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Political economy behind central bank independence

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ABSTRACT

This paper proposes a model that analyzes the reasons behind the establishment and persistence of central bank independence (CBI) in a competitive democracy where both incumbent and opposition parties have the right to veto the delegation of monetary policy. We show that in a country with a high level of corruption, the opposition party uses the absence of CBI to keep the economy unstable to increase its own chances of getting elected. The model also predicts persistence of CBI once it is established, due to the incumbent's fear of losing the office if the autonomy is removed.

1. Introduction

The ability of a central bank to commit to a specific monetary policy often engenders strong economic performance in the long run (Kydland and Prescott, 1977; Barro and Gordon, 1983). However, governments might have an incentive to limit central bank independence (CBI), which can hinder a central bank from sticking with a specific policy. Such perverse incentives arise from the fact that the results of future elections often depend on short-term economic performance. Without institutional control, politicians might manipulate economic variables before elections through fiscal and monetary instruments. Yet, as suggested by Rogoff (1985), creating an independent monetary authority should resolve the time-consistency problem associated with monetary policy. In other words, if monetary policy is delegated to an independent institution, the government loses access to monetary tools, which reduces the extent of a political cycle and provides more economic stability. Unfortunately, such independent delegation does not always exist.

This paper studies two questions: (1) why do some countries establish an independent monetary authority, whereas others do not? and (2) why is CBI persistent as suggested by the data? The explanation we offer applies only to competitive democracies wherein two parties have veto power in relation to the de facto independence of monetary authority. We show the presence/absence of CBI is associated with a number of parameters, including the level of corruption, the quality of politicians, the discount factor of the future, the value of economic growth and inflation in the voter preferences. Even though such parameters are responsible for creating a particular economic environment, the most striking result we obtain is that in countries with high levels of corruption, CBI might be vetoed by the opposition, not by the potentially corrupt incumbent, because the opposition is interested in keeping the economy unstable to undermine the incumbent and increase its own chances of winning the election. In addition, the model predicts persistence of CBI once it is established, because of the incumbent's fear of losing the office if CBI is removed. We recognize that in reality, many additional reasons explain the (non)existence of CBI; however, our goal is to demonstrate an additional and non-trivial channel.

Classical models of political business cycles (Rogoff and Sibert, 1988; Persson and Tabellini, 1990) predict the permanent presence of manipulations with policy instruments in electoral years. Much empirical work confirms the existence of fiscal political

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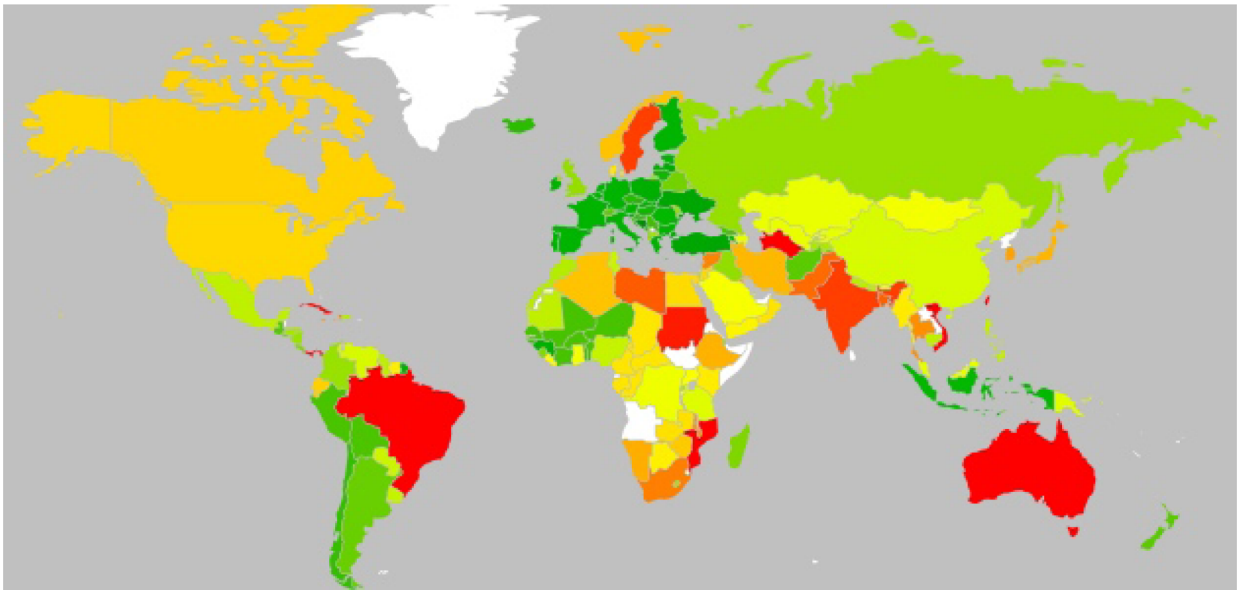

Fig. 1. 2012 CBI index: from low (red) to high (green) independence. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

cycles (e.g., Persson and Tabellini, 2003; Brender and Drazen, 2005; Akhmedov and Zhuravskaya, 2004; Brender and Drazen, 2013). However, prior investigations of political monetary business cycles have yielded mixed results, mostly due to reforms in CBI (Acemoglu et al., 2008). Studies that find evidence of pre-electoral monetary expansion (e.g., Tufte, 1978; Alesina and Roubini, 1992; Hallerberg et al., 2002; Block, 2002; Burkovskaya, 2013), are focused on countries without an independent monetary institution at the time. By contrast, Drazen (2000) discovers that monetary cycles disappeared in the US after 1979, when Paul Volcker became chairman of the Federal Reserve. Furthermore, numerous empirical findings support the negative relationship between CBI and inflation (e.g., Alesina and Summers, 1993; Loungani and Sheets, 1997; Franzese, 1999; Berger et al., 2001; Klomp and de Haan, 2010). Despite evidence of the clear advantages of CBI for the economy, not all countries choose to establish this delegation. An important question is why? Fig. 1 demonstrates the 2012 CBI de jure index from Garriga (2016).[2]

The economic literature offers various reasons for the absence of CBI. Cukierman (1994) points out CBI is unnecessary given political stability. McCallum (1995) argues the time-consistency problem cannot be resolved by CBI, because the government can always reverse the delegation. However, Jensen (1997) and Moser (1999) assert that the time-consistency problem can be reduced when such a reversal is costly. In addition to these reasons, researchers find a lack of desire to solve the problem of inflationary opposition (Milesi-Ferretti, 1995), inflation aversion, benefits of unanticipated inflation, and the natural rate of unemployment (Eijffinger and Schaling, 1998; Farvaque, 2002), the rise of populism (Masciandaro and Passarelli, 2018), and, in the light of the financial crisis, the richer set of tools useful during recessions (e.g., Blinder, 2013).

In contrast to the above, our contribution to the literature centers on general change and the persistence of institutions. Acemoglu and Robinson (2000, 2001, 2008) and Acemoglu et al. (2008) discuss the relationship between distribution of de jure and de facto political power and the persistence and change of institutions. The authors argue those with political power who are negatively affected by the policy reform are likely to use that power to block its effective implementation. Indeed, the main reason for the absence of CBI in our model is one of the politicians. The incumbent might be corrupt or the opposition might veto CBI to improve her own chances of winning the election.

An example of the first scenario is modern-day India, where demand for CBI comes from the central bank and economists; however, the incumbent government is trying to undermine the attempts through fixing the bill in its own interests.[3] By contrast, in Brazil, active preparation of a CBI bill was taking place after the impeachment of President Dilma Rousseff in 2016.[4] However, a year later, the reform was postponed due to lack of support in Congress.[5] Another example includes South Korea in 1997 before it finally achieved CBI. The incumbent formed a commission that strongly recommended improving the independence of the monetary authority (Cargill (2001)), but the recommendation did not proceed due to lack of support. Not until a financial crisis occurred and the International Monetary Fund applied pressure did South Korea establish CBI in 1998.

Another key point is that multiple studies of various CBI indices over different time periods (e.g., Crowe and Meade (2007, 2008),

[2] Note the de jure index provides information only about the existing laws and might differ from the de facto situation, especially in developing countries.

[3] *"India seeks to bury controversy over central bank,"* Financial Times, July 30, 2015.

[4] *"Brazil to formally enshrine central bank's autonomy,"* Financial Times, July 12, 2016.

[5] *"Independence May Remain Elusive for Brazil Central Bank Head,"* by M.S. Lima and M. Malinowski, Bloomberg Politics, September 18, 2017.

Dincer and Eichengreen (2014)) indicate the steady development and persistence of independence of monetary authority over time. Even in spite of the pressure to reduce CBI during the financial crisis, de Haan et al. (2018) show CBI has not diminished since then.

As long as the country experiences strong political competition, changing the status of de facto CBI would presumably require an agreement between the majority of the main domestic political actors. The previous literature suggests several veto players approving CBI lends it credibility (e.g., Moser (1999), Keefer and Stasavage (2003)), which might explain the persistence. However, the presence of two veto players delivers credibility only if at least one of the players is not interested in undermining CBI. In our model, the presence of two veto players is the reason for a lack of CBI in some cases, whereas persistence is guaranteed through the threat of economic instability and loss of office for the incumbent. For example, a Central Bank reform in Argentina in 2012 away from independence resulted in hyperinflation and loss of the next presidential elections for the Frente Para la Victoria[6] candidate. In other words, the incumbent is the guarantor of the credibility of CBI when put in place, whereas the opposition might be using its veto power to prevent the establishment of CBI in the first place.

This paper also relates to the models of political business cycles inspired by the pioneering work of Nordhaus (1975). Alesina (1987) models partisan cycles with the economy influenced by electoral expectations. After the rational expectations revolution, Rogoff and Sibert (1988) and Rogoff (1990) propose a signaling model with rational voters, who do not have information on the politician's type. In this model, politicians have different levels of competency in delivering government services. Persson and Tabellini (1990, 2000) apply the approach developed by Rogoff and Sibert to monetary policy and the economy described by the Phillips curve. Drazen (2000) introduces a separate monetary authority that is neither directly associated with the government nor completely independent. Ferre and Manzano (2014) add CBI to the partisan model of Alesina (1987). In the current study, we modify the model of Persson and Tabellini (2000) by adding a negotiation stage wherein both candidates might agree to establish or abolish CBI.

In this paper, we offer a toy two-period game that helps demonstrate the additional causes behind the existence or absence of CBI. We restrict the political business cycle model of Persson and Tabellini (1990, 2000) to two periods, while adding CBI as a potential monetary policy provider. The game goes as follows: An incumbent and a contender are up for elections at the end of period 1. Before any economic activity in period 1 starts, both politicians decide whether to change the current status of the central bank. The status can be changed only if both parties agree on the issue. The voters observe the current status of the central bank and know whether it has changed. The voters do not observe the actual voting, and they form their expectations about inflation based on the status of CBI. All economic activity is described by a rational expectations Phillips curve that takes into account the ability type of the incumbent to provide economic policy. Such ability can be high or low. Note the low-type politician might be interpreted as a populist. After period 1 economic activity occurs, the voters observe the current level of output and form beliefs about the type of the incumbent. At the end of period 1, elections take place, and in period 2, post-electoral economic activity occurs. The game has two types of perfect pure strategy equilibria: (1) separating equilibrium – both politicians agree on CBI in the beginning of the game; and (2) pooling equilibria – the contender vetoes CBI, keeping monetary tools in the incumbent's hands. In pooling equilibria, both types stimulate the economy to produce the same output in period 1, preventing voters from distinguishing the quality of the economic policy or the performance of the incumbent. Multiple pooling equilibria of this type occur, and each of them can be characterized by two parameters: the level of inflation expectations and the probability of incumbent re-election, which is bounded from above by the probability of the high-type politician.

The existence of one or another equilibrium is defined by a number of parameters in the model. The rent from office holding, which we associate more with corruption than with the presidential salary, and the future discount factor both reduce the probability of CBI. The reason is that the higher rent from office-holding and the discount factor increase re-election incentives for both types of politicians. Consequently, the low-type incumbent would prefer to mimic the output of the high type through monetary expansion, for which the absence of CBI is crucial. The probability of a high-type politician, the weight of output in voter preferences, and the difference between the politiciansabilities have a positive influence on the establishment of CBI. All of these parameters make the low-type incumbent prefer a more able politician to run the country instead of herself.

On the other hand, the rent from office-holding, the future discount factor, and the probability of incumbent re-election positively affect the existence of any given pooling equilibrium. All of these factors increase the incumbent's value from being re-elected and encourage the low-type incumbent to hide private information about her type. However, this story is not complete. The above justification explains why the type of equilibrium is pooling rather than separating in the absence of CBI, yet the reason for the actual absence is different: As long as the probability of incumbent re-election is lower than that of the high-type probability (which is the existence requirement), *the contender* prefers the lack of CBI to increase her own chances of winning election. Specifically, imagine a situation with high inflation expectations and the high level of corruption that guarantees high rent from office-holding. As a result, the low-type incumbent is encouraged to provide monetary stimulation in the absence of CBI. Even though an incumbent of any type might prefer living as a private citizen in a country with CBI and no inflation instead of running the country with high inflation, the foundation of CBI still fails, because voters generally do not favor any incumbent government due to high uncertainty about how well the country is actually run. The opposition (contender) is interested in keeping that uncertainty in place by refusing CBI.

However, if the game starts with CBI, independence will never get reversed. If an incumbent agrees to do so, the voters will immediately take it as a signal of the low type being in power and form inflation expectations. Therefore, the incumbent will never be able to get re-elected. To make matters worse, she will have to face inflation. This explanation is in line with the high-cost delegation

[6] Frente para la Victoria was the political party of Cristina Fernandez de Kirchner, the president of Argentina between 2007 and 2015.

argument in Jensen (1997) and Moser (1999), but in our model, the cost of delegation is *always* high because the price is losing the office. Such a high cost delivers persistence of the delegation and solves the time-consistency problem.

Our model relies on several fundamental assumptions: (1) The country is democratic, (2) at least two veto players are in the process of determining the de facto status of the central bank, (3) the voters observe only CBI status and not the voting behind it, and (4) the independence variable can take only two values: either the central bank is independent or it is not. Below, we discuss limitations imposed by these assumptions in more detail.

First, democracy is crucial for the existence of political cycles. A dictator has a wide range of means[7] to win political competition; therefore, the ruler does not usually need to stimulate the economy. Consequently, the economy might show stability during the regime (e.g., Mexico during Porfiriato, Putin's Russia). Moreover, the dictator is interested in improving the quality of work done by the central bank, because it contributes to the stability of the regime itself. For example, Mexico increased the autonomy of its central bank in 1993 under the Partido Revolucionario Institucional.[8] However, real independence of monetary authority is not possible in the presence of a dictator.

Second, as we already discussed, two veto players provide credibility to CBI when it is established and permanent absence otherwise. Removing this assumption would allow the incumbent to change the delegation at any moment. The model would then predict the existence of only one equilibrium with CBI. In fact, the high-type incumbent will always choose CBI, whereas the low-type incumbent might prefer its absence. However, reversing independence would send a negative message about the politician's type. As a result, the equilibrium will be separating regardless of the actual choice of the incumbent. Given that CBI delivers price stability, even the low-type incumbent would choose to keep it in this case.

Third, we assume the voters do not observe the actual voting, because in many cases, when de facto CBI is permanently absent, no voting actually takes place. The incumbent or the other party might want to introduce CBI; however, such a proposal often dies before reaching the formal legislative process or serious practical consideration, due to clear lack of support (e.g., Brazil). Even though nowadays a lot of information about political process and discussions are easily available on the internet, voters often do not pay attention to such details and stay quite uninformed. For example, the 2014 Annenberg Public Policy Center survey found only 27% of Americans knew a two-thirds vote of the House and Senate is necessary to override a presidential veto, and a similar picture was drawn in relation to other survey questions on political knowledge. This fact of political ignorance is the reason behind what we model as unobservable voting. If the voters were more cautious about the behind-the-scenes political process, we would have to give up this assumption, in which case, voters could punish the party that vetoes CBI, hence leading to the only separating equilibrium with CBI.

Fourth, CBI takes only two values: 0 and 1. In reality, CBI is a spectrum of outcomes, and any independence index would be a combination of a number of different attributes. Extending this assumption to different degrees of independence necessarily brings the question of how to model the effect of various levels of CBI on the economic outcomes. Potentially, this issue could be addressed by allowing the incumbent to generate limited inflation depending on the degree of CBI. Accounting for this extension would likely change the conditions on the existence of each type of equilibria and potentially add new ones.

This paper is organized as follows: Section 2 introduces the model. Section 3 analyzes the possible equilibria. Section 4 provides comparative statics. Section 5 concludes. All proofs are provided in the Appendix.

2. The model

2.1. Setup

In this section, we extend the model of opportunistic political business cycles of Persson and Tabellini (2000) to a setting that includes political decision on delegation of monetary policy. Note that we use only a two-period economy that might be extended to an infinite dynamic setting. However, the dynamic setting would overcomplicate the derivations and yield similar results; hence, we see it as unnecessary. We assume two politicians – an incumbent and a contender – are up for election. Each politician is characterized by her type, which is private information. We suppose there are two types – high μ_H with probability ρ and low μ_L with probability $1-\rho$. The type is related to the ability to boost the economy, which is described by the Phillips curve

$$y = \pi - \pi^e + \mu,$$

where μ is the incumbent's ability, π is inflation, and π^e is the expected inflation rate. Therefore, generally, the output is higher with a more able politician.

Voters' utility depends positively on output y_t in every period $t = 1, 2$ and negatively on inflation π_t with a discount for the second period:

$$u_v = -\frac{1}{2}\pi_1^2 + by_1 + \beta\left(-\frac{1}{2}\pi_2^2 + by_2\right).$$

The utility of the politicians is similar to the voters; however, they receive additional rent H if holding the office. We link the size of the rent with corruption: The greater the corruption, the more opportunities the incumbent has to extract rent. We assume both

[7] For example, he can jail political competitors.

[8] Partido Revolucionario Institucional held power for 71 years (1929-2000) in Mexico.

types of politicians receive non-negative utility from holding the office and the individual rationality constraints are met, which requires $H > b\rho\Delta\mu$[9], where $\Delta\mu = \mu_H - \mu_L$ is the difference in ability between the high and low types.

Generally, monetary instruments are in the hands of the incumbent; however, if the monetary policy is delegated to CBI, then – without loss of generality – it targets zero inflation.[10]

The timing of the model is as follows:

1. The game starts with the central bank, either independent or not. Before any first-period economic activity, politicians simultaneously decide whether to change the current status of the central bank. Only if both politicians agree does the delegation of monetary policy actually change.
   Having at least two parties with veto power is essential to guarantee credibility of de facto practice of CBI.
2. The voters observe whether the status of the central bank has changed, and set the expectation of inflation.
3. Monetary policy is used: The incumbent stimulates the economy according to her utility function in the case of no delegation to CBI. Otherwise, CBI sets the inflation target to zero.
4. The voters observe economic growth, but not inflation, and form beliefs about the type of incumbent.
   We assume inflation reacts more slowly to the expansionary monetary policy than the output. Hence, in the short run, the population is able to"feel" increased economic activity (e.g., through getting hired or observing increases in demand); however, the prices have not yet adjusted accordingly.
5. The election takes place, and the second-period economic activity is observed with either the new or re-elected incumbent.

We use the pure-strategy Perfect Bayesian Equilibrium concept to solve this game. See the Appendix for all the proofs.

3. Equilibria

3.1. Monetary policy is delegated to CBI

In this section, we study the case in which the central bank is independent during economic activity. The voters know the inflation target and set the appropriate expectation.

Lemma 3.1. *If the central bank is independent, $\pi_1 = \pi_2 = \pi_1^e = \pi_2^e = 0$. The high-type incumbent gets re-elected, the low-type incumbent loses the election, and the incumbent's expected payoffs are*

$$u^I(\mu_H) = (1 + \beta)(b\mu_H + H)$$

$$u^I(\mu_L) = b\mu_L + H + \beta bE\mu.$$

Note that whether or not the status of the central bank has changed does not matter since the inaccessibility of monetary instruments perfectly reveals the incumbent's type through the observed output. Consequently, the high-type incumbent is re-elected, whereas the low type is not, because the voters prefer uncertainty about the incumbent's type over the certainty that it is low.

3.2. No independent monetary authority

In the absence of CBI and after the election is over, both types of politicians prefer the same level of inflation, which rational voters also expect.

Lemma 3.2. *If the central bank is not independent, $\pi_2 = \pi_2^e = b$, and the utility of the politician in office in period 2 is*

$$u_2^I(\mu) = -0.5b^2 + b\mu + H.$$

3.2.1. Change from CBI to no delegation

In this section, we investigate the information set, in which CBI is being reversed by mutual agreement of the politicians.

Lemma 3.3. *If the status of the central bank changes from independent to dependent, then in the equilibrium $\pi_1 = \pi_2 = \pi_1^e = \pi_2^e = b$, the incumbent always loses elections and receives expected payoff*

$$u^I(\mu) = -0.5b^2 + b\mu + H + \beta bE\mu.$$

[9] This condition requires that the rent from holding office is high enough that the low type has incentives to run for office. Otherwise, we would face an economy with only able politicians, which seems to contradict reality.

[10] Consider the CBI loss function $L_t = \pi_t^2$ in each period $t = 1, 2$.

The high-type incumbent receives the highest payoff only in the case of CBI, because she is guaranteed re-election and the country experiences economic stability that is represented in the model by a lack of inflation. In the absence of CBI, even if the high type is reelected, the effect of the monetary expansion on output will be offset by the inflation expectation, and the economy will experience instability through inflation. Henceforth, the high-type incumbent always vetoes any attempt to remove CBI. In effect, rational voters presume the type of the incumbent is low and elect the contender if such a situation is observed.

Note that overriding CBI does not signal anything about the type of the contender: CBI reversal hands over the office to the opposition, and, as a result, the contender always supports the reversal in this case.

3.3. Game outcome

In this section, we study the final outcome of the game, which can be described by two types of equilibria: separating and pooling. The separating equilibrium is characterized by the delegation of the monetary policy, whereas the pooling equilibrium is possible only when the politicians have access to the monetary instruments.

Theorem 3.1. *The game has two types of equilibria:*

1. ***Separating:*** *The monetary policy is delegated to CBI immediately,* $\pi_1 = \pi_2 = \pi_1^e = \pi_2^e = 0$. *The high-type incumbent gets re-elected and the low-type incumbent loses the election. This equilibrium exists if*

$$0.5\Delta\mu^2 + \beta b\rho\Delta\mu - \beta H > 0. \tag{1}$$

2. ***Pooling:*** *The central bank remains dependent, output is* $y^p = E\mu$, *inflation is* $\pi_1^H = -(1-\rho)\Delta\mu + \pi_1^e$, $\pi_1^L = \rho\Delta\mu + \pi_1^e$, *and* $\pi_2 = \pi_2^e = b$, *and the incumbent gets re-elected with probability* $q \leq \rho$. *This equilibrium exists if*

$$-0.5(\rho\Delta\mu + \pi_1^e - b)^2 + q\beta(H - b\rho\Delta\mu) > 0. \tag{2}$$

Notice the persistent absence of CBI does not reveal any information about the type of the incumbent. Depending on the values of the parameters, the information set with the permanent absence of CBI might have different outcomes that result in different types of equilibria.

First, the separating equilibrium exists in the information set characterized by the permanent absence of CBI if condition (1) holds. In this situation, the rent from holding the office is not high enough; hence, the low type does not have incentives to stimulate the same level of output as the high type, because it requires very high inflation. Consequently, both types choose the optimal level of inflation, which is also expected by voters. As a result, output is different under different types of politicians; thus, the type is revealed. Subsequently, the high type gets re-elected, whereas the low type does not.

If the separating equilibrium is played in the information set with a permanent absence of CBI, both types of incumbents would prefer to delegate the monetary policy, because doing so would reduce inflation while delivering the same output and re-election outcome. Given that the high type gets re-elected and the low type does not under CBI or without it, the contender's probability of winning the election is the same in both scenarios. Henceforth, the opposition prefers CBI because it delivers more economic stability.

Second, the pooling equilibria is characterized by an identical level of output under both types of politicians but with different levels of inflation. The low type has to stimulate the economy more than the high type to achieve the equilibrium output. For such equilibria to exist, it is necessary that the probability of incumbent re-election $q \leq \rho$. The following paragraphs explain why.

Suppose $q > \rho$; that is the probability of incumbent re-election is greater than the probability of a high-type politician. In this case, the probability of electing the contender in the absence of CBI is $1 - q$. However, if the monetary policy is delegated to CBI, the opposition wins as often as the incumbent happens to be the low-type, which is $1 - \rho$. Thus, the contender prefers the delegation to CBI in this situation. Subsequently, rational voters know about the preference of the contender, and, as a result, associate the persistent absence of CBI with the low-type incumbent and elect the contender. The last point contradicts the assumption about $q > \rho$.

Hence, if $q \leq \rho$ and condition (2) holds, the pooling equilibria exist. Note we are dealing with the case of multiple equilibria with different levels of inflation. The voters expect an average level of inflation π_1^e, and the politicians have to adjust their monetary expansion to the level of the expectations to achieve the required level of output. In this case, the contender's probability of winning the election is greater in the absence of CBI. Consequently, the opposition always vetoes the delegation. Note that in this situation, actual preferences of the low type over CBI *do not* matter, as long as the low type has incentives to pool with the high type and be re-elected with probability q instead of choosing the optimal level of inflation and losing the election, which is guaranteed by condition (2). Hence, the low type might *prefer* CBI to economic instability, and yet the delegation does not occur.

4. Comparative statics

Note we have obtained two conditions on the parameters that define whether separating or pooling equilibria exist. In this section, we discuss how the model parameters affect those conditions. We start by analyzing the existence of CBI equilibrium and later focus on the persistent absence of CBI.

4.1. Equilibrium with CBI

The equilibrium with CBI exists if inequality (1) holds. Now we define a function

$$f_1(H, \Delta\mu, b, \rho, \beta) = 0.5\Delta\mu^2 + \beta b\rho\Delta\mu - \beta H;$$

then, condition (1) can be rewritten as $f_1(H, \Delta\mu, b, \rho, \beta) > 0$. To provide comparative statics, we obtain the derivatives of the above function with respect to the model parameters.

4.1.1. Rent from holding office

$$\frac{\partial f_1(H, \Delta\mu, b, \rho, \beta)}{\partial H} = -\beta < 0$$

The negative derivative with respect to H implies that the higher the rent that the incumbent can obtain by holding office, the less likely condition (1) holds, and the less likely CBI is established. The conclusion is reasonable because the higher the payoff from holding the office, the higher the incentives of the low type to hide her type in order to get re-elected.

4.1.2. The ability of politicians

$$\frac{\partial f_1(H, \Delta\mu, b, \rho, \beta)}{\partial \Delta\mu} = \Delta\mu + \beta b\rho > 0$$

The greater the difference in the ability of the politicians, the more likely CBI will be established. The greater the economic performance under the high type in comparison with the low type, the more incentives the low type has to be just a citizen who enjoys economic well-being rather than run the country with mediocre performance.

4.1.3. Weight of output in utility

$$\frac{\partial f_1(H, \Delta\mu, b, \rho, \beta)}{\partial b} = \beta\rho\Delta\mu > 0$$

The greater the weight of output in everyone's utility, the more likely we are to see the independent central bank. The conclusion is straightforward: The high type is better at providing economic well-being and she will always get re-elected with an independent central bank.

4.1.4. Probability of the high type

$$\frac{\partial f_1(H, \Delta\mu, b, \rho, \beta)}{\partial \rho} = b\beta\Delta\mu > 0$$

The greater the probability of the high-type politician, the more likely the CBI. A higher probability of the high type increases the expected economic performance if the uncertain contender wins. As a result, the low type has more incentives to be a private citizen of a country run by a professional.

4.1.5. Future discount factor

$$\frac{\partial f_1(H, \Delta\mu, b, \rho, \beta)}{\partial \beta} = b\rho\Delta\mu - H < 0$$

The greater the value of the future, the less likely the independence of the central bank. This conclusion is straightforward: the more the low type values the future, the more the low type values holding office in the future, and hence the more incentives the low type has to hide the information about her own ability.

4.2. Equilibrium with dependent central bank

Condition (2) has to hold for the existence of the pooling equilibrium with the dependent central bank. We define the function

$$f_2(H, \Delta\mu, b, \rho, \beta, q, \pi_1^e) = -0.5(\rho\Delta\mu + \pi_1^e - b)^2 + q\beta(H - b\rho\Delta\mu),$$

and rewrite inequality (2) as $f_2(H, \Delta\mu, b, \rho, \beta, q, \pi_1^e) > 0$. By analogy, we study partial derivatives to discuss the influence of the different model parameters.

4.2.1. Rent from holding office

$$\frac{\partial f_2(H, \Delta\mu, b, \rho, \beta, q, \pi_1^e)}{\partial H} = q\beta > 0$$

The greater the rent from holding the office, the higher the probability of the equilibrium without the independent central bank.

4.2.2. Future discount factor

$$\frac{\partial f_2(H,\ \Delta\mu,\ b,\ \rho,\ \beta,\ q,\ \pi_1^e)}{\partial \beta} = q(H - b\rho\Delta\mu) > 0$$

The more valuable the future is, the more likely there will be equilibrium with the dependent central bank.

4.2.3. Probability of re-election

$$\frac{\partial f_2(H,\ \Delta\mu,\ b,\ \rho,\ \beta,\ q,\ \pi_1^e)}{\partial q} = \beta(H - b\rho\Delta\mu) > 0$$

The higher the probability of re-election in the pooling equilibrium, the more likely that equilibrium will occur. The conclusion is reasonable because the higher the probability of re-election, the higher the expected payoff for the low type and the stronger the incentives for the low type to keep information hidden.

The impact from the rest of the parameters is not as straightforward.

4.2.4. Politicians' ability and the probability of the high type

$$\frac{\partial f_2(H,\ \Delta\mu,\ b,\ \rho,\ \beta,\ q,\ \pi_1^e)}{\partial \rho} = \Delta\mu(b(1 - q\beta) - \rho\Delta\mu - \pi_1^e)$$

$$\frac{\partial f_2(H,\ \Delta\mu,\ b,\ \rho,\ \beta,\ q,\ \pi_1^e)}{\partial \Delta\mu} = \rho(b(1 - q\beta) - \rho\Delta\mu - \pi_1^e)$$

If the level of expected inflation in the pooling equilibrium is high, the probability of a high type and the difference between types have a negative effect on the occurrence of equilibrium without the CBI. Higher inflation makes taking control of the economy preferable for all parties involved. Hence, the low type does not want to expand the economy further and reveals her type, and as a result, the opposition loses incentives to veto CBI.

However, if the equilibrium level of inflation is lower than optimal, then the greater the probability of the high type or difference in ability, the greater the required inflation to achieve the equilibrium level of output. Subsequently, inflation gets closer to the optimal level. However, we do not expect this case to happen in reality.

4.2.5. Weight of output in utility and expected inflation

$$\frac{\partial f_2(H,\ \Delta\mu,\ b,\ \rho,\ \beta,\ q,\ \pi_1^e)}{\partial b} = b - (1 + q\beta)\rho\Delta\mu - \pi_1^e$$

$$\frac{\partial f_2(H,\ \Delta\mu,\ b,\ \rho,\ \beta,\ q,\ \pi_1^e)}{\partial \pi_1^e} = -\rho\Delta\mu - \pi_1^e + b$$

If the level of inflation, the probability of a high type, or the difference in ability are high, then the greater the weight of output in preferences or the expected inflation, the lower the chance of the pooling equilibrium. The reason is the low type will prefer the country to be run by a more able politician.

However, if the level of inflation, the probability of a high type, and the difference in ability are all low – while the weight of output is already high – then the greater the weight of output in preferences or the expected inflation, the closer the equilibrium inflation is to optimal. As a result, politicians have more incentives to deviate from the equilibrium output and expand the economy.

4.3. Discussion

Denote $H_1 = \frac{1}{\beta q}(0.5(\rho\Delta\mu + \pi_1^e - b)^2) + b\rho\Delta\mu$ and $H_2 = \frac{0.5\Delta\mu^2}{\beta} + b\rho\Delta\mu$. The equilibrium with CBI exists if $H < H_2$, and the pooling equilibrium exists if $H > H_1$. No direct relationship exists between H_1 and H_2, implying that, depending on the parameters, multiple equilibria are possible or the equilibrium might not exist. However, very low or very high rent would result in a unique equilibrium: low with CBI and high without it. In effect, we can predict that reducing corruption, and thus lowering the rent, in developing countries would seriously reduce incentives of the low-type politicians to expand the economy before elections. Consequently, more stable economies would reveal the type of the incumbent, and thus decrease the probability of the opposition to win elections in the case of the high-type incumbent. Henceforth, the contender will have more incentives to support the establishment of CBI.

Note that an attempt to improve CBI often comes after a period of high inflation (e.g., Israel (1985), Argentina (1991)) or a financial crisis (e.g., South Korea (1998)). Growing inflation in our model means increasing π_1^e. A spike in π_1^e might break the existence of the pooling equilibria condition (2). If the other parameters are such that condition (1) is satisfied – for example, rent H is not too high – then the economy switches to the equilibrium with CBI (e.g., the US). However, if condition (1) is not satisfied, implying the rent H is still too high, CBI will not be established, and at some point when inflation decreases, the country will return to the pooling equilibrium (e.g., Argentina). In the case of a financial crisis that is not necessarily associated with high inflation, a country might experience pressure due to its inability to borrow from outside markets or to receive financial aid. This kind of pressure reduces rent H and makes the equilibrium with CBI more likely (e.g., South Korea).

5. Conclusion

In this paper, we have demonstrated an additional channel through which the level of corruption, the quality of politicians, the discount factor of the future, the value of economic growth and inflation in the voter preferences, and the behavior of the opposition affect the presence of de facto CBI. An unusual result we have found is that in a corrupt democracy, the opposition might block the establishment of an independent monetary authority to improve own chances of winning the office. In addition, we have showed the persistence of CBI can be explained by the incumbent's fear of losing the office. We have relied on four fundamental assumptions: (1) The country is democratic, (2) at least two veto players are in the process of determining the de facto status of the central bank, (3) the voters observe only CBI status and not the voting behind it, and (4) the independence variable can take only two values: either the central bank is independent or it is not. Removing any of the assumptions (1)–(3) would result in the unique separating equilibrium with CBI. By contrast, extending assumption (4) to multiple levels of CBI would potentially yield a larger number of different equilibria with a variety of levels of CBI.

In addition to the imposed assumptions, the model does not account for other factors that might be at play when determining the delegation of monetary policy. On one hand, in the light of financial crisis, the more developed countries are interested in reducing the level of independence to increase the number of tools that can be used to deal with recessions in the low-rate world. On the other hand, the rise in populism should provide strong incentives to keep CBI in place. By contrast, the decision to establish CBI in less developed countries might often be forced by international institutions, such as IMF (e.g., South Korea). The addition of some of these ignored factors to the model and their interaction might bring unexpected additional insights to CBI and should be seen as a potential direction for future research.

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Appendix A

Proof of Lemma 3.1. If the status of the central bank is independent, the economy does not experience inflation. Voters are rational and also do not expect inflation. Hence, $\pi_1 = \pi_2 = \pi_1^e = \pi_2^e = 0$. This fact results in $y = \mu$ in both periods, and voters observe the output. Thus, the state of the economy reveals the type of the incumbent. The high type gets re-elected, whereas uncertainty is better than the low type, so the low type loses the election. The payoffs of both types of incumbents are straightforward. □

Proof of Lemma 3.2. Getting re-elected in period 2 is not necessary, so the incumbent maximizes her utility:

$$\max_{\pi_2} b(\pi_2 - \pi_2^e + \mu) - 0.5\pi_2^2 + H.$$

Hence, the first-order condition suggests $\pi_2 = b$. Voters are rational, so they form consistent inflationary expectations $\pi_2^e = b$. The politician's payoff is straightforward. □

Proof of Lemma 3.3. First, consider separating equilibrium at this stage. Then, the low type does not have incentives to pretend to be the high type and chooses the optimal level of inflation, which is $\pi_L = b$. Hence, the high type also chooses the optimal level, which is $\pi_H = b$. Because voters are rational, the inflationary expectations are $\pi_1^e = b$. Note that the payoff of the high-type incumbent is then

$$u^I(\mu_H) = (1 + \beta)(-0.5b^2 + b\mu_H + H) < (1 + \beta)(b\mu_H + H),$$

which is strictly smaller than the payoff of the high-type incumbent under the independent central bank.

Second, note the pooling equilibrium will give a smaller payoff to the high type than the separating equilibrium. Indeed, for the pooling equilibrium in period 1, we have

$$\pi_H - \pi^e + \mu_H = \pi_L - \pi^e + \mu_L \Rightarrow \pi_L = \pi_H + \Delta\mu$$

$$\pi^e = \rho\pi_H + (1 - \rho)\pi_L = \pi_H + (1 - \rho)\Delta\mu$$

$$y_H = \mu_H - (1 - \rho)\Delta\mu.$$

Then, the payoff of the high-type incumbent if she wins re-election with some probability q is

$$u^I(\mu_H) = -0.5\pi_H^2 + b(\mu_H - (1 - \rho)\Delta\mu) + H + \beta(-0.5b^2 + q(b\mu_H + H) + (1 - q)bE\mu),$$

which is strictly smaller than $(1 + \beta)(b\mu_H + H)$ under the independent central bank.

Hence, if the original status of the central bank is independent and it changes to dependent, voters will update their beliefs about the incumbent realizing the incumbent's type must be low. As a result, the incumbent is never re-elected in this case and has no incentives to choose a different level of inflation than the preferred one. □

Proof of Theorem 3.1. To establish final equilibrium results, we have to consider what happens in the information set with

permanent absence of CBI.

Separating equilibrium

Given that the voters distinguish between the types, the low type chooses the optimal level of inflation, which is $\pi_L = b$. The optimal level of inflation is also available to the high type; hence, $\pi_H = b$. Thus, the inflationary expectations are $\pi_1^e = b$.

I. High-type incumbent always prefers CBI.

The payoff of the high type with CBI is

$$u_{CBI}^I = (1 + \beta)(b\mu_H + H).$$

The payoff of the high type without CBI in separating equilibrium is

$$u_{sep}^I = (1 + \beta)(-0.5b^2 + b\mu_H + H).$$

Note that $u_{CBI}^I > u_{sep}^I$ always holds; hence, the high-type incumbent supports CBI.

II. Low-type incumbent prefers CBI when $0.5\Delta\mu^2 + \beta b\rho\Delta\mu - \beta H > 0$.

For the separating equilibrium to exist, the low type should not have incentives to mimic the high type. The payoff of the low type in the information set without CBI is

$$u^I(\mu_L) = -0.5b^2 + b\mu_L + H + \beta(-0.5b^2 + bE\mu).$$

If the low type pretends to be the high type, inflation has to be such that the output is μ_H. Note also that $\pi^e = b$ because we consider the separating equilibrium, in which both types of politicians are expected to choose $\pi = b$. Hence,

$$\pi_L - b + \mu_L = \mu_H \Rightarrow \pi_L = b + \Delta\mu.$$

If the low type mimics the high type, the payoff of the low type would be

$$u_{LH}^I(\mu_L) = -0.5(b + \Delta\mu)^2 + b\mu_H + H + \beta(-0.5b^2 + b\mu_L + H).$$

For equilibrium to exist, the latter must not be greater than the original utility; thus,

$$-0.5\Delta\mu^2 + \beta(b\mu_L + H - bE\mu) < 0,$$

which simplifies to

$$0.5\Delta\mu^2 + \beta b\rho\Delta\mu - \beta H > 0.$$

Now consider the first stage where politicians decide on the delegation. Initially, no CBI exists. The low type loses re-election; thus, her payoff under CBI is higher due to the lack of inflation. Consequently, in this case, the low-type incumbent votes for CBI.

III. Contender always prefers CBI in the separating case.

Note the election results do not depend on whether or not CBI exists. As a result, the contender's probability of getting elected is not affected by that fact. Hence, with probability ρ, the incumbent is the high type and gets re-elected, whereas with probability $1 - \rho$, the incumbent is the low type and the voters choose the contender. The payoff of the contender is

$$u_{CBI}^C(\mu) = bE\mu + \beta(\rho b\mu_H + (1 - \rho)(b\mu + H)).$$

The payoff in the separating equilibrium without CBI is

$$u_{sep}^C(\mu) = -0.5b^2 + bE\mu + \beta(-0.5b^2 + \rho b\mu_H + (1 - \rho)(b\mu + H)).$$

Hence, $u_{CBI}^C(\mu) > u_{sep}^C(\mu)$ always holds and the opposition prefers a more stable economy without inflation.

IV. Separating equilibrium.

As one might see, we obtained that the separating equilibrium in the subgame with permanent absence of CBI delivers separating equilibrium with CBI in the entire game. The only condition for the existence of this equilibrium is the existence of separating equilibrium in the discussed subgame based on the low type, that is

$$0.5\Delta\mu^2 + \beta b\rho\Delta\mu - \beta H > 0.$$

Pooling equilibria

Voters have a belief p about the probability of the high type and the incumbent is re-elected with probability q.

I. Voters equilibrium belief must be $p = \rho$.

The information set of the permanent absence of CBI might be reached through a number of different scenarios. For example, (1) contenders might always prefer CBI, but the low-type incumbent does not permit it; or (2) contender always rejects CBI no matter

what. Because we have not established the behavior of the contender in this type of the equilibrium, in theory, belief p might take different values. However, this case does not happen.

When $p > \rho$, the incumbent is always re-elected, and hence, $q = 1$, implying the contender is never elected. As a result, she prefers a CBI that would provide her with probability $(1 - \rho)$ of winning the election. This fact implies the central bank remains dependent if and only if the incumbent is the low type. The voters would update beliefs accordingly, i.e., $p = 0$, which leads to contradiction. Thus, this equilibrium would not exist.

When $p < \rho$, the incumbent always loses the election. The pooling equilibrium does not exist in this case, because none of the types has incentives to choose the level of inflation different from b. If they both choose $\pi_1 = b$, the equilibrium would be separating because it would produce different levels of output. Hence, it must be the case that $p = \rho$.

II. In pooling equilibrium we have $\pi_1^L = \rho\Delta\mu + \pi_1^e$, $\pi_1^H = -(1-\rho)\Delta\mu + \pi_1^e$ *and* $y^p = E\mu$.

The pooling level of output is denoted y^p, and for simplicity, we specify that voters update their belief as follows[11]:

$$p(y) = \begin{cases} \rho, & \text{if } y = y^p \\ 0, & \text{otherwise} \end{cases}.$$

To achieve y^p, the incumbent has to stimulate the economy with the following levels of inflation:

$$\pi_1^L = y^p + \pi^e - \mu_L \text{ and } \pi_1^H = y^p + \pi^e - \mu_H.$$

As a result, the voters will form the inflationary expectations

$$\pi_1^e = \rho\pi_1^H + (1-\rho)\pi_1^L = y^p + \pi^e - (\rho\mu_H + (1-\rho)\mu_L) \Rightarrow y^p = E\mu.$$

Hence, in this equilibrium, only one level of output is possible, however, with different levels of inflation. We keep π_1^e as a parameter, and then

$$\pi_1^L = \rho\mu_H + (1-\rho)\mu_L + \pi_1^e - \mu_L = \rho\Delta\mu + \pi_1^e$$

$$\pi_1^H = \rho\mu_H + (1-\rho)\mu_L + \pi_1^e - \mu_H = -(1-\rho)\Delta\mu + \pi_1^e.$$

III. An incumbent does not deviate if $-0.5(\rho\Delta\mu + \pi_1^e - b)^2 + q\beta(H - b\rho\Delta\mu) > 0$.

Utility of the high-type incumbent is

$$u^I(\mu_H) = -0.5(-(1-\rho)\Delta\mu + \pi_1^e)^2 + bE\mu + H - 0.5\beta b^2 + q\beta(b\mu_H + H) + (1-q)\beta bE\mu.$$

If the high type deviates to some other level of inflation, the most profitable level is b; however, any deviation results in no re-election. Thus, her utility in this case would be

$$u^I_{\pi=b}(\mu_H) = -0.5b^2 + b(b - \pi_1^e + \mu_H) + H + \beta(-0.5b^2 + bE\mu).$$

For equilibrium to exist, we must have $u^I(\mu_H) \geq u^I_{\pi=b}(\mu_H)$ (the IC constraint for the high type).

By analogy, the low type's utility is

$$u^I(\mu_L) = -0.5(\rho\Delta\mu + \pi_1^e)^2 + bE\mu + H - 0.5\beta b^2 + q\beta(b\mu_L + H) + (1-q)\beta bE\mu.$$

Utility of the low type under the deviation to b is

$$u^I_{\pi=b}(\mu_L) = -0.5b^2 + b(b - \pi_1^e + \mu_L) + H + \beta(-0.5b^2 + bE\mu).$$

The IC constraint for the low type is $u^I(\mu_L) \geq u^I_{\pi=b}(\mu_L)$, which simplifies to

$$-0.5(\rho\Delta\mu + \pi_1^e - b)^2 + q\beta(H - b\rho\Delta\mu) > 0,$$

and implies that the IC for the high type holds too.

IV. In pooling equilibrium, $q \leq \rho$ *and contender always rejects CBI.*

Now notice the following. If $q \geq \rho$, the contender prefers CBI as her probability of winning election $1 - \rho$ would be greater than $1 - q$ in the case of a pooling equilibrium. Hence, the central bank is not independent if and only if the incumbent is low type; hence, the voters update their beliefs and equilibrium belief would be $p = 0$, which contradicts $p = \rho$. Hence, only the situation with $q \leq \rho$ might be possible.

[11] Note that on the equilibrium path, having $p(y^p) = \rho$ is required; however, PBE allows the off-equilibrium beliefs to be anything. The current hypothesis $p(y) = 0$ if $y \neq y^p$ generates the richest set of parameters under which pooling equilibria are possible, because the high type cannot improve the probability of re-election by deviating at all. Hence, the assumption accounts for the worst-case scenario in the case of deviation of the high type. However, different off-equilibrium beliefs might make deviating to some other levels of π_1^H with a set of levels of π^e more profitable and would rule out the existence of some of the pooling equilibria. In this paper, we are not interested in specific belief updating by voters and concentrate on which equilibrium outcomes might be achieved with some beliefs, which the chosen function delivers fully.

If $q \leq \rho$, the contender votes against CBI to maximize her probability of election $1 - q$ versus $1 - \rho$. The central bank stays dependent because the contender prefers to hide the information about the type of the incumbent because it gives her better chances of winning the office.

V. Pooling equilibria.

The pooling equilibria exist if the corresponding pooling behavior is reached under the permanent absence of CBI. Thus, the only condition for this equilibria comes from the IC constraint of the low type:

$$-0.5(\rho\Delta\mu + \pi_1^e - b)^2 + q\beta(H - b\rho\Delta\mu) > 0.$$

□

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jmacro.2019.103121.

References

Acemoglu, D., Johnson, S., Querubin, P., Robinson, J.A., 2008. When does policy reform work – the case of central bank independence. Brookings Pap. Econ. Act. 351–418.
Acemoglu, D., Robinson, J., 2001. A theory of political transitions. Am. Econ. Rev. 91(4), 938–963.
Acemoglu, D., Robinson, J., 2008. Persistence of powers, elites and institutions. Am. Econ. Rev. 98(1), 267–293.
Acemoglu, D., Robinson, J.A., 2000. Why did the west extend the franchise? Democracy, inequality, and growth in historical perspective. Q. J. Econ. 115(4), 1167–1199.
Akhmedov, A., Zhuravskaya, 2004. Opportunistic political cycles: test in a young democracy setting. Q. J. Econ. 119(4), 1301–1338.
Alesina, A., 1987. Macroeconomics and politics in a two-party system as a repeated game. Q. J. Econ. 102(3), 651–678.
Alesina, A., Roubini, 1992. Political cycles in OECD economies. Rev. Econ. Stud. 59(4), 663–688.
Alesina, A., Summers, 1993. Central bank independence and macroeconomic performance: some comparative evidence. J. Money Credit Bank. 25(2), 151–162.
Barro, R.J., Gordon, 1983. Rules, discretion, and reputation in a model of monetary policy. J. Monet. Econ. 12(1), 101–121.
Berger, H., de Haan, J., Eijffinger, S., 2001. Central bank independence: an update of theory and evidence. J. Econ. Surv. 15(1), 3–40.
Blinder, A., 2013. Financial crises and central bank independence. Bus. Econ. 48(3), 163–165.
Block, S., 2002. Political business cycles, democratization, and economic reform: the case of Africa. J. Dev. Econ. 67(1), 205–228.
Brender, A., Drazen, A., 2005. Political budget cycles in new versus established democracies. J. Monet. Econ. 52(7), 1271–1295.
Brender, A., Drazen, A., 2013. Elections, leaders, and the composition of government spending. J. Public Econ. 97, 18–31.
Burkovskaya, A., 2013. Monetary political business cycles: new democracy setting. Quantile 11, 75–90.
Cargill, T., 2001. Central bank independence in Korea. J. Korean Economy 2(1), 1–33.
Crowe, C., Meade, E., 2007. The evolution of central bank governance around the world. J. Econ. Perspect. 21(4), 69–90.
Crowe, C., Meade, E., 2008. Central bank independence and transparency: evolution and effectiveness. Eur. J. Polit. Econ. 24(4), 763–777.
Cukierman, A., 1994. Commitment through Delegation, Political Influence and Central Bank Independence. Kluwer Academic Publishers, Boston.
Dincer, N.N., Eichengreen, B., 2014. Central bank transparency and independence: updates and new measures. Int. J. Cent. Banking 10(1), 189–253.
Drazen, A., 2000. The political business cycle after 25 years. NBER Macroeconomic Annual.
Eijffinger, S., Schaling, E., 1998. The Ultimate Determinants of Central Bank Independence. Cambridge University Press, Cambridge.
Farvaque, E., 2002. Political determinants of central bank independence. Econ. Lett. 77(1), 131–135.
Ferre, M., Manzano, C., 2014. Rational partisan theory with fiscal policy and an independent central bank. J. Macroecon. 42, 27–37.
Franzese, R.J., 1999. Partially independent central banks, politically responsive governments, and inflation. Am. J. Pol. Sci. 43(3), 681–706.
Garriga, A.C., 2016. Central bank independence in the world: a new dataset. Int. Interact. 42(5), 849–868.
de Haan, J., Bodea, C., Hicks, R., Eijffinger, S., 2018. Central bank independence before and after the crisis. Comp. Econ. Stud. 60(2), 183–202.
Hallerberg, M., de Souza, L., Clark, W., 2002. Political business cycles in eu accession countries. Eur. Union Polit. 3(2), 231–250.
Jensen, H., 1997. Credibility of optimal monetary delegation. Am. Econ. Rev. 87(5), 911–920.
Keefer, P., Stasavage, D., 2003. The limits of delegation: veto players, central bank independence, and the credibility of monetary policy. Am. Polit. Sci. Rev. 97(3), 407–423.
Klomp, J., de Haan, J., 2010. Inflation and central bank independence: a meta-regression analysis. J. Econ. Surv. 24(4), 593–621.
Kydland, F., Prescott, E., 1977. Rules rather than discretion: the inconsistency of optimal plans. J. Polit. Econ. 85(3), 473–490.
Loungani, P., Sheets, N., 1997. Central bank independence, inflation and growth in transition economies. J. Money Credit Banking 28(3), 381–399.
Masciandaro, D., Passarelli, F., 2018. Populism, financial inequality and central bank independence: a political economics approach. Bocconi Working Paper Series 74.
McCallum, B.T., 1995. Two fallacies concerning central bank independence. Am. Econ. Rev. Pap. Proc. 85(2), 207–211.
Milesi-Ferretti, G.M., 1995. The disadvantage of tying their hands: on the political economy of policy commitments. Econ. J. 105(433), 1381–1402.
Moser, P., 1999. Checks and balances, and the supply of central bank independence. Eur. Econ. Rev. 43(8), 1569–1593.
Nordhaus, W.D., 1975. The political business cycle. Rev. Econ. Stud. 42(2), 169–190.
Persson, T., Tabellini, G., 1990. Macroeconomic Policy, Credibility and Politics. Amsterdam, The Netherlands: Harwood Academic Publishers.
Persson, T., Tabellini, G., 2000. Political Economics and Macroeconomic Policy. Amsterdam: North-Holland.
Persson, T., Tabellini, G., 2003. Do electoral cycles differ across political systems? Bocconi Working Paper Series 232.
Rogoff, K., 1985. The optimal degree of commitment to an intermediate monetary target. Q. J. Econ. 100(4), 1169–1189.
Rogoff, K., 1990. Equilibrium political budget cycles. Am. Econ. Rev. 80(1), 21–36.
Rogoff, K., Sibert, A., 1988. Elections and macroeconomic policy cycles. Rev. Econ. Stud. 55(1), 1–16.
Tufte, E., 1978. Political Control of the Economy. Princeton: Princeton University Press.