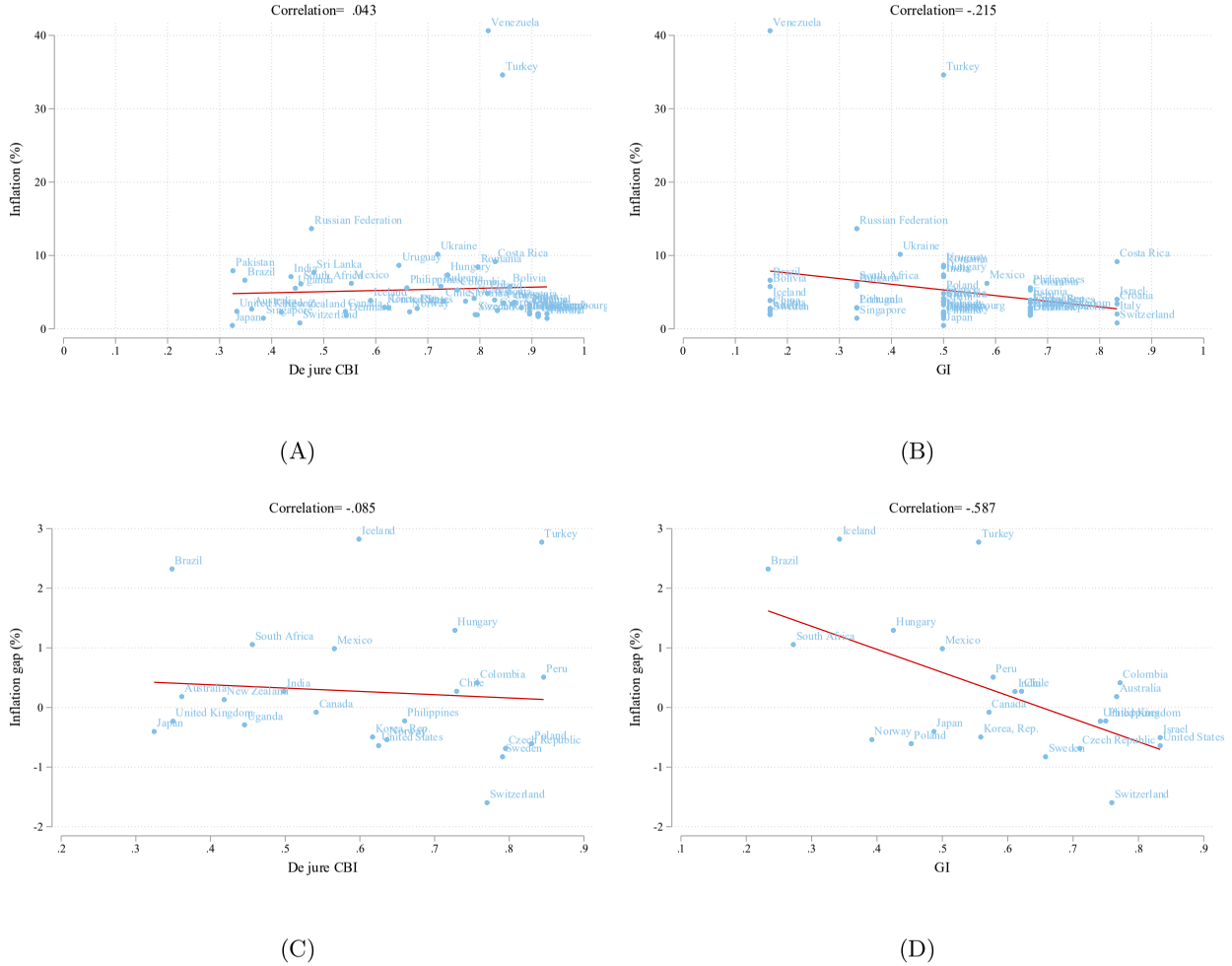

Note: This figure aggregates the data on the GI and de jure CBI indexes at the country level. The red bars show the gap between de jure CBI and GI indexes, which is calculated as the difference between the de jure CBI and GI indexes (left y-axis). The connected dots show the mean value of the de jure CBI index (light blue solid line) and GI index (blue dashed line) across countries (right y-axis). Larger bars above zero reflect higher gaps, with de jure independence (higher de jure CBI index) being larger than de facto independence (higher GI index). Conversely, larger bars below zero reflect higher gaps, with de facto independence (higher GI index) being larger than de jure independence (higher de jure CBI index). Smaller bars reflect higher convergence between de jure independence (de jure CBI index) and de facto independence (GI index).

Figure 2: GI and de jure CBI indexes over time




Note: This figure aggregates the data on different indexes at the year level and plots them over time. The black line shows the evolution for the GI index. The dotted lies show the evolution for the de jure CBI indexes: the red line shows the evolution for the ROM index (referring to Romelli, 2022), the scattered blue line for the CWN index (Cukierman et al., 1992), and the scattered yellow line for the GMT index (Grilli et al., 1991). Higher values for all of these indexes reflect more independence.

Figure 3: Inflation and CBI




Note: This figure shows the relation between inflation and either de jure CBI or governor appointments. Panel A plots the relation between median inflation and the de jure CBI index. Panel B plots the equivalent using the GI index instead of the de jure CBI index. Panel C plots the relation between the median inflation gap and the de jure CBI index from 2000 (following Haldane, 2020) for all concerned countries in our data set. Panel D plots the equivalent using the GI index instead of the de jure CBI index. The Appendix A provides variable definitions and sources.

# A Variable Definitions and Sources

| Variable name | Definitions and data sources |
|---|---|
| GI | Index of independence of central bank governor appointments, ranging between 0 (no independence) and 1 (full independence) and varying at the governor-appointment year level. The index consists of six criteria: (1) Executive ties; (2) Succession; (3) Education; (4) Experience; (5) Press; and (6) Experts. See Table 1 for details about the coding rules. |
| GI PCA | The first principal component of the 16 sub-criteria forming the GI index (see Table 1). Principal component analysis effectively performs a singular value decomposition of the correlation matrix of GI sub-criteria. The single factor selected in this study is the eigenvector in the decomposition with the highest eigenvalue. |
| De jure CBI | Index of central bank independence and accountability, ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. The index follows codification strategy of Cukierman et al. (1992) and provides information on 42 criteria of central bank institutional design across six subcategories: (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. This is the ROM index throughtout the analyses unless stated otherwise, in which case it is either the CWN index or GMT index (both indexes only using subcategories (1)-(4)). Sources: Grilli et al. (1991); Cukierman et al. (1992); Romelli (2022). |
| De jure CBI governance | Index of independence in central bank governance (subcategory (1) "governor and central bank board" of the ROM index), ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. Source: Romelli (2022). |
| De jure CBI policy | Index of central bank independence in determining and implementing monetary policy (subcategory (2) "monetary policy and conflict resolution" of the ROM index), ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. Source: Romelli (2022). |
| De jure CBI objectives | Index on the definitions and ordering of the central bank policy objectives as embedded in the law (subcategory (3) "objectives" of the ROM index), ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. Source: Romelli (2022). |
| De jure CBI lending | Index of independence and limits in lending to the public sector (subcategory (4) "limitations on lending to the government" of the ROM index), ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. Source: Romelli (2022). |

| | |
|---|---|
| De jure CBI finances | Index of central bank financial independence (subcategory (5) "financial independence" of the ROM index), ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. Source: Romelli (2022). |
| De jure CBI accountability | Index of central bank policy and financial reporting (subcategory (6) "reporting and disclosure" of the ROM index), ranging between 0 (no independence) and 1 (full independence) and varying at the country-year level. Source: Romelli (2022). |
| Main "legislative" reform | Dummy variable that takes the value of 1 in the years following the most significant change to central bank legislation related to the subcategory of the ROM index specified in place of the term "legislative" in the variable name (i.e., policy, objectives, lending, finances, accountability), and 0 otherwise. A significant reform corresponds to a positive change of approximately 2 standard deviations in the subcategory of the ROM index (Table OA6 reports the reform years). Source: authors following Romelli (2022). |
| Democratic accountability | Index measuring government's responsiveness to its people, ranging between 0 and 6 and varying at the country-year level. The less responsive government will fall peacefully in a democratic society and possibly violently in a nondemocratic society. A high score indicates higher democratic accountability and vice versa. Source: ICRG. |
| Law and order | Index measuring two risk components, ranging between 0 and 6 and varying at the country-year level. The "law" component assesses the strength and impartiality of the legal system, and the "order" component assesses popular observance of the law. Source: ICRG. |
| Government stability | Index measuring both the government's ability to carry out its declared program(s), and its ability to stay in office. The index consists of three components: (1) government unity; (2) legislative strength; and (3) popular support. The index ranges between 0 and 12 and varies at the country-year level. Source: ICRG. |
| Regional CBI diffusion | The jackknife average of CBI (as measured by "de jure CBI") in a region in a given year, excluding the own-country observation. There are seven regions: Africa, East Asia and the Pacific, Eastern Europe and Central Asia, Western Europe and other developed countries, Latin America and the Caribbean, the Middle East and the North of Africa, and South Asia. Source: authors following Acemoglu et al. (2019) and Romelli (2022). |
| EU accession | Dummy variable that takes the value of 1 in the five years prior to joining the European Union, and 0 otherwise. Source: authors following Romelli (2022). |

| | |
|---|---|
| IMF program | Dummy variable that takes the value of 1 in the years following an IMF assistance program (Flexible Credit Line Arrangement), and 0 otherwise. Source: authors following Dreher (2006). |
| Experts (hindsight) | Dummy variable that takes the value of 1 if the surveyed experts perceive the governor as having acted independently during her or his whole term in office, and 0 otherwise. To quantify the results of the survey accounting for divergence of opinions and the different numbers of responses, the standard balance statistic is calculated (Pesaran and Weale, 2006). A balance statistic greater (smaller) than 0 means a politically independent (a politically dependent) term in office according to the experts. This variable is based on the second question of the survey: *"In your opinion, with the benefit of hindsight, was [Governor's name] a politically independent central bank governor?"*. |
| Mean inflation (log) | The log of the average rate of consumer price inflation during the governor's term. Source: World Bank. |
| Inflation gap | The average rate of inflation during the governor's term minus the central bank's stated inflation target. Sources: World Bank and Siklos (2017). |
| Sovereign debt | Dummy variable that takes the value of 1 if there is a sovereign debt crisis during the governor's term, and 0 otherwise. Sources: Laeven and Valencia (2013, 2018). |
| Currency | Dummy variable that takes the value of 1 if there is a currency crisis during the governor's term, and 0 otherwise. Sources: Laeven and Valencia (2013, 2018). |
| Banking | Dummy variable that takes the value of 1 if there is a banking crisis during the governor's term, and 0 otherwise. Sources: Laeven and Valencia (2013, 2018). |

# For Online Publication

# "(In)dependent Central Banks"

Table OA1: List of countries and governor appointments

| Country code | Country name | Governor appointment (month-year) |
|---|---|---|
| ARG | Argentina | Mario Blejer (Jan. 2002), Aldo Pignanelli (Jun. 2002), Alfonso Prat-Gay (Dec. 2002), Martin Redrado (Sep. 2004), Mercedes Marcó del Pont (Feb 2010), Juan Carlos Fabrega (Nov. 2013), Alejandro Vanoli (Oct. 2014), Federico Sturzenegger (Dec. 2015), Luis Caputo (Jun. 2018), Guido Sandleris (Sep. 2018), Miguel Ángel Pesce (Dec. 2019) |
| AUS | Australia | Bernie Fraser (Sep. 1989), Ian Macfarlane (Sep. 1996), Glenn Stevens (Sep. 2006), Philip Lowe (Sep. 2016) |
| AUT | Austria | Hellmuth Klauhs (Sep. 1988), Maria Schaumayer (Jun. 1990), Klaus Liebscher (Jun. 1995), Ewald Nowotny (Sep. 2008), Robert Holzmann (Sep. 2019) |
| BEL | Belgium | Alfons Verplaetse (Jul. 1989), Guy Quaden (Mar. 1999), Luc Coene (Apr. 2011), Jan Smets (Mar. 2015), Pierre Wunsch (Jan. 2019) |
| BOL | Bolivia | Javier Nogales Iturri (Jun. 1986), Jacques Trigo Loubiere (Jun. 1988), Raúl Boada Rodríguez (Aug. 1989), Armando Méndez Morales (Jun. 1992), Fernando Candia Castillo (Aug. 1993), Juan Antonio Morales (Sep. 1995), Raúl Garrón Claure (May 2006), Gabriel Loza Tellería (Nov. 2008), Marcelo Zabalaga Estrada (Nov. 2010), Pablo Ramos Sánchez (Jan. 2017) |
| BRA | Brazil | Paulo César Ximenes (Mar. 1993), Pedro Sampaio Malan (Sep. 1993), Pérsio Arida (Jan. 1995), Gustavo Jorge Laboissière Loyola (Jun. 1995), Gustavo Henrique de Barroso Franco (Aug. 1997), Armínio Fraga Neto (Mar. 1999), Henrique de Campos Meirelles (Jan. 2003), Alexandre Antonio Tombini (Jan. 2011), Ilan Goldfajn (Jun. 2016), Roberto de Oliveira Campos Neto (Feb. 2019) |
| BGR | Bulgaria | Ivan Dragnevski (Dec. 1989), Todor Valchev (Jan. 1991), Lyubomir Filipov (Jan. 1996), Svetoslav Gavriiski (jun. 1997), Ivan Iskrov (Oct. 2003), Dimitar Radev (Jul. 2015) |
| CAN | Canada | John Crow (Feb. 1987), Gordon Thiessen (Feb. 1994), David A. Dodge (Feb. 2001), Mark Carney (Feb. 2008), Stephen Poloz (Jun. 2013) |
| CHL | Chile | Andrés Bianchi Larre (Dec. 1989), Roberto Zahler Mayanz (Dec. 1991), Carlos Massad Abud (Sept. 1996), Vittorio Corbo Lioi (Apr. 2003), José De Gregorio Rebeco (Dec. 2007), Rodrigo Vergara (Dec. 2011), Mario Marcel Cullell (Dec. 2016) |
| CHN | China | Chen Muhua (Mar. 1985), Li Guixian (Apr. 1988), Zhu Rongji (Jul. 1993), Dai Xianglong (Jun. 1995), Zhou Xiaochuan (Dec. 2002), Yi Gang (Mar. 2018) |
| COL | Colombia | Miguent Urrutia Montoya (Feb. 1993), José Darío Uribe Escobar (Jan. 2005), Juan José Echavarría Soto (Jan. 2017) |
| CRI | Costa Rica | Rodrigo Bolaños Zamora (Mar. 1995), Eduardo Lizano Fait (May 1998), Francisco de Paula Gutierrez G. (Nov. 2002), Rodrigo Bolaños Zamora (Jun. 2010), Olivier Castro Pérez (May 2014) |
| HRV | Croatia | Ante Cicin-Šain (Aug. 1990), Pero Jurkovic (Jun. 1992), Marko Škreb (Mar. 1996), Željko Rohatinski (Jul. 2000), Boris Vujčić (Jul. 2012) |

| | | |
|---|---|---|
| CYP | Cyprus | Christodoulos Christodoulou (May 2002), Athanasios Orphanides (Apr. 2007), Panicos O. Demetriades (May 2012), Chrystalla Georghadji (Apr. 2014), Constantinos Herodotou (Mar. 2019) |
| CZE | Czech Republic | Zdeněk Tůma (Dec. 2000), Miroslav Singer (Jul. 2010), Jiří Rusnok (Jul. 2016) |
| DNK | Denmark | Bodil Nyboe Andersen (Nov. 1994), Nils Bernstein (Jun. 2005), Lars Rohde (Feb. 2013) |
| EST | Estonia | Siim Kallas (Sep. 1991), Vahur Kraft (Apr. 1995), Andres Lipstok (Jun. 2005), Ardo Hansson (Jun. 2012), Madis Müller (Jun. 2019) |
| FIN | Finland | Sirkka Hämäläinen (Apr. 1992), Matti Vanhala (Jun. 1998), Erkki Liikanen (Jul. 2004), Olli Rehn (Jul. 2018) |
| FRA | France | Jacques de Larosiere (Jan. 1987), Jean-Claude Trichet (Sep. 1993), Christian Noyer (Nov. 2003), Francois Villeroy de Saroy de Galhau (Nov. 2015) |
| DEU | Germany | Helmut Schlesinger (Aug. 1991), Hans Tietmeyer (Oct. 1993), Ernst Welteke (Sep. 1999), Axel Weber (May 2004), Jens Weidmann (May 2011), |
| GRC | Greece | Efthymios Cristodoulou (Feb. 1992), Ioannis Boutos (Dec. 1993), Lucas Papademos (Oct. 1994), Nikolaos Garganas (Jun. 2002), Georgios Provopoulos (Jun. 2008), Yannis Stournaras (Jun. 2014) |
| HUN | Hungary | Ferenc Bartha (Jun. 1988), György Surányi (Jul. 1990), Péter Ákos Bod (Dec. 1991), György Surányi (Mar. 1995), Zsigmond Járai (Mar. 2001), Andras Simor (Mar. 2007), György Matolcsy (Mar. 2013) |
| ISL | Iceland | Birgir Ísleifur Gunnarsson (Mar. 1991), David Oddsson (Oct. 2005), Már Gudmundsson(Aug. 2009), Ásgeir Jónsson (Jul. 2019) |
| IND | India | Ram Narain Malhotra (Feb. 1985), S. Venkitaramanan (Dec. 1990), Chakravarthi Rangarajan (Dec. 1992), Bimal Jalan (Nov. 1997), Yaga Venugopal Reddy (Sep. 2003), Duvvuri Subbarao (Sep. 2008), Raghuram Rajan (Sep. 2013), Urjit Patel (Sep. 2016), Shaktikanta Das (Dec. 2018) |
| IRL | Ireland | Maurice F. Doyle (May 1987), Maurice O'Connell (May 1994), John Hurley (Mar. 2002), Patrick Honohan (Sep. 2009), Philip Lane (Nov. 2015) |
| ISR | Israel | Michael Bruno (Jun. 1986), Jacob A. Frenkel (Aug. 1991), David Klein (Jan. 2000), Stanley Fischer (May 2005), Karnit Flug (Nov. 2013), Amir Yaron (Dec. 2019) |
| ITA | Italy | Antonio Fazio (May 1993), Mario Draghi (Dec. 2005), Ignazio Visco (Nov. 2011) |
| JPN | Japan | Yasushi Mieno (Dec. 1989), Yasuo Matsushita (Dec. 1994), Masaru Hayami (Mar. 1998), Toshihiko Fukui (Mar. 2003), Masaaki Shirakawa (Apr. 2008), Haruhiko Kuroda (Mar. 2013) |
| KOR | Korea, Rep. | Kun Kim (Mar. 1988), Cho Soon (Mar. 1992), Myung Ho Kim (Mar. 1993), Kyung Shik Lee (Aug. 1995), Chol-Hwan Chon (Mar. 1998), Seung Park (Apr. 2002), Seongtae Lee (Mar. 2006), Choong-Soo Kim (Apr. 2010), Ju-Yeol Lee (Apr. 2014) |
| LTU | Lithuania | Kazys Ratkevicius (Nov. 1993), Reinoldijus Sarkinas (Feb. 1996), Vitas Vasiliauskas (Apr. 2011) |
| LUX | Luxembourg | Yves Mersch (Jun. 1998), Gaston Reinesch (Jan. 2013) |

| | | |
|---|---|---|
| MEX | Mexico | Guillermo Ortiz Martinez (Jan. 1998), Agustin Carstens (Jan. 2010), Alejandro Díaz de León Carrillo (Dec. 2017) |
| NDL | Netherlands | Nout Wellink (Jul. 1997), Klaas Knot (Jul. 2011) |
| NZL | New Zealand | Donald Brash (Sep. 1988), Alan Bollard (Sep. 2002), Graeme Wheeler (Sep. 2012), Adrian Orr (Mar. 2018) |
| NOR | Norway | Hermod Skånland (Apr. 1985), Torstein Moland (Jan. 1994), Kjell Storvik (Feb. 1996), Svein Gjedrem (Jan. 1999), Oeystein Olsen (Jan. 2011) |
| PAK | Pakistan | Imtiaz Alam Hanfi (Aug. 1988), Muhammad Yaqub (Jul. 1993), Ishrat Husain (Dec. 1999), Shamshad Akhtar (Jan. 2006), Syed Salim Raza (Feb. 2009), Shahid Hafeez Kardar (Sep. 2010), Yaseen Anwar (Jul. 2011), Ashraf Mahmood Wathra (Apr. 2014), Tariq Bajwa (Jul. 2017), Reza Baqir (May 2019) |
| PER | Peru | Pedro Coronado Labo (Dec. 1987), Carlos Capunay Mimbela (Aug. 1989), Jorge Chavez Alvarez (Sep. 1990), Germán Suárez Chávez (Apr. 1992), Richard Webb Duarte (Sep. 2001), Sivla Ruete (Jul. 2003), Julio Velarde Flores (Oct. 2006) |
| PHL | Philippines | Jose L. Cuisa Jr. (Feb. 1990), Gabriel Singson (Jul. 1993), Rafael Buenaventura (Jul. 1999), Amando Tetangco Jr. (Jul. 2005), Nestor Espenilla Jr. (Jul. 2017), Benjamin Diokno (Mar. 2019) |
| POL | Poland | Wladyslaw Baka (Nov. 1985), Zdzislaw Pakula (Jul. 1988), Wladyslaw Baka (Sep. 1989), Grzegorz Wojtowicz (Jan. 1991), Andrzej Topinski (Aug. 1991), Hanna Gronkiewicz-Waltz (Mar. 1992), Leszek Balcerowicz (Jan. 2001), Slawomir Skrzypek (Jan. 2007), Marek Belka (Jun. 2010), Adam Glapinski (Jun. 2016) |
| PTR | Portugal | Vítor Manuel Ribeiro Constâncio (Apr. 1985), Jose Alberto Tavares Moreira (May 1986), Luis Miguel Couceiro Pizarro Beleza (May 1992), Antonio Jose Fernandes de Sousa (Jun. 1994), Vítor Manuel Ribeiro Constâncio (Feb 2000), Carlos da Silva Costa (Jun. 2010) |
| ROM | Romania | Decebal Urdea (Mar. 1989), Mugur Constantin Isărescu (Sep. 1990) |
| RUS | Russian Federation | Georgy Matyukhin (Jan. 1990), Viktor Gerashchenko (Jul. 1992), Tatyana Paramonova (Oct. 1994), Sergei Dubinin (Nov. 1995), Viktor Gerashchenko (Sept. 1998), Sergei Ignatyev (Mar. 2002), Elvira Nabiullina (Jun. 2013) |
| SGP | Singapore | Richard Hu (Jan. 1985), Lee Hsien Loong (Jan. 1998), Goh Chok Tong (Aug. 2004), Tharman Shanmugaratnam (May 2011) |
| SVK | Slovakia | Marian Tkac (Jan. 1993), Vladimir Masar (Jul. 1993), Marian Jusko (Jul. 1999), Ivan Sramko (Jan. 2005), Jozef Makuch (Jan. 2010), Peter Kazimír (Jun. 2019) |
| SVN | Slovenia | France Arhar (Jun. 1991), Mitja Gaspari (Apr. 2001), Marko Kranjec (Jun. 2007), Boštjan Jazbec (Jul. 2013), Boštjan Vasle (Dec. 2018) |
| ZAF | South Africa | Chris Stals (Aug. 1989), Tito Mboweni (Aug. 1999), Gill Marcus (Nov. 2009), Lesetja Kganyago (Nov. 2014) |
| ESP | Spain | Luis Ángel Rojo Duque (Jul. 1992), Jaime Caruana Lacorte (Jul. 2000), Miguel Ángel Fernández Ordóñez (Jul. 2006), Luis Maria Linde de Castro (Jun. 2012), Pablo Hernández de Cos (Jun. 2018) |

| | | |
|---|---|---|
| LKA | Sri Lanka | Neville Sepala Karunatilake (Nov. 1988), Heen Banda Disanayaka (Jul. 1992), Amarananda Somasiri Jayawardena (Nov. 1995), Sunil Mendis (Jul. 2004), Ajith Nivard Cabraal (Jul. 2006), Arjuna Mahendran (Jan. 2015), Indrajit Coomaraswamy (Jul. 2016), Weligamage Don Lakshman (Dec. 2019) |
| SWE | Sweden | Urban Bäckström (Jan. 1994), Lars Heikensten (Jan. 2003), Stefan Ingves (Jan. 2006) |
| CHE | Switzerland | Pierre Languetin (Jan. 1985), Markus Lusser (May 1988), Hans Meyer (May 1996), Jean-Pierre Roth (Jan. 2001), Philipp Hildebrand (Jan. 2010), Thomas J. Jordan (Apr. 2012) |
| TUR | Turkey | Rüşdü Saracoğlu (Jul. 1987), Nihat Bülent Gültekin (Sep. 1993), Yaman Törüner (Feb. 1994), Süleyman Gazi Erçel (Apr. 1996), Süreyya Serdengecti (Mar. 2001), Durmus Yilmaz (Apr. 2006), Erdem Başçı (Apr. 2011), Murat Çetinkaya (Apr. 2016) |
| UGA | Uganda | Suleiman Kiggundu (Dec. 1986), Charles Kikonyogo (May 1990), Emmanuel Tumusiime Mutebire (Dec. 2000) |
| UKR | Ukraine | Volodymyr S. Stelmakh (Jan. 2000), Sergei Tigipko (Dec. 2002), Volodymyr S. Stelmakh (Dec. 2004), Sergiy Arbuzov (Dec. 2010), Ivor Sorkin (Jan. 2013), Valeriia O. Gontareva (Jun. 2014), Yakiv Smolii (May 2017) |
| GBR | United Kingdom | Edward Alan John George (Jul. 1993), Mervyn Allister King (Jul. 2003), Mark Carney (Jul. 2013) |
| USA | United States | Alan Greenspan (Aug. 1987), Ben Bernanke (Feb. 2006), Janet Yellen (Feb. 2014), Jerome Powell (Feb. 2018) |
| URY | Uruguay | Ramón P. Diaz (Apr. 1990), Enrique Braga (Oct. 1993), Ricardo Pascale (Apr. 1995), Humberto Capote (Apr. 1996), César Rodríguez (Apr. 2000), Julio de Brun (Jul. 2002), Walter Cancela (Mar. 2005), Mario Bergara Duque (Nov. 2008), Alberto Graña (Jan. 2014), Mario Bergara Duque (Nov. 2015), Alberto Graña (Nov. 2018), Diego Labat (Mar. 2020) |
| VEN | Venezuela | Antonio Casas Gonzalez (Apr. 1994), Diego Luis Castellanos (Jan. 2000), Gastón Parra Luzardo (Jan. 2005), Nelson José Merentes Diaz (Apr. 2009), Edmée Betancourt (Apr. 2013), Eudomar Tovar (Aug. 2013), Nelson José Merentes Diaz (Dec. 2014), Ricardo Sanguino (Jan. 2017), Ramon Agusto Lobo Moreno (Nov. 2017), Calixto Ortega Sánchez (Jun. 2018) |

Table OA2: Descriptive statistics on additional key variables

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | N | Mean | SD | Min | Median | Max |
| De jure CBI | 292 | 0.623 | 0.197 | 0.146 | 0.617 | 0.929 |
| Democratic accountability | 291 | 4.755 | 1.293 | 1.000 | 5.000 | 6.000 |
| Law and order | 291 | 4.060 | 1.528 | 0.417 | 4.000 | 6.000 |
| Government stability | 291 | 7.134 | 1.797 | 1.000 | 7.000 | 11.000 |
| EU accession | 316 | 0.028 | 0.167 | 0.000 | 0.000 | 1.000 |
| IMF program | 309 | 0.010 | 0.098 | 0.000 | 0.000 | 1.000 |
| Experts (hindsight) | 293 | 0.580 | 0.315 | 0.000 | 0.625 | 1.000 |

Note: This table presents descriptive statistics for all variables used in the main analysis except the GI index and its criteria, which are reported in Table 1. The Appendix A provides variable definitions and sources.

Table OA3: Governor appointments and de jure CBI: Alternative de jure CBI indexes

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Dependent variable: | GI | | | | | | | |
| CWN | -0.031 | -0.046 | 0.097 | 0.126 | | | | |
| | [-0.291] | [-0.505] | [0.746] | [0.900] | | | | |
| GMT | | | | | -0.031 | -0.046 | 0.097 | 0.126 |
| | | | | | [-0.291] | [-0.505] | [0.746] | [0.900] |
| Democratic accountability | | 0.052** | 0.006 | 0.007 | | 0.052** | 0.006 | 0.007 |
| | | [2.559] | [0.335] | [0.369] | | [2.559] | [0.335] | [0.369] |
| Law and order | | 0.018 | 0.027 | 0.028 | | 0.018 | 0.027 | 0.028 |
| | | [1.009] | [1.342] | [1.206] | | [1.009] | [1.342] | [1.206] |
| Government stability | | -0.003 | -0.001 | 0.001 | | -0.003 | -0.001 | 0.001 |
| | | [-0.259] | [-0.123] | [0.091] | | [-0.259] | [-0.123] | [0.091] |
| Country FE | | | YES | YES | | | YES | YES |
| Decade FE | | | | YES | | | | YES |
| Observations | 239 | 224 | 223 | 223 | 239 | 224 | 223 | 223 |
| R-squared | 0.001 | 0.0870 | 0.415 | 0.416 | 0.001 | 0.0870 | 0.415 | 0.416 |

Note: This table presents estimates of the effect of de jure CBI on governor appointments based on the model in Eqn. 2 and alternative indexes of de jure CBI. All columns report results using the GI index as dependent variable. Columns (1)-(4) includes the CWN index as independent variable of interest, and columns (5)-(8) includes the GMT index as independent variable of interest. Robust standard errors are clustered at the country level. *t*-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table OA4: Principal component analysis of the GI index

**Panel A: Correlation matrix**

| | GI PCA |
|---|---|
| GI | 0.805*** |

**Panel B: PCA loadings**

| Sub-criteria | Loadings |
|---|---|
| **C1. Executive ties** | |
| C1.1. The latest position of the appointee is in the executive branch of the government | 0.358 |
| C1.2. The appointee has a prior link to the ruling political party/parties via any of the following: prior electoral mandate, publicly known partisan relationship/friendship | 0.377 |
| C1.3. The appointee has a prior link to the ruling political party/parties via family ties (up to third-degree family members) | 0.146 |
| **C2. Succession** | |
| C2.1. The appointee is not the 'natural' successor (deputy governor) | 0.425 |
| C2.2. The appointee replaces a governor who was forced to leave prior to the end of term | 0.105 |
| C2.3. The appointee replaces a governor who was not reappointed, despite being eligible and willing to continue | 0.096 |
| **C3. Education** | |
| C3.1. The appointee has a PhD degree in Economics or Finance | 0.160 |
| **C4. Experience** | |
| C4.1. In the past, the appointee held a top-level position (i.e., deputy governor, executive or non-executive member of the board of directors) at a central bank | 0.351 |
| C4.2. In the past, the appointee held a top-level position in international organizations promoting economic, monetary, and financial stability (e.g., IMF, WB, BIS, OECD, EBRD, EIB, IDB) | 0.016 |
| C4.3. In the past, the appointee held a top-level position in branches of the government in charge of economic affairs (e.g., treasury, ministry of finance, ministry of economic affairs, central planning bureau) | -0.269 |
| C4.4. In the past, the appointee held a high-level position in a related discipline at an academic institution (e.g., university professor in Economics, Finance, Law or other related discipline) | 0.044 |
| C4.5. In the past, the appointee was member of the council of economic advisors or an equivalent body providing independent advice to the government | -0.003 |
| C4.6. In the past, the appointee held a top management position in the private financial sector | -0.087 |
| C4.7. In the past, the appointee held a position other than deputy governor or member of the board of directors of a central bank | 0.330 |
| **C5. Press** | |
| C5.1. The international (English-speaking) press explicitly reports the appointment as "political" | 0.283 |
| **C6. Experts** | |
| C6.1. The majority of academics surveyed indicates that the appointment is "political" | 0.297 |

Note: This table presents the principal component analysis of the GI index. Panel A presents the correlation matrix between the GI and the GI PCA indexes. Panel B presents the loadings from the first principal component. For each criterion, responses can be either 'YES' or 'NO'. We assign a code of '1' to the answer indicating higher independence. Therefore, in our coding system, a higher score consistently represents greater independence. The higher the absolute value of the loading, the more the original variable contributes to the component. The PCA loadings indicate several key factors associated with central bank governor independence: not being a natural successor (C2.1), lacking executive ties (C1.1 and C1.2), possessing specific types of professional experience (C4.1 and C4.7), survey responses (C6.1), and media perception (C5.1). In addition, the loading for government branch experience (C4.3) suggests that holding a top government position in economic affairs is viewed as a factor indicating dependence within the PCA framework.

Table OA5: Governor appointments and de jure CBI: Sub-sample analysis

| | (1) | (2) | (3) |
|---|---|---|---|
| Dependent variable: | GI | | |
| Sample: | Developed countries | Developing countries | Non-EZ countries |
| De jure CBI | 0.280 | -0.051 | 0.145 |
| | [1.272] | [-0.296] | [0.818] |
| Democratic accountability | -0.019 | 0.006 | 0.005 |
| | [-0.426] | [0.211] | [0.240] |
| Law and order | 0.011 | 0.022 | 0.034 |
| | [0.245] | [0.823] | [1.288] |
| Government stability | 0.003 | 0.003 | 0.003 |
| | [0.152] | [0.161] | [0.232] |
| Country FE | YES | YES | YES |
| Decade FE | YES | YES | YES |
| Observations | 120 | 103 | 181 |
| R-squared | 0.404 | 0.412 | 0.451 |

Note: This table presents estimates of the effect of de jure CBI on governor appointments based on model in Eqn. 2. All columns report results using the GI index as dependent variables. Column (1) only includes "developed" countries as classified by the World Bank, while column (2) only includes "developing" countries as per the same classification. Column (3) excludes Eurozone (EZ) countries. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table OA6: Main legislative reforms

| | Policy | Objectives | Lending | Finance | Report |
|---|---|---|---|---|---|
| Bolivia | 1995 | 1995 | 1995 | | 1995 |
| Bulgaria | | | 1997 | 1997 | 1997 |
| Chile | 1989 | 1989 | | 1989 | |
| Costa Rica | 1995 | | | | |
| Cyprus | 2002 | 2002 | 2002 | 2002 | 2002 |
| Czech Republic | | | 2000 | | 2000 |
| Denmark | | | | | 2005 |
| Finland | 1998 | 1998 | 1998 | 1998 | 1998 |
| France | 1993 | 1993 | 1993 | | 1993 |
| Greece | | | 1994 | | 1994 |
| Hungary | 2001 | 2001 | 2001 | 2001 | 2001 |
| India | | 2016 | | | |
| Korea, Rep. | 1998 | 1998 | | | |
| Lithuania | | | | 1996 | |
| Luxembourg | 1998 | 1998 | | 1998 | |
| Peru | | 1992 | 1992 | 1992 | 1992 |
| Mexico | 2010 | | | | |
| Norway | 1985 | | | | |
| Philippines | | 1993 | 1993 | | |
| Russian Federation | | | | 2002 | |
| South Africa | 1989 | 1989 | | | |
| Sri Lanka | | 2006 | | | |
| Turkey | 2001 | 2001 | 1994 | | 2001 |
| United Kingdom | 1998 | | | | |
| Uruguay | 1995 | 1995 | 1995 | 1995 | |

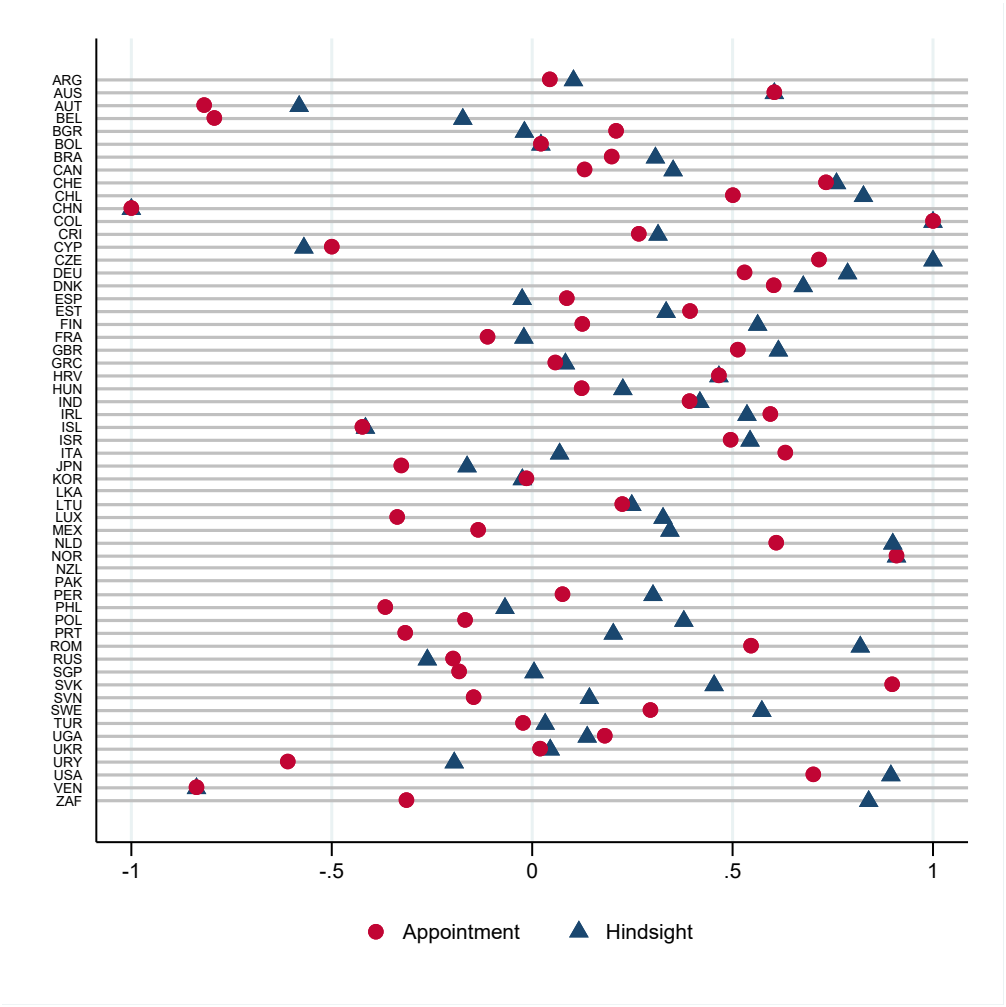
Note: This table reports the year for the sample countries having undertaken a significant change to their central bank legislation, with reforms in the form of complete changes of statutes or reprints of central bank charters, and legislative amendments. The years reported are the most significant changes per country over the sample period for the subcategory of the ROM index (specified in the column label). If a sample country is not reported, it means that the changes to its central bank legislation, if any, are not significant enough ("significant" is defined as a positive change of approximately 2 standard deviations of the (sub)index sample mean).

Table OA7: Experts' hindsight opinion and governor appointments: Alternative definition of the GI index

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dependent variable: | Experts (hindsight) | | | |
| GI (excluding "experts") | 0.583*** | 0.529*** | 0.435*** | 0.445*** |
| | [7.137] | [7.021] | [5.532] | [5.428] |
| Democratic accountability | | 0.055* | 0.014 | 0.012 |
| | | [1.751] | [0.517] | [0.366] |
| Law and order | | 0.006 | -0.009 | -0.016 |
| | | [0.256] | [-0.435] | [-0.618] |
| Government stability | | 0.001 | 0.010 | -0.002 |
| | | [0.079] | [0.855] | [-0.143] |
| Country FE | | | YES | YES |
| Decade FE | | | | YES |
| Observations | 258 | 242 | 240 | 240 |
| R-squared | 0.201 | 0.260 | 0.621 | 0.631 |

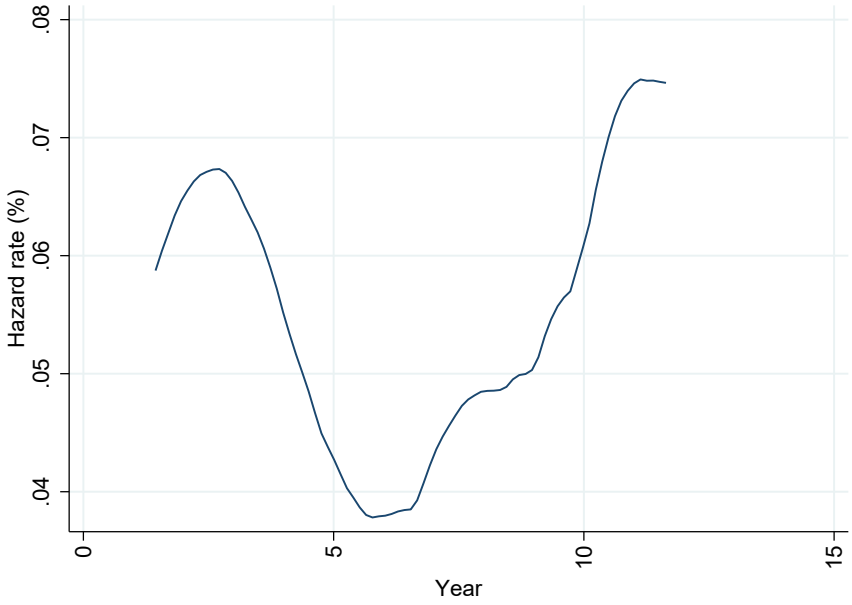
Note: This table presents estimates of the effect of governor appointments on experts' hindsight opinion based on a version of the model in Eqn. 2. All columns report results using Experts (hindsight) as dependent variable. The main independent variable of interest is GI, from which the "Experts" criterion has been excluded. Robust standard errors are clustered at the country level. $t$-statistics are in brackets. The Appendix A provides variable definitions and sources. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Figure OA1: Visualisation of criterion "Experts" of the GI index

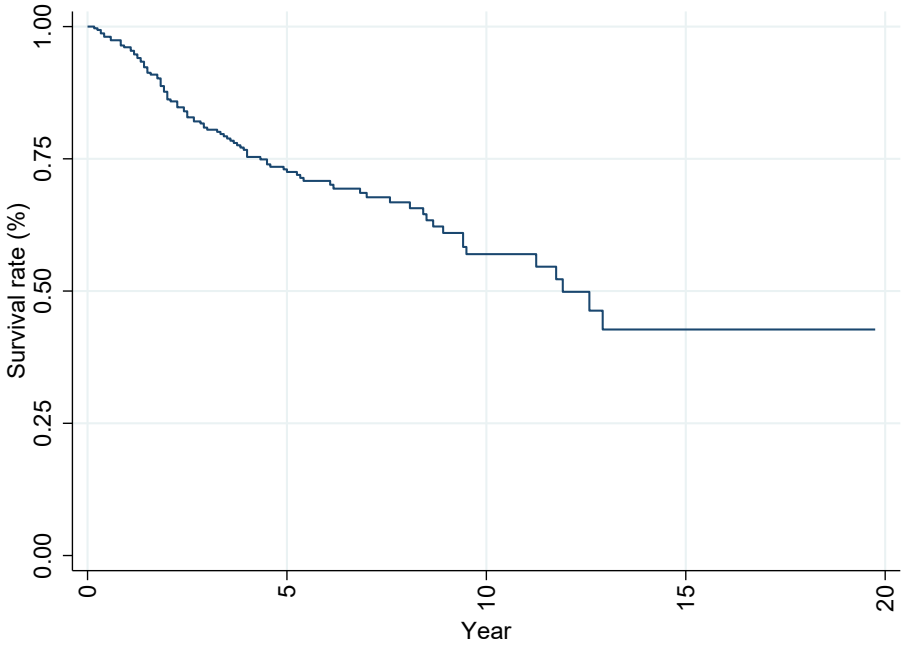



Note: This figure shows data aggregated at the country level and compares cross-country patterns for the criterion "Experts" of the GI index. The survey includes two questions inquiring about: (1) political independence during the appointment event; and (2) political independence during the whole term in office. Higher (positive) values reflect political independence and vice versa. For instance, in China (CHN) the experts indicate significant political interference during the appointment and the term in office. In Belgium (BEL) the experts suggest political intervention for the appointment of governors, but less so while in office.

Figure OA2: Non-parametrically estimated survivor functions



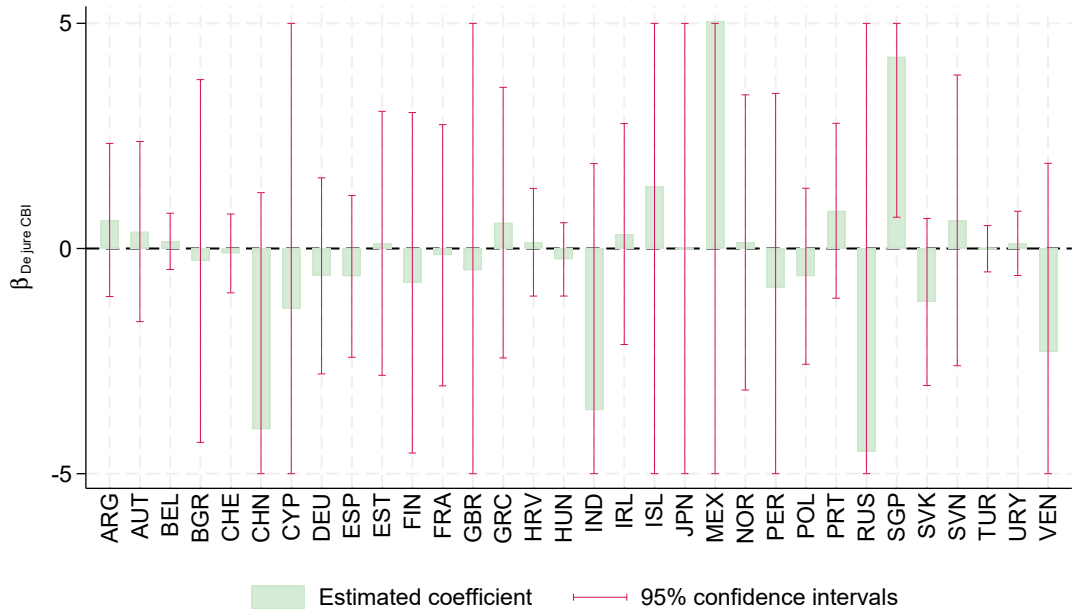

(A) Hazard ratio




(B) Kaplan-Meier survival curve

Note: This figure shows in Panel A the smoothed hazard estimate, while Panel B shows the Kaplan-Meier survival estimate with respect to time.

Figure OA3: Between country correlations




Note: This figure compares cross-country patterns between GI and de jure CBI indexes. The green bars represent the estimated coefficient, $\beta$, of Eqn. 2 for each sample country. The vertical blue lines are 95% confidence intervals.

Figure OA4: Experts' hindsight opinion and governor appointments: cross-country plot


Note: This figure shows the mean value of GI index (black line) and the Experts (hindsight) variable (maroon dashed line) across countries.