

**DETERMINANTS OF CENTRAL BANK INDEPENDENCE
IN DEVELOPING COUNTRIES: A TWO-LEVEL THEORY**

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This dissertation answers the following question: *What are the determinants of central bank independence (CBI) in developing countries?* I argue that in developing countries CBI is the product of vulnerable governments trying to attract foreign investors and creditors.

Incumbents' vulnerability increases when they experience *need for capital*. I define need for capital as the presence of growth problems, coupled with losses of FDI or high levels of foreign debt. Countries needing capital have to either attract investment or borrow funds in the international market. Because developing countries cannot rely on their reputation to attract capital, they need to signal their commitment to stable economic policy. I argue that CBI is one of the principal signals that international investors and lenders ask for. Therefore, I expect that as the need for capital increases, developing countries will accommodate the demands of international actors. This occurs independently of the preferences of domestic actors. However, the capacity of a government to respond to international incentives and pressures through CBI is determined by an institutional context that makes institutional change more or less costly. Focusing on presidential systems, I expect that two factors condition the elasticity of governments' responses to international incentives: the capacity of the actors in the inter-institutional bargaining (president and congress), and the preference distance between the two branches of government.

I present evidence suggesting that need for capital has the opposite effect in developed and developing countries' changes in CBI. Developing countries respond to need for capital with CBI

increases. Changes in CBI are also affected by the expected credibility of the signal. The findings with regard to the domestic level of the theory are mixed: although presidential powers, congress capabilities and preference distance affect the likelihood of central bank reform, they do not affect it in the direction that was expected by the theory. Finally, the case studies provide a closer look at the process of central bank reform in Argentina and Brazil. An analysis of the reforms affecting CBI, and of instances of lack of reform, provides qualitative evidence of incumbents' motivations for and obstacles against central bank reform.

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I dedicate this dissertation to my little brother Andres, who left too early to see me become a PhD.

LIST OF ABBREVIATIONS

BCB	Central Bank of Brazil (<i>Banco Central do Brasil</i>)
BCRA	Argentine Central Bank (<i>Banco Central de la República Argentina</i>)
BNDE	National Bank of Economic Development (<i>Banco Nacional de Desarrollo Económico</i>)
BOB	Bank of Brazil (<i>Banco do Brasil</i>)
CBI	Central bank independence
FDI	Foreign direct investment
GDP	Gross domestic product
IMF	International Monetary Fund
SUMOC	Superintendence of Money and Credit (<i>Superintendência da Moeda e do Crédito</i>)
VP	Veto players

1.0 INTRODUCTION

In this dissertation I ask: *What are the determinants of central bank independence (CBI) in developing countries?* In particular, how do these determinants work in developing countries with separation of powers systems? In order to answer these questions, this research analyzes the interplay of domestic and international incentives for politicians to give up their control over monetary policy by providing central banks with more independence.

Most states' constitutions allow the government to regulate monetary policy, that is, to manage the country's money supply to achieve economic goals such as maximizing production and employment, or stabilizing the currency. Although the government could be interested in making all monetary decisions to favor its own constituents' interests, there are advantages in delegating some powers in monetary policy to central banks, by giving these institutions more independence. CBI is argued to lower inflation, to increase credibility of the monetary policy, and to reduce uncertainty among economic agents because private actors can trust monetary policy will be stable and independent of changes in the political situation. Yet, the wide variance in CBI across countries and time is not explained just by economic reasons.

In the next sections, I define CBI, explain why the substantial variance in CBI across countries is puzzling, present an overview of the answer I propose, and highlight the theoretical and empirical contribution of my research.

1.1 DEFINITION AND PUZZLE

CBI is the central bank's capability of controlling monetary instruments (Bernhard 2002:21). Inversely, CBI is the set of restrictions on the government's influence on the central bank's management of monetary policy. CBI can be restricted or increased in three dimensions: personnel, financial, and policy independence (Eijffinger and de Haan 1996:2). The first dimension, *personnel*, refers to the way in which the chief executive officer (CEO) of the bank is appointed and dismissed. As the influence of the government on the CEO's tenure increases, the margin of independence of the central bank shrinks. The government can also affect personnel CBI through controlling membership on the central bank's board. *Financial* independence refers to the ability of the government to finance its expenditures. If the government has direct access to central bank's credit, it is more likely that monetary policy will be subordinated to fiscal policy. On the contrary, restrictions on the government's ability to finance itself through monetary instruments reflect higher degrees of CBI. Finally, *policy* independence reflects the central bank's powers to formulate and execute monetary policy. Finally, central banks have two primary ways they can affect monetary policy: (1) Setting the goals, and (2) choosing the instruments of monetary policy (DeBelle and Fischer 1994, 1995).

Through reforms in the institutional design of the central bank, the government can increase or reduce CBI. Therefore, CBI is a matter of degree and can be conceived as a continuous variable (Bernhard 2002:21).

Although some scholars have questioned the actual impact of CBI on inflation (Campillo and Miron 1997; Forder 1998; Posen 1993, 1995), there is a general consensus regarding the stabilizing effects of CBI on the economy in general. This consensus is considered one of the "few things on which economists are in total agreement" (Plender 2008). Said agreement involves not

only scholars (Bordo and Capie 1994; Cukierman 1992, 1998; Cukierman, Miller and Neyapti 2002; Cukierman, Webb and Neyapti 1992; Eijffinger and de Haan 1996; Eijffinger and Schaling 1997; Persson and Tabellini 1990, 1999; Prast 1997; Rogoff 1985; Schaling 1995), but also international agencies and policy makers (Bernhard, Broz and Clark 2002:699; International Monetary Fund 1999; Siklos 2008:802; World Bank 1992).¹ CBI is argued to lower inflation, to reduce variation in inflation and output, to increase credibility of the monetary policy, and to reduce uncertainty among economic agents because private actors can trust monetary policy will be stable.² Although economic reasons would justify the establishment of independent central banks, there is a wide variance of the levels of CBI across countries. This variance is not explained just by economic fundamentals. Furthermore, extant explanations for developed countries do not seem to apply to the case of developing countries.

1.2 THE ARGUMENT IN BRIEF

I argue that neither purely domestic nor purely international factors can account for varying levels of CBI. In particular, I contend that *there are objective conditions that make international determinants of CBI take precedence over domestic determinants of CBI*. In particular, I argue that whereas domestic factors can explain much of the variance in CBI in developed countries, international factors play a crucial role in developing countries³ facing (a relative) need for capital (see Figure 1.1).

Countries needing capital have to either attract investment or borrow funds in the international market. Developed countries can rely on their reputation to attract capital, but

¹ Note that said consensus was particularly strong during the 1990s, and it still persists among the majority of scholars and decision makers. On why CBI is so widely approved, see Forder (2005).

² For reviews of this literature, see Berger, de Haan and Eijffinger (2001), and Eijffinger and de Haan (1996).

³ Hereafter, developing countries refers both to underdeveloped and developing countries.

developing countries need to signal their commitment to stable economic policy. CBI is one of the principal signals that international investors and lenders ask for. As the need for capital increases, developing countries will be forced to accommodate the demands of international actors independently from the preferences of domestic actors.

		Structural conditions	
		<i>Developed countries</i>	<i>Developing countries</i>
Circumstantial conditions	<i>No need for capital</i>	Domestic determinants	Domestic determinants
	<i>Need for capital</i>	Domestic determinants	International determinants

Figure 1.1. Main determinants of CBI
 Determinants of CBI are different for developed and developing countries

My explanation goes beyond predicting the relative weight of domestic and international determinants of CBI, to show *how domestic institutions condition the response to international incentives*. I argue that the incentives to use CBI as a signal to international actors are proportional to the need of capital in the country. However, the capacity of a government to respond to international incentives and pressures through CBI is determined by an institutional context that makes institutional change more or less costly. Since domestic institutions may make response to international forces more or less difficult, institutional hurdles affect the likelihood of central bank reform. Focusing on presidential systems, I intend to show that the strength of presidential powers, the capacity of the legislature, and the preference distance between the two branches of government condition the elasticity of governments’ responses to international incentives. My theory therefore integrates two

components: an explanation of which international factors matter and under which circumstances, and an explanation of how domestic institutions condition the response to international incentives for CBI.

The idea that the international system influences domestic politics is anything but new (Gourevitch 1978, 2002; Kohli *et al.* 1995; Milner 1997, 1998; Pevehouse 2002; Putnam 1988; Remmer 1990, 1995; Valenzuela and Valenzuela 1978). Since Gourevitch's "second image reversed" (Gourevitch 1978), many studies have focused on the interaction between domestic and international politics. My dissertation is framed in this research program. I argue that neither purely domestic nor purely international factors account for the levels of CBI, but that there is an interaction between domestic and international factors. As a result, my proposed research is related to the logic of two-level games (Putnam 1988).⁴

1.3 THEORETICAL AND EMPIRICAL CONTRIBUTION

This research represents a contribution to three literatures. First, it provides the literature on central banks with an explanation of the determinants of CBI that accounts for the distinctive behavior of developing countries. This explanation integrates domestic and international factors influencing the level of CBI and the likelihood of central bank reform. This explanation is tested on an exceptionally large sample of developed and developing countries, which allows me to show the effects of the variables of interest in both groups of countries. Empirically, this research shows different patterns of behavior in developed and developing countries. Whereas most of the

⁴ Although I do not focus on international bargaining, I explore the relationship between domestic and international politics in an attempt to show when and how they affect each other (Putnam 1988).

literature on CBI highlights that the behavior of developing countries is not consistent with the predictions of extant theories, I present evidence of a systematic behavior among these countries.

Second, this research presents a model of institutional reform in separation of powers systems that applies to presidential countries beyond the United States. This model completes the literature on delegation by allowing variance in president's powers, and in congress's capacity. Interestingly, some of the predictions derived from this literature do not find empirical support, stressing the need of accounting for a broader set of factors when analyzing inter-institutional relations in developing countries.

Finally, the analysis of cases represents a contribution to the understanding of liberal reforms and of monetary policy decisions in Latin American countries. The patterns of attempted and effective central bank reforms in Argentina and Brazil show the importance of reexamining the relationships between domestic and international actors. In contrast to some literature, in these cases these relationships have been characterized more by positive than by negative incentives. In other words, central bank reforms seem framed by "politics of seduction" instead of by politics of coercion.

This research also offers an empirical contribution: In order to test my theory, I have collected the legislation on central bank organization and attributes, as reported by the central banks and completed by academic and journalistic accounts. I have built two variables: The first one indicates the existence of central bank reform in a given year and the direction of such reform (towards more or less independence). I have coded reforms for 166 countries between 1970 and 2008. The second variable is an extension of Cukierman *et al.*'s index of CBI: Cukierman *et al.* have coded CBI in 72 countries by decade (Cukierman, Webb and Neyapti 1992), and in 26 former socialist economies before and after the dissolution of the Soviet Union (Cukierman, Miller and Neyapti 2002). Polillo and Guillen (2005) built a time-series cross-sectional dataset for 71 countries,

for the period 1990-2000, and Crowe and Meade (2007) coded CBI for 1989 and 2003. I extended the extant datasets, covering all the countries that have been coded by these authors (a total of 116 countries) from 1970 to 2008. My dataset includes 5,278 country-year observations on central bank reform, and 3,369 country-year observations with scores for all the components of the Cukierman *et al.*'s index.

1.4 PLAN OF THE DISSERTATION

The remainder of this dissertation is organized in six additional chapters. In Chapter 2, I discuss the most relevant literature that attempts to explain CBI. I organize the discussion around five groups of studies: macroeconomic explanations, literature on political economy, literature on international political economy, models of political delegation, and literature on learning and diffusion.

In Chapter 3, I present the two levels of my theory. I start by presenting the basic intuition that informs the theory, and I justify the assumptions on which I build my theory. I then proceed to describe the two levels of the theory on the determinants of CBI. The first level explains why one should expect a particular behavior in developing countries, while the second level explains what domestic factors should influence the likelihood of observing central bank reforms in developing countries with presidential systems.

Chapters 4 to 6 present empirical evidence. Chapter 4 presents a series of statistical tests of the international level of the theory. In this chapter, I first show a systematic difference in the determinants of CBI between developed and developing countries. Second, I analyze the factors influencing changes in CBI in developing countries. Chapter 5 presents the results of a series of tests of the hypotheses derived from the second level of the theory. In Chapter 6, I analyze the

evolution of central banking in two cases: Argentina, one of the cases that the theory presented here predicts relatively well, and Brazil, a case in which central bank reforms do not seem to be predicted well by the theory (at least, when examined superficially).

The last chapter of this dissertation summarizes the theory and findings and discusses extensions of this project.

2.0 WHAT DO WE ALREADY KNOW ABOUT CBI?

2.1 INTRODUCTION

What are the determinants of CBI in developing countries? In particular, how do these determinants work in developing countries with separation of powers systems? This research analyzes the interplay of domestic and international incentives for politicians to give up their control over monetary policy by providing central banks with more independence. Going from general to particular, this chapter analyzes the literature on determinants of CBI in general, the explanations of CBI in developing countries, and highlights the lack of consideration in the literature for the special case constituted by the separation of powers systems.

What factors determine CBI? Most of the literature on CBI focuses on economic or political *domestic* determinants.⁵ However, neglecting international influences on monetary policy in an era of increasing capital mobility is problematic, to say the least. Various scholars show the importance of international factors in explaining monetary policy choices (Bearce 2002; Bernhard, Broz and Clark 2002; Clark 2002; Clark and Hallerberg 2000; Goodhart 1989; Simmons 1996). In addition, few scholars take into account international factors to explain the choice of independent

⁵ Although part of the literature on domestic economic explanations does not to consider political determinants (Cukierman 1992; Prast 1997), the more recent developments are in the field of political economy (Cukierman and Webb 1995; de Haan and Siermann 1996; Eijffinger and de Haan 1996; Eijffinger and Schaling 1997; Schaling 1995). A substantial part of the literature domestic political explanations controls for economic factors (Bernhard 1998, 2002; Broz 2002; Crowe 2006; Grier 2004; Hallerberg 2002). Other domestic explanations include the role of culture, highlighting the correlation between the tolerance to inequality in power and wealth, and CBI (de Jong 2002).

central banks. There is evidence supporting causal stories that apply only to a restricted set of cases, namely, OECD countries or parliamentary systems (Bernhard 2002; Clark and Hallerberg 2000; Hallerberg 2002; Lohmann 1998). Extant explanations of CBI in developing countries have not been subject to multivariate cross-sectional analyses (Maxfield 1997; McNamara 2003; McNamara and Castro 2003), leaving open the question about the generalization of their findings.

What is still missing in most accounts, however, is a clear explanation of the interplay between domestic and international incentives. How do domestic (or international) factors condition the impact of international (or domestic) factors? Are there conditions under which a set of incentives takes precedence over another?

In the following sections, I discuss the existing literature and show that the research question remains unanswered.

2.2 EXISTING LITERATURE

Although there is a profuse research about the effects of CBI, the research on the determinants of CBI is more scant.⁶ In this section, I discuss the most relevant literature that attempts to explain CBI. I organize the discussion around five groups of studies: macroeconomic explanations, literature on political economy, literature on international political economy, models of political delegation, and literature on learning and diffusion.

⁶ For reviews of the literature about the effects of CBI, see Berger *et al.* (2001), de Haan *et al.* (2008), and Eijffinger and de Haan (1996).

2.2.1 Macroeconomic explanations

From a macroeconomic standpoint, delegation to central banks has been justified as a solution to the time consistency problem (Kydland and Prescott 1977).⁷ Since the abandonment of the international regime of Bretton Woods, countries have no formal constraints for expanding the money supply (Barro and Gordon 1983a). Once nominal wages are set, governments have an incentive to renege on their promises of low inflation in order to generate short-term increases⁸ in employment and output. Since governments' attempts to reduce unemployment below the natural rate are anticipated by the price setters, these attempts become ineffective in terms of employment (Rogoff 1985), but they still raise inflation above its natural rate. As long as the decision-making power on monetary issues rests on the politicians' hands, there is always a temptation to manipulate monetary policy with distributional or electoral purposes.⁹ Therefore, the practical advice derived from the "rules versus discretion" literature (Barro 1986; Barro and Gordon 1983a, 1983b; Rogoff 1985) is to delegate the control of monetary policy to independent central banks.

The argument, however, goes beyond just "rules" or lack of political interference (CBI). Rogoff argues that delegating monetary policy to a more conservative central banker,¹⁰ or giving the

⁷ Kydland and Prescott show that even in the presence of an agreed social objective function, discretionary policy does not maximize that social objective function. Politicians will select the best actions "given the current situation" (even if that implies deviating from previous commitments). Since rational economic agents will anticipate this behavior, economic performance can be improved by relying on "some policy rule" (Kydland and Prescott 1977:473-474).

⁸ This "generated" inflation does not have real effects in the long-run.

⁹ Note however that the original argument did not imply distributional or electoral motivations. According to Kydland and Prescott "*doing what is best, given the current situation*, results in an excessive level of inflation" (Kydland and Prescott 1977:474, emphasis added). Furthermore, the mere existence of *more targets than instruments* is argued to incentive policymakers to deviate from the *ex ante* optimal policy (Lippi 1999:8).

¹⁰ Central bankers are typically assumed to be more conservative, that is, they are assumed to be more eager on fighting inflation than policymakers (Rogoff 1985:1179-1180). Christopher Adolph framed this assumption within a theory of central bankers preferences, and subject it to empirical test (Adolph 2004).

central bank incentives to achieve an immediate monetary target reduces the time-consistent rate of inflation (Rogoff 1985).¹¹

The effects of higher levels of CBI have been analyzed and tested by many scholars (Cukierman 1998; Cukierman, Webb and Neyapti 1992; Eijffinger and de Haan 1996; Eijffinger and Schaling 1997; Persson and Tabellini 1990, 1999; Prast 1997; Schaling 1995), and the evidence is still mixed. For instance, Cukierman *et al.* find that in *industrial countries*, central bank legal independence has a statistically significant negative impact on inflation (“laws do make a difference,” Cukierman, Webb and Neyapti 1992:371), but legal independence does not seem to have an impact in developing countries.

Two characteristics of this literature are relevant for the purposes of this research. First, these first macroeconomic studies have an *apolitical* view of monetary policy and of the behavior of central bankers. Both the government (a “benevolent politician”¹²) and the central bank have an objective social function. The difference between said functions is that the latter places a larger weight on inflation stabilization relative to employment (Rogoff 1985:1187).¹³ Furthermore, the government is a unitary actor: there are no diverging preferences regarding the content of the “social welfare function,” no different incentives for executive and legislative authorities to delegate decision making in monetary policy to an independent agency, nor bargaining or strategic calculations among political actors.¹⁴

Second, in these explanations, central banks receive more independence to solve credibility issues and to lower time-inconsistent inflation (provided that inflation is a consequence of a trade-

¹¹ However, CBI may also raise the variance of employment in the presence of large supply shocks (Rogoff 1985).

¹² Barro and Gordon see the policymaker “as attempting to maximize an objective that reflects ‘society’s’ preferences on inflation and unemployment” (Barro and Gordon 1983a:591, emphasis added).

¹³ Clark (2002) also criticizes the non-partisan or electorally motivated principal assumed in this models.

¹⁴ Interestingly, the principal in Rogoff’s framework is “society”: “When supply shocks are important, *society* may prefer to give the central bank incentives to focus on a monetary target other than the inflation rate” (Rogoff 1985:1187, emphasis added).

off between price stability and employment along the Phillips curve). If that were the case, CBI should be a response to high levels of inflation, and should probably be associated with lower rates of inflation (after the central bank receives more independence). Whereas there is some evidence regarding the impact of CBI on inflation, most governments have not responded to high inflation with more delegation to central banks. Furthermore, this literature assumes that government will not violate or change the institutional commitment to CBI.

Being “apolitical,” this literature misses an important point: *what are the incentives for politicians to give up control on monetary policy?* Welfare considerations may be part of politicians’ utility functions, but there is considerable evidence regarding the weight of constituency service and electoral calculations among politicians’ motivations.

Several scholars have stressed the shortcomings of this line of macroeconomic studies. For example, Iversen and Soskice point out that this very sophisticated literature has failed to account for “most of the observed variance in economic policies and outcomes” (Iversen and Soskice 2006:425). Similarly, Bernhard, Broz and Clark stress the need of determining “how politics conditions the opportunity costs of different configurations of monetary commitments.” They argue for considering the possibility that the time-inconsistency framework “does not capture how political actors evaluate the benefits and costs of different monetary arrangements. The choice of these institutions may have less to do with fighting inflation than with the desire to redistribute real income to *powerful constituents*, assemble an *electoral coalition*, increase the *durability of cabinets*, or engineer *economic expansions around elections...*” (Bernhard, Broz and Clark 2002:694, emphasis added). Even central bankers state that the time-inconsistency problem is not a central concern for increasing CBI (de Haan, Masciandaro and Quintyn 2008:718; Greenspan 2007).

2.2.2 Explanations from political economy

In the early 1990s scholars started analyzing the impact of domestic political variables on CBI. Although several variables have been tested, the results of the studies are sometimes contradictory, lack statistical significance, or are not articulated within a general framework. The next sub-sections describe the most representative research on the determinants of CBI.

2.2.2.1 Political instability

Many studies test the impact of what they call “political instability” on CBI. The underlying argument is that politicians would be more likely to prefer CBI when the chances of retaining power are small. In these studies, “political instability” is an umbrella under which the notions of electoral cycle, tenure horizon and regime stability are confounded under the same concept.

Scholars measure political instability in different forms and obtained mixed results. Cukierman hypothesizes a positive relationship between *party political instability* and *regime political instability*,¹⁵ and CBI (Cukierman 1992). This idea is tested by de Haan and Van’t Hag using the frequency of government changes and the frequency of *significant* government changes (changes in coalitions) as proxies of political instability (de Haan and Van't Hag 1995). On a sample of 22 industrial countries, they find a negative relationship between frequency of government changes and CBI,¹⁶ but no significant relationship for changes in coalitions. De Haan and Siermann (1996) use a different proxy for political instability (the number of coup d’états). Their sample is larger (43 developing countries, between 1950 and 1989), and they measure CBI using the turnover rate of

¹⁵ An idea already present in his study about seigniorage (Cukierman, Edwards and Tabellini 1991).

¹⁶ Notice however that their sample pools parliamentary, presidential and semi-presidential regimes. Furthermore, their data is cross-sectional, and not time-series.

central bank boards. They find a negative relationship between the number of coup d'états (their proxy for political instability) and CBI.

In a later study, Cukierman and Webb include a dichotomous measure of *political vulnerability* (high- and low-level) (Cukierman and Webb 1995). This variable reflects the percentage of political transitions that were followed by the replacement of the central bank's CEO (within a period of 6 months after the transition). They test this variable on a sample of 64 industrial and developing countries, between 1950 and 1989. They only find significant results for high-level political instability (reflecting changes in the regime), and for a dummy variable for developing countries. Finally, Bagheri and Habibi (1998) explore the association between political liberty, political instability and CBI. In a sample of "highly democratic" countries, they find a positive association between Cukierman's legal independence index and both political freedom and regime political stability, but a negative association with party political stability. However, the direction of these associations changes when the sample is restricted to developing democracies and when using different measures of CBI.

Independently from the mixed empirical evidence, the aforementioned studies analyzing political instability have troubles explaining the incentives for stable democracies to have relatively high levels of CBI, whereas unstable developing countries have been characterized by relatively low levels of CBI (and rare central bank reforms).

2.2.2.2 Government debt

Cukierman argues a positive relationship between government debt and incentives to increase CBI: domestic debt may generate fears of inflation, and CBI should work as an appropriate tool to contain inflation. Although the convenience of an independent central bank in cases of high public debt is formally shown by Beetsma and Bovenberg (1997), the empirical evidence does not

support this relationship. First, Sikken and de Haan find no relationship between independence and the level of budget deficits (Sikken and de Haan 1998). Furthermore, using various measures of CBI and different samples, de Haan and Van't Hag (1995) do not find a statistically significant relationship between *government debt ratio* and CBI.

2.2.2.3 Veto players

Moser argues that CBI is credible only if the legislative process has at least two veto players whose preferences do not overlap (Moser 1993). He includes a *political system index* (PSI) in his analysis of 22 industrial countries (1967-1990), ranging from 1 (unicameral legislatures and bicameral legislatures with the same composition) to 4 (strong bicameral legislatures, equal in powers, and with different composition). He finds a positive relationship between PSI and CBI.¹⁷ Lohmann also stresses the impact of federalism on the choice of independent central banks (Lohmann 1998).

Analyzing the choice between CBI and exchange rate in industrial countries, Hallerberg finds that two types of veto players matter: subnational governments and party veto players (Hallerberg 2002). He finds evidence that federal states with two or more party veto players have the most-politically independent central banks.¹⁸

Finally, although Keefer and Stasavage are concerned with veto players and CBI in separation of powers systems, their dependent variable is not CBI, but credibility measured as currency depreciation (Keefer and Stasavage 1998) and inflation (Keefer and Stasavage 2000).

¹⁷ Note however, that Moser's explanation does not have a straightforward application to presidential systems.

¹⁸ Subnational units can affect money supply independently from the national government's will. For instance, they can run deficits or borrow. That may hamper the credibility of national government commitments to lower inflation (Hallerberg 2002).

2.2.2.4 Sectoral interests

Regarding the impact of sectoral interests on CBI, Posen analyzes the impact of the financial opposition to inflation (both in terms of intensity, and of effectiveness in their mobilization) on CBI (Posen 1993). Four variables proxy this opposition: the existence of a universal banking system, the central bank regulatory powers over the financial sector, federalism, and fractionalization of the party systems. The first three should be positively related to CBI, and the fourth should be negatively related to CBI. He finds support for his hypotheses on a sample of 17 industrial countries between 1950-1989 only with Cukierman's index of CBI as dependent variable. This explanation does not seem to cover the cases of developing countries that experienced increases in their CBI without significant changes in Posen's four variables of interest.

Bernhard also mentions changes in the "traditional social coalitions." According to him "economic developments have changed constituent demands [and] replaced the traditional class-based demands" (Bernhard 2002:13). However, he does not offer a direct test of this argument.

2.2.2.5 Partisanship

Several studies point to the influence of partisanship on monetary decisions. There is evidence about a systematic relationship between unemployment and inflation, and the political orientation of the governments (Alesina 1988; Hibbs Jr. 1977). Eijffinger and Schaling find a significant impact of relative number of years of socialist (left-wing) government and CBI in a sample of 19 industrial between 1960 and 1993 (Eijffinger and Schaling 1997). Furthermore, Bearce shows that leftist-led governments opted for an autonomous loose fiscal-tight monetary policy mix associated with exchange rate instability (Bearce 2002).

Partisanship itself seems insufficient explanation of the difference in levels of CBI, or of the timing of the central bank reforms. Although more CBI is associated with center-rightist

government, it is not clear under which circumstances these governments decide to reform central banks.

2.2.2.6 Transparency

According to Broz (2002), democracies are more likely to have higher levels of CBI than autocracies. Although both CBI and fixed exchange rates are mechanisms to solve the time inconsistency problem, there is a tradeoff between the transparency and flexibility of these two mechanisms (fixed exchange rate is a more transparent but less flexible instrument, whereas the opposite is true for CBI). According to Broz, monetary commitments must be transparent in order to be credible: governmental opportunism needs to be detected and punished. However, transparency can be provided either by the commitment technology, or by political institutions (Broz 2002:883). Since autocracies' commitment to CBI might not be credible, autocracies should have more incentives to rely on pegging exchange rates instead of on CBI. Broz finds empirical evidence supporting a substitution hypothesis: "the degree of transparency of the monetary commitment mechanism is inversely related to the degree of transparency in the political system" (Broz 2002:861). However, he does not offer a direct test of the impact of transparency on the choice of independent central banks.

In Chapter 3, I argue that although regime has an impact on CBI, the causal mechanism is not only transparency, but a broader idea of credibility.

2.2.2.7 Informational asymmetries and intraparty conflict

William Bernhard's work deserves special consideration (Bernhard 1998, 2002). Bernhard argues that variance in CBI reflects informational asymmetries of monetary policymaking between

legislators, coalition partners, and government ministers (Bernhard 1998:312-313; 2002).¹⁹ Independent central banks provide credible information about the cabinet's policy choices and their economic consequences to all political actors, avoiding conflicts among them. In his account, CBI is a product of diverging monetary incentives among the three kinds of political actors (legislators, coalition partners, and government ministers), and of the credibility of backbenchers' and coalition partners' threat to withdraw their support over a policy dispute (Bernhard 1998:315).²⁰

Although Bernhard argues his theory accounts for the cross-national variation of CBI (Bernhard 1998:311), the aforementioned political dynamics exist only in parliamentary systems that are not constrained by need for capital and international demands.²¹ Bernhard states that in presidential system, although the government's survival does not depend on the support of party legislators, the government still requires legislative support to achieve its political goals (Bernhard 1998:313). However, I contend that his argument does not provide a sufficient account for presidential systems. First, the need legislative support to achieve other political goals does not explain why the executive would give up monetary policy, and not any other concession. Second, the origin of monetary preferences remains unclear (it is attributed to the distribution of constituent preferences and electoral institutions,²² which are considered exogenous). Third, it remains unclear under which circumstances the executive would "offer" (or the legislature would demand) CBI to

¹⁹ According to Bernhard, since *all* politicians are office-seekers, they have incentives to pursue policy outcomes that satisfy their constituents' preferences. However, they cannot choose policies that satisfy their constituencies if they lack proper information. Since government ministers have better information than backbench legislators, this asymmetry can create conflicts between coalition partners in a multiparty government. An independent central bank can alleviate those conflicts by providing information about the cabinet's policy choices and their economic consequences (Bernhard 1998:311).

²⁰ Crowe formalizes an argument similar to Bernhard's one (Crowe 2006). According to Crowe, policy delegation (CBI) helps politicians manage diverse coalitions. "Because monetary policy is contentious, it can split otherwise homogeneous political coalitions. Taking monetary policy 'off the table' makes it easier for these actors to effectively combine to control policy with respect to other key issues. Far from being constrained, politicians who decide to delegate may see their overall freedom of action enhanced" (Crowe 2006:3).

²¹ Since the restriction to industrial countries is explicit in Bernhard (2002), and it is consistent with the empirical support Bernhard found (1998), I will argue why his theory only applies to parliamentary systems.

²² Note that although the impact of electoral institutions is part of Bernhard's explanation, he does not test the impact of district size or of non-concurrent elections.

obtain other policy objectives. In other words, Bernhard's story does not account for cases in which CBI is in the interest of the executive. My theory fills those gaps by accounting for cases in which the executive has incentives for increasing CBI. I do not dispute (or intend to explain) the domestic incentives in parliamentary system when there are not international pressures for CBI (that is, in developed countries with parliamentary systems). However, my theory indicates under what circumstances this explanation is plausible.

In sum, most of the research on domestic political determinants of CBI focuses on developed countries and/or on parliamentary systems. When tested on a wider sample, their predictions do not find empirical support in non-OECD countries.²³ I argue that the existing models cannot explain CBI in developing countries because they do not account for the institutional context that characterizes developing countries. Two features have been ignored. First, the type of institutional organization: there is a significant overlap between industrialized countries and parliamentarism, and between developing countries and presidentialism. Since most studies do not control for the form of government, this institutional difference may be obscured or attributed to differences in development. Second, although central banks are assumed to be technical bodies of comparable quality across countries, the "quality" of institutions in developing countries cannot be assumed to be a constant. In particular, the literature makes no reference to the efficiency or professionalization of legislative bodies. This may significantly alter the predictions regarding the relationships between the executive and legislative powers.

²³ Note that some theories cannot be applied to institutional context other than parliamentary systems.

2.2.3 International political economy

The need to incorporate international factors and actors in the study of the determinants of CBI was highlighted several years ago (Freeman 2002:896). However, few scholars take into account international factors to explain the choice of independent central banks. Although many scholars stress the need to integrate the analysis of international factors in the analysis of CBI (Bernhard 1998; Bernhard, Broz and Clark 2002; Boylan 2001; Maxfield 1997), to my knowledge there is no large-*N* study of the determinants of CBI. Most of the causal stories either apply only to a restricted set of cases (such as OECD countries, or parliamentary systems), have found empirical support on restricted samples (Clark and Hallerberg 2000; Hallerberg 2002; Lohmann 1998; McNamara 2003), or have not been subject to a multivariate cross-sectional analysis (Maxfield 1997).

Maxfield argues that “the likelihood that politicians in middle-income developing countries will attempt to signal creditworthiness by increasing CBI is an increasing function of their nation’s objective need for balance of payments support, the expected effectiveness of signaling, and politicians’ tenure security. It is a decreasing function of the extent of financial regulation in the politician’s country” (Maxfield 1997:35). Since her argument has significant resemblance with the first level of the argument I put forth, I will stress some her theory’s limitations that this research overcomes.

Maxfield’s explanation is centered on the supply side of CBI: when the balance of payment is in deficit, politicians perceive the need to signal creditworthiness and reform their central banks. However, since her theory does not account for a demand for CBI, it is not clear why sometimes (and especially in the 1990s) CBI is used as a signal of creditworthiness, and not in other periods of time. Second, and more importantly, this supply of CBI is unconditional: facing problems in the balance of payments, governments respond with increases in CBI. This explanation, however, does

not seem to find empirical support. In cases where all the factors that would lead to more CBI are present, but there is no central bank reform, her explanation is that politicians did not perceive the need of competing for creditworthiness (Maxfield 1997:119),²⁴ or that the country did not need to compete for capital (as in the case of Brazil, Maxfield 1997:137).²⁵ In other cases, such as Mexico, there is no explanation for lags in the response.²⁶ She argues that “Mexican central bank history strongly suggest that legal change follows *from* increase in central bank authority, with a considerable lag” (Maxfield 1997:105). This not only leaves the causes of such lags unexplained, but also suggests a different mechanism that leads to central bank reform. My theory integrates both an international demand for CBI and domestic factors that can constrain the supply of CBI, offering a systematic explanation of both the “waves” of CBI, and the lags in (or lack of) supply of CBI.

Third, Maxfield’s explanation is restricted to “middle-income developing countries.” However, there is no rationale for the exclusion of developed and of low-income developing countries, or theorization about how the same variables could affect or not other cases. I provide an explanation for why economies that can rely on reputation do not need to accommodate to an international demand for CBI, and I test that explanation empirically.

Finally, Maxfield’s empirical evidence relies on four case studies (Thailand, Korea, Brazil, and Mexico), but she does not conduct any kind of multivariate time-series or cross-sectional analysis. I propose a systematic test of my theory on samples restricted only in case of unavailability of data, allowing for different controls suggested by the literature.

²⁴ In the conclusion to the analysis of the Korean case, she argues that the “Korean central bank history highlights the way in which *politicians’ perception of low need and value* of competing for international creditworthiness can jeopardize CBI” (Maxfield 1997:119, emphasis added).

²⁵ Interestingly, the tables that are presented as (descriptive) evidence of need of competing for capital show periods in which Brazil does have decreases in FDI, and negative balances in bonds and equities (Maxfield 1997:125).

²⁶ Note that one could interpret varying lags in the response as either a conditional causality (with the conditions not being specified), or spurious causality.

Table 2.1 summarizes the principal variables used to explain CBI, how they were operationalized, the samples on which these variables were tested, and the results obtained.

Table 2.1. Political economy explanations of CBI: Selected variables, operationalization and results

Variable	Operationalization	Results(†)	Sample
Political instability	<i>Party and regime political instability</i> (Cukierman 1992)	N/T	
	<i>Frequency of government changes</i> (de Haan and Van't Hag 1995)	(-)	22 OECD countries (cross-sectional analysis)
	<i>Changes in coalitions</i> (de Haan and Van't Hag 1995)	N/S	22 OECD countries (cross-sectional analysis)
	<i>Number of coup d'états</i> (de Haan and Siermann 1996)	(-)	43 developing countries (1950-89)
	<i>Political vulnerability</i> (Cukierman and Webb 1995)	Inconsistent	64 countries (1950-89)
	<i>Political freedom and regime political stability</i> (Bagheri and Habibi 1998)	Inconsistent	20 industrial and 52 developing countries, all "highly democratic"
Government debt	<i>Government debt ratio</i> (de Haan and Van't Hag 1995)	N/S	
Veto players	At least two <i>veto players</i> whose <i>preferences</i> do not overlap (Moser 1993)	(+)	22 industrial countries (1967-90)
	<i>Federalism and party veto players</i> (Hallerberg 2002)	(+)	20 developed countries (1973-89)
	<i>Federalism</i> (Lohmann 1998)		Germany
Sectoral interests	<i>Financial opposition to inflation</i> (Posen 1993)	(+)	17 industrial countries (1950-89)
Partisanship	<i>Years of socialist government</i> (Eijffinger and Schaling 1997)	(-)	19 industrial countries (1960-93)
Transparency	<i>Democracies</i> (Broz 2002)	N/T	22 OECD countries
Informational asymmetries and intraparty conflict	<i>Strong bicameralism</i> and	(+)	N=20
	<i>Alford index</i> (Bernhard 1998, 2002).	(-)	
Creditworthiness signal	"Objective" need for balance of payments support, Expected effectiveness of signaling Politicians' tenure security, and Extent of financial regulation in the politician's country (Maxfield 1997)		4 developing countries

(†) **N/T** indicates the lack of test; **N/S** indicates the lack of statistical significance; **(+)** indicates a positive and statistically significant relationship between the variable of interest and CBI; **(-)** indicates a negative and statistically significant relationship between the variable of interest and CBI; **Inconsistent** indicates different results either on different samples, or with different model specifications.

2.2.4 Models of political delegation

Many scholars recognize that CBI is a case of political delegation (e.g., Keefer and Stasavage 2003). However, there is a gap between models of political delegation and models explaining delegation to central banks (level of CBI). Models of delegation have relaxed their early assumptions in order to include, for example, multiple principals (e.g., Bendor 1988; Gailmard 2007; Lindstadt 2006; Lohmann and O'Halloran 1994; Moe and Caldwell 1994; Spiller 1990; Thatcher and Stone Sweet 2003) or low quality bureaucracies (Huber and McCarty 2004). Nonetheless, most models of CBI retain the single principal assumption,²⁷ or consider informational asymmetries as a constant across countries. This is problematic at least for two reasons: First, models of political bargaining with a single principal hardly apply to presidential systems, where passing legislation involves inter-institutional bargaining. Second, the formal powers of the president and the legislature vary across countries (Shugart and Carey 1992).

My theory helps bridging the aforementioned gap by accounting for the bargaining that precedes the institutional reform (the decision to change the level of CBI) in presidential systems. First, it completes the traditional models of delegation by accounting for the origin of preferences. Second, it integrates the possibility of two sets of preferences in the government, completing domestic political explanations of CBI. Finally, it extends the results of some formal models in the literature of delegation regarding quality of the bureaucracies and of the legislatures, to presidential systems beyond the US, providing an empirical test for them in the framework of monetary policy choices.

²⁷ Notable exception to single principal assumptions are Bernhard (1998) in parliamentary systems, and Morris (2000) in the U.S. However, Morris' dependent variable is not central bank reform, but policymaking by the central bank.

2.2.5 Diffusion: Learning and emulation

Learning and emulation are alternative explanations for CBI. It is possible that countries do not reform their central banks in response to financial incentives, but that they imitate institutional arrangements established by other countries (Elkins and Simmons 2005:37; Polillo and Guillén 2005), or that learn from other countries' experiences.²⁸ Although these channels are logically different, there may be observationally equivalent (Meseguer 2005).²⁹

Regarding learning, the literature highlights two alternative channels of learning (Simmons and Elkins 2004):³⁰ one could expect learning from successful experiences, or learning from “peers.” In the first case, one should expect countries to imitate measures adopted for the world leaders. For instance, CBI in developing countries with inflation would follow the successful German example.³¹ In the second case, one should expect countries that share some characteristics (for example, institutions, wealth, or inflation), to be more likely to adopt CBI as the proportion of countries with CBI in its own “group” increases (Gilardi 2005). None of these two alternatives (learning from successful experiences or learning from peers) explains the incentives for the first countries in such “groups” to delegate authority to central banks, or the differences in timing and levels of delegation

²⁸ Notice that the literature identifies other mechanisms of diffusion. For example, Bennett identify four processes through which convergence might arise: “*emulation*, where state officials copy actions taken elsewhere; *elite networking*, where convergence results from transnational policy communities; *harmonization* through international regimes; and *penetration by external actors and interests*” (Bennett 1991:215). Although all these mechanisms may result in similar outcomes (convergence), I argue that the last two mechanisms are not properly “diffusion processes,” but mechanisms of a different nature. They represent different forms of incentives: the benefits of harmonization or international cooperation constitute positive incentives, and whereas coercion works as negative incentives.

Although the independent effects of some of these mechanisms have been tested (on the effects of socialization, including “elite networking”, see Bearce and Bondanella 2007; Bondanella 2009), other scholars argue that socialization and coercion may coexists in the same processes of central bank reforms – what Johnson calls “two-track diffusion” (Johnson 2006).

²⁹ On the difficulties of empirically distinguishing between learning and a “less rational” emulation in Latin American reforms, see Meseguer (2005).

³⁰ Simmons and Elkins (2004) also talk about the role of pressures as engine of diffusion. I consider pressures (either in the form of coercion or incentives) as part of a different argument: coercion. Note that these authors adopt a similar approach in their 2005 article, omitting coercion in the analysis of diffusion (Elkins and Simmons 2005).

³¹ Goodhart analyzes the possibility of a demonstration effect of the relative economic success of West Germany and Switzerland among developed countries (Goodhart 1989:295).

to central banks. Furthermore, there is some anecdotic evidence against the learning argument. When describing the reform of the Chilean central bank, Céspedes and Valdés stress that the context of the discussion around CBI was hardly around a standard recommendations, or part of an economist's "toolkit" (Céspedes C. and Valdés P. 2006:32).³²

Other scholars argue that convergence towards monetary discipline is not the result of emulation or of international influence. Laney (1985, 2007) suggests that the simultaneous movement towards monetary discipline may result from "an idea whose time had come." Those who take diffusion to an extreme predict convergence of political choices and, in particular, of monetary institutions. From this standpoint, the wave of CBI would not be an intentional answer to a particular configuration of international demands, but just another effect of a "wave" of liberalization. However, there is little insight regarding why the wave of liberalization included central banks, why the diffusion is so heterogeneous (in terms of levels of CBI and of timing of the reform), and there is no explanation for why some countries have restricted their CBI. While analyzing other types of reforms, some scholars point to the importance of domestic institutions for understanding the outcomes of policy-diffusion outcomes (Melo 2004).

³² In their case study, Céspedes C. and Valdés stress the fact that "none of the papers mentions Rogoff [...] or points to evidence regarding the effects of CBI" (Céspedes C. and Valdés P. 2006:32).

3.0 A TWO-LEVEL THEORY OF THE DETERMINANTS OF CBI

3.1 INTRODUCTION

In the previous chapters, I established the research question, its importance, and the lack of an answer for this question in the extant literature. I argued that although the literature provides satisfactory explanations for CBI in developed countries, these explanations either do not find empirical support in developing countries or cannot be applied to them. Therefore, the question about the determinants of CBI in developing countries remains unanswered.

In this chapter, I provide an answer to the research question: “What factors determine CBI in developing countries?” The literature suggests that domestic factors are the main determinants of CBI in developed countries, but I argue that international factors are more important in developing countries. Investors and lenders demand that potential recipients of their assets show commitment to sound economic policies. Although developed countries can rely on reputation to satisfy investors and lenders, developing countries need to rely on more costly signaling devices to attract capital. I show that CBI is one of the signals demanded by investors and lenders. The level of CBI is a function of international incentives or pressures, the vulnerability of the government to these pressures, and the elasticity of the governments to respond to international demands. This chapter explains the determinants of CBI in countries where reputation does not work.

3.1.1 Research question

What factors determine CBI in developing countries? Most states' constitutions allow the government to regulate monetary policy, that is, to manage the country's money supply to achieve economic goals such as preserving the value of the national currency, or maximizing production and employment.³³ Although the government could be interested in making all monetary decisions to favor its own constituents' interests, there are advantages in delegating some powers in monetary policy to central banks, by giving these institutions more independence. CBI is expected to lower inflation, to increase monetary policy credibility, and to reduce uncertainty among economic agents because private actors can trust monetary policy will be stable and independent from changes in the political situation. Still, the wide variance in CBI across countries and time is not explained just by economic reasons.

What factors determine CBI? As shown in Chapter 2, most of the literature focuses on economic or political *domestic* determinants of CBI.³⁴ However, neglecting international influences on monetary policy in an era of increasing capital mobility is problematic, to say the least. Various scholars show the importance of international factors to explain monetary policy choices (Bearce 2002; Bernhard, Broz and Clark 2002; Clark 2002; Clark and Hallerberg 2000; Goodhart 1989; Simmons 1996). Few scholars take into account international factors to explain the choice of independent central banks. However, most of their causal stories either apply only to a restricted set of cases such as OECD countries or parliamentary systems (Bernhard 2002; Hallerberg 2002;

³³ Note, however, that some of the central bank reforms have been made through constitutional amendments.

³⁴ Although the first explanations focused almost exclusively on domestic economic factors (Cukierman 1992; Prast 1997), the more recent developments are in the field of political economy (Cukierman and Webb 1995; de Haan and Siermann 1996; Eijffinger and de Haan 1996; Eijffinger and Schaling 1997; Schaling 1995). A substantial part of the literature domestic on political explanations controls for economic factors (Bernhard 1998, 2002; Broz 2002; Crowe 2006; Grier 2004; Hallerberg 2002). Other domestic explanations include the role of culture (de Jong 2002).

Lohmann 1998),³⁵ have found empirical support on restricted samples (Clark and Hallerberg 2000), or have not been subject to a multivariate cross-sectional analysis (Maxfield 1997; McNamara 2003; McNamara and Castro 2003).

What is still missing in most accounts is a clear explanation of the interplay between domestic and international incentives. How do domestic (or international) factors condition the impact of international (or domestic) factors? Are there conditions under which a set of incentives takes precedence over another? I argue that neither purely domestic nor purely international factors can account for the levels of CBI. Furthermore, I contend that *there are objective conditions that make international determinants of CBI take precedence over domestic determinants of CBI*. In particular, I argue that whereas domestic factors can explain much of the variance in CBI in developed countries, international factors play a crucial role in underdeveloped or developing countries facing a (relative) need for capital.

3.2 THEORY

3.2.1 Intuition

The vulnerability of incumbent politicians increases when the real economy faces problems. To avoid the risk of being replaced, vulnerable governments will look for capital to reinvigorate the economy. In a context of mobile and relatively scarce capital, competition for capital among governments has increased. Governments compete in terms not only of expected returns of investments, but also in terms of predictability of the country's economy. Although developed

³⁵ I will argue later that the logic of veto players does not directly translate from parliamentary to presidential systems.

countries generally have a reputation of economic stability, or at least political institutions that make economic commitments more credible, developing countries need to signal their commitment to sound economic policies.³⁶ One way in which a country can signal stability to investors and creditors is by delegating monetary policy to the central bank, that is, by increasing its CBI. I argue that foreign investors and lenders demand CBI in developing countries as a signal of commitment to sound economic policy. As the need for capital increases, developing countries will be constrained to accommodate the demands of international actors independently from the preferences of domestic actors.

My explanation, however, goes beyond predicting the relative weight of domestic and international determinants of CBI, to show *how domestic institutions condition the response to international incentives*. I argue that the incentives to use CBI as a signal to international actors are proportional to the perceived need for capital in the country. However, the capacity of a government to respond to international incentives and pressures through CBI is determined by an institutional context that makes institutional change more or less costly. Since domestic institutions may make response to international forces more or less difficult, institutional hurdles affect the likelihood of central bank reform. Focusing on presidential systems, I argue that the capacity of the president relative to the congress, and the preference distance between these two institutions condition the elasticity of the government's response to international incentives.

My theory therefore integrates two levels of analysis (Putnam 1988):³⁷ an explanation of which international factors matter and under which circumstances (international level), and an

³⁶ This does not imply that developed countries do not need to signal commitment to policies to markets. However, these governments' promises tend to be more credible because of their reputation of commitment to economic stability, because of the workings of political institutions that allow punishing irresponsible governments, or because of both reasons.

³⁷ Although Putnam focuses on international bargaining, his model stresses the importance of studying the relationship between domestic and international politics in an attempt to show when and how they affect each other (Putnam 1988).

explanation of how domestic institutions condition the response to international incentives for CBI (domestic level).

In the next sections, I introduce the basic assumptions on which I build the theory, explain both levels of the theory, and present the hypotheses to be tested in this study.

3.2.2 Building blocks

The theory of the determinants of CBI in developing countries presented in this chapter builds on two sets of ideas. First, there is a linkage between poor economic performance, the incumbents' perception of their increased vulnerability, and incumbents understanding that capital can help to secure their survival in office. Second, there are two most likely sources of capital for incumbents trying to improve the economic situation based on survival considerations.

These two sets of ideas will not be subject to empirical test; however, the following sections show the plausibility and the theoretical grounds of these assumptions.

3.2.2.1 Problems in the economy and incumbent vulnerability

Based on the extant literature, I assume that when politicians observe serious problems in the real economy, they realize their survival in office is threatened. When politicians feel vulnerable, they engage in survival behavior (Ames 1987:4), that is, they prioritize policies that protect their permanence in power.

Research has consistently shown that economic performance affects democratic governments' stability and survival. For democracies, the literature on economic voting explains

how short-term economic conditions influence voters' appraisal of incumbent politicians.³⁸ There is some disagreement regarding how voters evaluate the economic situation in order to make their decisions, specifically, whether voters evaluate national or personal economic conditions (sociotropic or pocketbook voting),³⁹ and whether they make these evaluations in a prospective or retrospective way.⁴⁰ However, there is empirical evidence showing that aggregate measures of economic conditions systematically influence the survival of politicians.⁴¹ Since Kramer's (1971) pioneering work, this impact has been shown in studies of American politics both for presidential and legislative elections.⁴² The effect of economic conditions on voters' behavior has also been found outside the US, in industrialized democracies (Powell Jr. and Whitten 1993), in Western Europe (Clarke, Dutt and Kornberg 1993; Lewis-Beck 1986), in Eastern Europe (Duch 2001; Mishler and Rose 1994, 1997; Pacek 1994), in Latin American countries (Kaufman and Zuckermann

³⁸ It is not my purpose to provide an extensive review of literature on economic voting, however Kiewiet (1983), Kramer (1983), and Radcliff (1988) are good examples of the logic behind the connection between aggregate measures of economic conditions and voting behavior. For reviews of the earlier literature, see Kiewiet (1983), Kiewiet and Rivers (1984), Lewis-Beck (1988), or Monroe (1979).

³⁹ Whereas some scholars stress the impact of personal consideration on voting choices (e.g., Fiorina 1978; Kaufman and Zuckermann 1998; Kiewiet 1981; Kramer 1983; Weyland 1998), others find empirical support for the influence of sociotropic evaluations (Alford and Legge Jr. 1984; Evans and Andersen 2006; Kinder and Kiewiet 1979, 1981). For arguments behind both groups of studies, see the debate between Lewis-Beck (1985) and Lau *et al.* (1990).

⁴⁰ The literature providing empirical evidence for prospective evaluation (Lockerbie 1991; MacKuen, Erikson and Stimson 1992) is not free from criticism (Alesina and Rosenthal 1989; Kiewiet and Rivers 1984). For the logic behind retrospective evaluations, see Fiorina (1981). Other scholars posit that the relative weight of prospective and retrospective evaluations depends on countries' characteristics such as level of development (Cohen 2004), and may have differential impact on welfare (Reed and Cho 1998).

⁴¹ Note that there is an extensive literature showing that there are factors that influence the impact of economic conditions across individuals. Examples of these moderating factors are class (Hibbs Jr. and Vasilatos 1982; Weatherford 1978, 1982), education and information (Krause 1997), group membership (Hibbs Jr., Rivers and Vasilatos 1982), partisanship (Evans and Andersen 2006; Kinder and Kiewiet 1979; Swank and Eisinga 1999), and grievances (Kiewiet 1981; Lau and Sears 1981). Research also shows that the accuracy of this forecast is conditional on the levels of information of the voters (Krause and Granato 1998).

⁴² For economic voting in presidential elections see Erickson (1989), Gleisner (1992), Hibbs Jr. (2000), Holbrook (1994), Nadeau and Lewis-Beck (2001), and Norpoth (2001). Examples of the more extensive literature on Congress elections are Alesina and Rosenthal (1989), Erikson (1990), Kramer (1971), Lewis-Beck and Rice (1984), Lockerbie (1991), Radcliff (1988), and Weatherford (1978).

1998; Remmer 1991; Roberts and Wibbels 1999; Weyland 1998), in Asia (Gupta 1989; Hsieh, Lacy and Niou 1998; Phadnis 1989), and in Africa (Holm 1988).⁴³

There is also evidence of the negative effects of poor economic performance on autocracies and, more generally, on regime survival. Regarding autocracies in particular, Soh showed that economic conditions were associated with political disturbances in North Korea (Soh 1988:272). More generally, economic contraction has been associated with regime stability (both of democracies and of autocracies). Economic conditions are associated with regime support (Mishler and Rose 1994), and severe and long-lasting economic problems are associated with breakdown in democratic regimes (i.e., Alesina *et al.* 1992; Bernhard, Nordstrom and Reenock 2001; Gasiorowski 1995; Haggard and Kaufman 1997; Przeworski and Limongi 1993, 1997),⁴⁴ particularly in young democracies (Haggard and Kaufman 1995).⁴⁵ The same factors should also prompt authoritarian withdrawals (Haggard and Kaufman 1995, 1997).

In sum, a large body of literature shows that economic performance affects governments' stability and survival not only in democracies but also in autocracies. Furthermore, some literature

⁴³ Different aspects of economic voting found empirical support both in case studies, and in cross-national samples. Case studies involve presidential, semi-presidential systems and parliamentary systems. There is evidence of economic voting in Costa Rica (Seligson and Gomez B. 1989), of sociotropic voting in Mexico (Buendía Laredo 2001; Kaufman and Zuckermann 1998) and pocketbook voting in Venezuela (Weyland 1998), of prospective evaluations in Taiwan (Hsieh, Lacy and Niou 1998), and of both sociotropic and egocentric vote in France (Lewis-Beck 1983). Examples of case studies in parliamentary systems are Alford and Legge's study of sociotropic voting in Germany (1984), Swank and Eisinga's study of the Netherlands (1999), several studies of the British case (Hibbs Jr. and Vasilatos 1982; Norpoth 1987), and analyses of the post-communist Russia (Filippov 2002; Hesli and Bashkirova 2001), Hungary and Poland (Duch 2001). Large-N studies include studies of developed democracies, such as Powell and Whitten's (1993) study of 19 industrialized democracies between 1969-1988, Clarke *et al.* (1993), and Palmer and Whitten (1999); studies of new democracies (Mishler and Rose 1994, 1997; Pacek 1994; Pacek and Radcliff 1995; Remmer 1991), and pooled groups, such as Cohen's (2004) study of 41 nations.

⁴⁴ Haggard and Kaufman claim that "the prolonged failure of elected governments to address effectively challenges of growth and equity are likely to erode the depth and stability of support for democracy" (1997:279). However, the association between severe economic problems and regime breakdowns is not necessarily monotonic. Rapid growth is argued to negatively affect regime stability in poor countries (Huntington 1968; Olson 1963, 1985), suggesting a non-linear relationship, at least under some conditions (institutional and economic development).

⁴⁵ This association between economic performance and regime stability is affected by some country's characteristics. For example, Bernhard *et al.* (2001) examine institutional configurations that seem to make democracies more resistant to economic contraction, and Przeworski and Limongi (1997) show that the effect of negative growth is greater in poor democracies.

suggests that in presidential systems, economic performance particularly affect the survival of the executive power.

Why does poor economic performance affect governments' survival? The literature suggests different mechanisms. Research on economic voting suggests that poor economic performance erodes voters' support for the incumbents. From the leader's perspective, economic expansions are argued to facilitate the organization of political support: more resources allow both to maintain political support of the incumbent's allies (Ames 1987; Bueno de Mesquita *et al.* 2003),⁴⁶ and to compensate groups that might be excluded or specially hurt by the deteriorating economy. Because the effects of poor economic performance cut across social strata, affecting groups unevenly (Haggard and Kaufman 1997:267), compensating some groups helps to reduce "political alienation, polarization, and destabilizing social violence" (Haggard and Kaufman 1997:279). It is precisely in those cases that "poor economic performance reduces the bargaining power of [authoritarian] incumbents and increases the strength of oppositions" (Haggard and Kaufman 1997:267).⁴⁷

It is not my purpose to disentangle which of the mechanisms linking poor economic performance with survival is the strongest, how the incumbents analyze the repercussions bad economic times on their own survival, or what actors or groups are targeted first by the incumbents in order to increase their likelihood of retaining office. Based on previous research, however, it seems reasonable to assume that poor economic performance is a matter of concern for the

⁴⁶ For example, Bueno de Mesquita *et al.* highlight that "the survival of leaders and of the institutions and regimes they lead is threatened when they are no longer able to provide sufficient resources to sustain political support" (Bueno de Mesquita *et al.* 2003:26).

⁴⁷ On the one hand, some scholars focus on the availability of resources to be distributed among the winning coalition (Bueno de Mesquita *et al.* 2003) or to attract new supporters (Ames 1987:4). Bueno de Mesquita *et al.* note that "fluctuations in resources should be reflected in the level of public and private goods that the leader can provide to her winning coalition. Fewer resources available in a period should mean lower level of public and private goods" (Bueno de Mesquita *et al.* 2003:283). Haggard and Kaufman, on the other hand, focus on the ability of compensating groups beyond the incumbent's coalition. As this ability decreases, so does the bargaining power of the incumbent (Haggard and Kaufman 1997:267).

incumbents because it threatens their survival in power. Therefore, when the economy is experiencing trouble, incumbents feel vulnerable.

When incumbents feel vulnerable, survival – the behavior “designed to ensure holding onto the office itself” (Ames 1987:4) – becomes the incumbents’ priority. This assumption is crucial: although incumbents are “almost always interested in maintaining office” (Ames 1987:11), identifying times when the maintenance of office becomes a priority allows drawing expectations on the incumbents’ behavior independently from their substantive preferences (Ames 1987:4, 8). I argue that when incumbents feel that poor economic conditions increase their vulnerability, they will adopt reforms they might not have otherwise adopted in order to attract capital to reinvigorate the economy.

3.2.2.2 Sources of capital for vulnerable incumbents

In this section, I argue that although in theory there are various sources of capital (such as inflation, taxation, foreign aid, FDI and loans), vulnerable incumbents will try to attract loans and FDI to reinvigorate the economy.

What sources can provide capital to bolster the economy? Although both the business cycle and the time-inconsistency literatures highlight the governments’ tendency to generate inflation to temporarily boost consumption, inflation does not generate growth and might also be at the root of the country’s poor economic performance. Furthermore, inflation in poor countries hurts mostly people with fixed and lower incomes, who constitute a large proportion of developing countries’ population. Therefore, it is not likely that politicians in developing countries intentionally generate inflation in order to overcome economic hardship and maintain office.

In order to reinvigorate the economy, governments can appeal to domestic and foreign actors. Domestically, governments can try to motivate consumption (at least for a short-time fix), or

investment. However, these options are not available all the time for all countries, especially for developing countries. If the economy does not have enough stock of savings and credit is not cheap, stimuli to consumption or domestic investment will probably be fruitless.

Governments lacking domestic sources of capital will need to attract foreign resources. In theory, funds can be channeled to an economy in three ways: as foreign aid, as foreign investment, and as credit. I will argue that FDI and credit are the principal sources governments will appeal to in order to bolster the economy. On the one hand, although most of the aid organizations working in poor countries have “promoting productive investment and economic growth” among their goals, “it is not possible to conclude from existing empirical evidence that aid contributes positively to growth” (Pedersen 1996:423). Even if some literature shows that aid has an impact on growth under certain circumstances (i.e., Burnside and Dollar 2000; Dalgaard, Hansen and Tarp 2004), recent research suggests that said results are fragile, especially when tested on larger samples (i.e., Easterly 2003; Easterly, Levine and Roodman 2003; Roodman 2007). Finally, foreign aid is not available for all countries; even for recipient countries, it depends on the will of the donor,⁴⁸ and rarely works counter-cyclically. Therefore, I do not consider foreign aid as a likely source of economic boost at the government’s reach.⁴⁹

In the next sections, I explain why governments feeling vulnerable would consider attracting loans and FDI as tools for survival.

⁴⁸ Part of what Easterly calls “the peculiar nature of the aid mechanism” is that aid may have different objectives beyond economic growth or poverty reduction in the recipient country (i.e., strategic and security consideration, maintenance of allegiances, or fostering policy reform). “Multiple objectives often work against each other and weaken each other, so that aid may end up serving none of its multiple goals especially well” (Easterly 2003:34).

⁴⁹ This is consistent with Oatley’s conclusion. Given that foreign aid programs are limited, “if a developing society is to import foreign savings, it must rely on private capital” (Oatley 2009:311).

3.2.2.2.1. Why will incumbents try to attract credit?

In theory, a government can rely on its own (budgetary) resources or on borrowed funds to stimulate the economy. In the first case, the government can try to generate or to free budgetary resources either by increasing taxes or by reducing (other) expenditures. Leaving aside the convenience of using public spending to boost the economy, when the economy's performance is poor, it is unlikely that governments can extract many more resources from the economy.⁵⁰ Furthermore, it is unlikely that the political costs of cutting expenditures would overcome the ultimate economic boost generated with those savings. In this context, the only alternative for governments needing resources to boost the economy is borrowing. This argument is consistent with the neoclassical expectation of capital moving to countries where it is most scarce, which holds even in the presence of credit constraints (Verdier 2008).

Although loans were the principal source of capital for developing countries until the 1980s, the relative importance of loans diminished significantly in the 1990s, when FDI became a more significant source of capital. Some scholars stress the negative effect of external debt on investment and economic growth – because it reduces liquidity and anticipated profitability – (Claessens and Diwan 1990:21), suggesting a possible cause for the observed reduction in the relative importance of credit as a source of financing. Others, however, attribute this decline to “a shift from public to private sector borrowing” after the crisis of the debt (Modya and Murshid 2005:259). In any case, and even if the relative weight of loans as a source of capital for a country has declined, I argue that governments whose survival is threatened by present poor economic conditions will try to attract credit.

⁵⁰ Note that it is also possible that governments in the midst of economic problems consider tax cuts or tax incentives to foster either consumption or investment.

3.2.2.2. Why will incumbents try to attract FDI?

FDI is cross-border investment characterized by the acquisition of productive assets located in a country by a resident or corporation based in another country (Oatley 2009:385).⁵¹ Before the mid-1980s, loans were the principal flow of capital to developing countries. However, since the mid-1980s FDI has been the prevailing form of foreign capital for developing countries. This is in spite of the increasing prevalence of portfolio investors in the 1990s (Modya and Murshid 2005:258).

There are different reasons why a government would try to attract FDI to bolster its economy. First, FDI provides “resources that are not readily available” in the host country (Oatley 2009:182). In the short-run,⁵² the host economy receives funds either to compensate for the transfer of the property of existing factories (mergers and acquisitions), or to build new ones (greenfield investment). However, FDI does not only imply the inflow of funds, but also of technology and managerial expertise that promise long term advantages (Oatley 2009:182).

Second, FDI is less volatile than other flows of capital (Albuquerque 2003; Lipsey 2001; UNCTAD 1998; World Bank 1999). Even if mergers and acquisitions are gaining a more prominent place among FDI flows (Modya and Murshid 2005:259), most of these flows to developing countries are greenfield investments (Albuquerque 2003:357).⁵³ In both cases, there is evidence suggesting that FDI responds less to sudden changes than other forms of investment (Chuhan, Perez-Quiros and Popper 1996).

⁵¹ For the purposes of this study, it is irrelevant whether the investment implies the creation of a new plant or a factory, or the purchase of an existing one.

⁵² Although short- and long-run have a temporal reference, the short-run is the period of time in which at least one production input is fixed and the quantities of the other inputs can be varied. On the contrary, the long-run is a period of time in which the quantities of all inputs can be varied (Krugman, Wells and Graddy 2008:186).

⁵³ According to UNCTAD (1998), greenfield investments represented 94% of the FDI received by developing countries in 1991, and 87% in 1997 (Albuquerque 2003:357).

Third, FDI encourages domestic investment. Between 1978 and 1995, a dollar of external flows to developing countries raised domestic investment by more than 50 cents on average.⁵⁴ This impact is significantly larger over the long-run, contrasting with the long-run impact of loans and portfolio investments (Modya and Murshid 2005:258).⁵⁵

Fourth, FDI is believed to promote growth (Findlay 1978; Romer 1993a). This “widespread belief among policymakers” (Alfaro *et al.* 2007:1) is grounded on some empirical support.⁵⁶ Besides the immediate effect of an injection of funds in the economy, FDI allows developing countries access to advanced technologies (Borensztein, Gregorio and Lee 1998:117; Carkovic and Levine 2005:195). This access to technology does not necessarily (or unconditionally) promote growth, but there is evidence that it encourages growth under certain circumstances.⁵⁷ For example, when the host country offers a competitive environment (Moran, Graham and Blomstrom 2005:375), a developed financial market (Alfaro *et al.* 2004, 2007; Durham 2004; Hermes and Lensink 2003; Prasad, Rajan and Subramanian 2007), an outwardly oriented trade policy (Balasubramanyam, Salisu and Sapsford 1996), or when the country has a minimum stock of capabilities to absorb new technologies, such as a human capital (Borensztein, Gregorio and Lee 1998; Jyun-Yi and Chih-Chiang 2008; Xu 2000) or GDP (Blomstrom, Lipsey and Zejan 1994; Jyun-Yi and Chih-Chiang 2008). Note that some studies highlight that the main impact of FDI on growth is not through an increase in the host economy’s accumulation of capital, but by stimulating technological progress

⁵⁴ An additional dollar of FDI is associated with an 52-cent increase in domestic investment according to Bosworth and Collins (1999), or 66 cents in Modya and Murshid’s analysis (2005:255). Note that Modya and Murshid found no relationship between FDI and domestic investment on a sample of developed countries (2005:256).

⁵⁵ In dynamic specifications of their model, the effect of loans on domestic investment falls drastically, whereas the impact of portfolio flows becomes negative (Modya and Murshid 2005:258).

⁵⁶ Note however, that these findings are considered weak by part of the literature (Alfaro *et al.* 2007; Carkovic and Levine 2005), although most of their criticisms rely on the conditional nature of the findings.

⁵⁷ Some models explain that FDI increases the national income when the price of capital does not exceed its marginal product. If, on the contrary, the price of capital exceeds its marginal product, FDI will reduce the national income (Cardoso and Dornbusch 1989). However, these models have been criticized for different reasons: First, they are static and equate investment to more physical capital. Second, an increase in growth might not translate into an increase in welfare, especially since investment returns can be repatriated (Reis 2001:411-2).

(Barrell and Pain 1997; Borensztein, Gregorio and Lee 1998; Haddad and Harrison 1993; Moran, Graham and Blomstrom 2005; Reis 2001; Romer 1993b). Furthermore, this transference of technology is argued to contribute to growth relatively more than domestic investment (Borensztein, Gregorio and Lee 1998).

The aforementioned arguments rely on the possibility of obtaining positive externalities from the investment. In other words, the investment needs to generate benefits that exceed the retribution to the factors of production and the foreign investor's profits (Moran, Graham and Blomstrom 2005:3). These externalities justify the idea that "financially constrained countries should borrow relatively more through FDI", not because FDI is more productive or less volatile, but "because FDI is harder to expropriate [by the investor]" (Albuquerque 2003:353). However, FDI can have a positive impact in the economy or in the feeling of people for the state of the economy even without positive externalities (defined above) or without long-run development. For instance, given that "foreign firms consistently pay higher wages than domestic firms in both developed and developing countries" (Lipsev and Sjöholm 2005), FDI can represent a boost in income that may marginally increase domestic consumption or savings.

There is a final reason for why governments may make efforts to attract FDI: in many cases, developing countries may not have access to other forms of financing or lending. Some scholars argue that the rise in FDI as a proportion of total capital flows in developing countries is precisely a consequence of the 1980s decline in commercial bank lending to these countries (Aitken and Harrison 1999; Carkovic and Levine 2005; World Bank 1997). Albuquerque suggests that the relative importance of FDI is a reflection of developing countries' weak capacity for borrowing, implying that FDI "is all that they can get" (Albuquerque 2003:380).

In sum, there are different reasons why governments would try to attract FDI to bolster their countries' economies. Many of these reasons explain why attracting FDI is more appealing for

governments than attracting other short-term flows that are rarely accompanied by technology or skills transfers, are much more volatile (introducing higher levels of uncertainty in the domestic market), and do not necessarily promote productive investment or growth.

I do not assume that incumbents are fully aware of the set of reasons presented above.⁵⁸ However, it is not unrealistic to assume that the incumbent's advisors evaluate some of these reasons when proposing measures to boost the economy. Furthermore, although all these reasons for attracting FDI are plausible and could be considered by decision makers, I argue that a politician concerned about survival would rely (or try to rely) on FDI because FDI is the only available resource for them. The most immediate effect of FDI, especially important for politicians concerned about their own survival being threatened by poor economic conditions, is the injection of funds in the economy, with potential employment creation and positive externalities.

3.2.3 Basic story

My explanation of central bank reform and CBI is a story about demand and supply of signals, and about the conditions under which they will meet. From the demand side, and leaving aside capital flows oriented by political reasons (aid), capital flows pursue profits. Said profits are determined both by the expected returns of the investment or the interest associated to the loan, and by the risk of recovering the original capital plus its yields.⁵⁹ Other things being equal, investors and lenders will prefer to direct their assets to countries where the risk of the government making decisions that

⁵⁸ However, qualitative evidence suggests that politicians are aware of the benefits of FDI over other sources of capital.

⁵⁹ In a strict sense, the risk associated to recovering the investment can be considered part of the expected return of the investment. I am using this terms in a looser way, to allow a distinction between an "endogenous" component of profit, associated with the yields of the project or loan itself, and an "exogenous" component of the profit, not associated with the productivity of the exploitation or the real interest rate of the loan, but to the risks that political decisions affect the appropriation of the profit.

affect the profitability of their investments or loans is smaller. If the owners of capital cannot rely on a country's reputation to ensure that said risk is small, they will use other pieces of information that credibly signal the government's commitment to providing a stable economic environment. The mere use of these (costly) signals as part of investors' and lenders' decision making process constitutes an incentive for governments to signal commitment to sound economic policy. This incentive can be strictly considered a demand when foreign actors expressly state what kinds of signals they would require to trust the government. The first level of my theory analyzes the set international incentives for central bank reform.

The existence of demands associated with available international funds does not imply that governments will automatically engage in policy or institutional reforms to attract capital. Institutional arrangements are equilibria achieved through time.⁶⁰ I do not argue that an international demand for signals appears at different moments for different countries. On the contrary, I argue that the perception of CBI as a signal of "good economic policies" is relatively constant among international actors since the end of the 1980s. However, I argue the incumbents' perception of a need for capital (as defined below) creates the conditions for international demands to incentive central bank reform.

From the supply side, governments whose survival is threatened by poor economic performance are more willing to engage in reforms to attract capital than they would be in absence of this threat. However, there are circumstances that focus the attention of politicians on the demands of foreign actors: (1) when the country is losing FDI or (2) when high levels of foreign

⁶⁰ Assuming that the demands of international actors (incentives) have not changed drastically or significantly, one can assume that institutional arrangements are equilibria that consistent with said (international) incentives. Institutional arrangements also represent a resolution of conflicting interests (Drazen 1998:39). On the political economy of reform, see Sturzenegger and Tommasi (1998), and Tommasi (2006).

debt makes financing growth or refinancing the very debt more difficult. Incumbents perceive their *need for capital* when poor economic performance is joined by FDI loss or high levels of foreign debt.

Even when politicians needing capital have incentives to use reforms as signals, domestic institutional and political constraints make reform more or less likely, affecting the elasticity of the government's response to the incentive system. The second level of my theory analyzes the domestic hurdles for central bank reform.

Note that the theory developed here is conditional, one of the differences that distinguishes it from the extant literature. On the one hand, the demand for signaling commitment to sound economic policies is dependent on the *type* of the potential host for capital. I argue that developing countries have higher incentives to signal commitment to sound economic policies though costly reforms. This is why international incentives are better predictors of central bank reform in developing countries than in developed countries. On the other hand, the supply of central bank reform is conditional on the existence of economic problems that are threatening the government's survival, and on the perception that foreign investors and lenders should be attracted. The sum of both conditions is what I call here "need for capital."

In the next sections, I explain under which conditions governments face a demand for CBI, and when one can expect to see central bank reform to satisfy that demand.

3.2.4 *Level 1. International incentives*

3.2.4.1 An international audience

The macroeconomic literature conceives CBI as a signal from the government to individuals (principally, wage setters) regarding the government's commitment to non-inflationary policies. This institutional "rule" (CBI) is supposed to solve the time inconsistency problem (Barro and Gordon

1983a, 1983b; Kydland and Prescott 1977). Higher levels of CBI imply smaller discretion of the government over monetary policy, and should be associated with lower levels of inflation.

Some implications of this argument are problematic. First, if CBI signals commitment principally to domestic price setters to contain inflation,⁶¹ governments should delegate authority to central banks as a response to (expected or actual) high inflation.⁶² However, the empirical evidence does not seem to support this hypothesis (Forder 2005:845). Second, being apolitical, this literature fails in identifying the politicians' incentives to give up the control of monetary policy. Although a stylized benevolent leader can be a useful assumption for some models, it does not seem to represent accurately political motivations. Politicians want power and, once in power, want to keep power (Ames 1987; Bueno de Mesquita *et al.* 2003). Even "benevolent" leaders need to be in power to pursue their programs. I assume that the main motivation for politicians is their own (or their party's) political survival, and that their political survival has better prospects when the economy works better.⁶³ Finally, although this literature highlights the importance of CBI after the crisis of the Bretton Woods system, it does not connect domestic and international economies. Within the framework of increasingly mobile capital, domestic economies cannot be considered in isolation from the international economy. In particular, the choices of the levels of CBI and the exchange rate system cannot be assumed to be independent from each other (Bernhard, Broz and Clark 2002).

By neglecting the international connections of the domestic economy, the macroeconomic literature excludes international audiences that can be targeted with CBI. Commitment regarding domestic price stability is of interest not only of domestic price setters and constituencies, but also

⁶¹ This literature often merges the time-inconsistency and the credibility problems (Forder 1998; McCallum 1997 are exceptions to this confusion). Although both problems cause inflation, the mechanisms through which they generate inflation (and, therefore, the impact of CBI as a response) are different.

⁶² There is a literature suggesting that there are reputational mechanisms (other than "rules") that could generate the same anti-inflationary effect (Backus and Driffill 1985a, 1985b; O'Flaherty 1990).

⁶³ Furthermore, and as explained above, the literature on economic vote suggests that in presidential systems, a poor economic performance jeopardizes the president's survival.

of international actors, particularly investors and creditors (de Haan, Masciandaro and Quintyn 2008:717; Maxfield 1997; World Bank 1992).

Note that I do not claim that CBI cannot be a signal to domestic audience. However, for the purposes of the argument presented here, it is relevant to highlight that (1) domestic audiences are not the only audience for CBI as a signal; (2) domestic audiences are not necessarily the most important audience for CBI as a signal; and (3) recognizing that international actors could be the relevant audience for this signal affects the framework to analyze central bank reform, because it introduces another set of incentives that should be accounted for to understand central bank reform.

Not only it is possible for CBI to be a signal to foreign actors, CBI is a *reasonable* signal of commitment to sound economic policy. CBI has been considered an indication of good economic policy not only by scholars, who consider that CBI “remains a *sine qua non* of good public policy” (Siklos 2008:802), but also by risk rating agencies,⁶⁴ foreign investors (Maxfield 1997:206; Mosley 2003), international financial institutions (G-20 2004b; International Monetary Fund 1999; World Bank 1992), and policy makers (Bernhard, Broz and Clark 2002:699; Lefort 2006:1; Volker 1991).

Some scholars have already posited that an international audience could be relevant for the decision of delegating monetary policy in more independent central banks (Daunfeldt, Hellstrom and Landstrom 2009; Maxfield 1997). However, this literature does not satisfactorily explain under what conditions the existence of an international audience configures a demand for central bank reform. By providing an unconditional explanation, this literature assumes that a country’s response to incentives is independent from the country’s position in the international economy, and from its domestic politics. Furthermore, this literature leaves the causal mechanism linking the international audience and politicians’ decisions unexplained.

⁶⁴ For example, when Fitch assess the Brazilian sovereign creditworthiness a regular recommendation is to give formal independence to the central bank (Business Wire 2006).

3.2.4.2 The demand for developing countries: International creditors and investors

International creditors. The literature stresses that indebted countries are subject to the pressures of relatively few and organized creditors. Indeed, states facing difficulties in repaying their debt and/or the need of debt restructuring have been subject to increasing pressures from creditors and international financial organizations demanding a series of policies associated with fiscal discipline and the assurance of repayment.⁶⁵ These demands are commonly known as conditionalities. Some scholars point to the association between debt and CBI, suggesting that CBI was imposed as one of those conditionalities (Daunfeldt, Hellstrom and Landstrom 2009). Some evidence supporting this argument can be found in the U.S. Department of Treasury instructions to the U.S. Executive Director of the IMF to promote the establishment of “independent monetary authority, with full power to conduct monetary policy” (U.S. Department of the Treasury 2001:5).⁶⁶ Although I argue that international creditors are part of the international audience and can configure an international demand for CBI, two things must be noted. First, although CBI is part of the discourse of international institutions regarding “good practices” in monetary policy (Folkerts-Landau, Lindgren and International Monetary Fund 1998:41-ff; G-20 2004a, 2004b; International Monetary Fund 1999, 2001; Lefort 2006), CBI seldom appears among the international financial institutions’ conditions to access to loans. As Axel Dreher illustrates, in a sample of 17 World Bank programs, only two of the programs (11.76%) included CBI as a conditionality, and granting or improving CBI represented only .51% of the conditions included in the sampled programs (Dreher

⁶⁵ Conditions have been attached to international financial institutions’ loans since the 1950s. The detail of IMF conditions have increased significantly since the mid-1970, after the introduction of the Extended Fund Facility in 1974 by the IMF (Dreher 2002:9). On the evolution of the imposition of conditionalities (number, type, etc.) by the World Bank and the IMF, see Dreher (2004) and Gould (2003).

⁶⁶ Multiple times, the U.S. Department of Treasury has instructed the U.S. Executive Director of the IMF to encourage CBI. For example, in 2001 the U.S. Executive Director of the IMF was instructed “to use aggressively [his] voice and vote” to “*Vigorously promote policies to increase the effectiveness of the International Monetary Fund in promoting market-oriented reform, trade liberalization, economic growth, democratic governance, and social stability through: A—Establishing an independent monetary authority, with full power to conduct monetary policy, that provides for a non-inflationary domestic currency that is fully convertible in foreign exchange market*” (U.S. Department of the Treasury 2001:5, italics in the original).

2002:58, Table 5). On a larger sample of conditions in IMF Standby Arrangements (36 programs, 1999-2001), and using letters of intent as the source of the data, only one out of 699 conditions was to grant CBI (Dreher 2002:61, Table 7).

Second, and more important, the mechanism presented here is about voluntary actions, not coercion. The incentive for governments to reform their central bank is not the international financial institutions' imposition, but the expectation of international creditors' appraisal of CBI as a good signal. In other words, the mechanism linking international actors to the decision of reforming the central bank is not the international creditors' coercion of developing countries, but the developing countries' attempts to attract international funds by generating costly signals of commitment to a set of policies. The demand from creditors, particularly international financial institutions, becomes crucial when bonds rating agencies contemplate developing countries' compliance to international financial institutions' recommendations as part of their assessment of the country risk.

This difference is not minor. If the argument is about coercion, one should expect more convergence to CBI in countries under heavier IMF conditionalities, or that make more use of IMF loans, for example. On the contrary, one should not expect CBI in countries that do not rely significantly on international financial institutions' funding. However, if the mechanism involves international financial institutions producing recommendations regarding desirable policies, and reports on the conformity to these recommendations first, and rating agencies using these reports to evaluate sovereign debt subsequently, the weight of the international financial institutions' demands should not necessarily be related to their capacity of enforcing conditions or denying credit.

Do international financial institutions use CBI as a signal of good economic policy? In the early 1990s, international financial institutions explicitly considered CBI as a signal of commitment to sound economic policies. According to the World Bank, "by giving its central bank the mandate

and reputation for maintaining price stability, a government can signal the strength of its commitment to price stability” (World Bank 1992:1). Beyond the IMF being considered a “consistent advocate of independent monetary authorities” (U.S. Department of the Treasury 2001:9), more evidence of the reception of CBI as a good signal can be found in the IMF’s publications and the speeches of the IMF’s directors (Fischer 1994, 1996).

For example, the IMF publishes regularly Public Information Notices (PINs) in order to promote transparency of the IMF’s views and analysis of economic developments and policies.⁶⁷ It is not rare for PINs to explicitly state the desire of the Directors for countries to strengthen their central banks’ powers and enhancing CBI in countries in countries from Macedonia (International Monetary Fund 2008a) to Iran (International Monetary Fund 2004, 2007, 2008a, 2008b).⁶⁸

Note that the IMF is very clear regarding what signal CBI is sending to international markets: When the IMF recommends more independent central banks, the argument is not only about price stability. According to IMF’s top officials – such as Anoop Singh acting as Deputy Director of the IMF’s Asia Pacific department – an independent central bank is “crucial to a credible macroeconomic framework” (Fidler 2001). Or, as Reuters reported in April 2007, Serbia needed a truly independent central bank “to make sure financial markets trust its policies” (Filipovic 2007).

⁶⁷ *Public Information Notices* are issued after Executive Board discussions of Article IV consultations with member countries, after assessments of member countries with long-term program engagements, and after Executive Board discussions of general policy matters. They can be found at <http://www.imf.org/external/news/default.aspx?pn>.

⁶⁸ It is interesting to note how the PINs phrase the desirability of CBI and central bank reform. For instance, the *PIN No. 08/146*, regarding Macedonia, reads: “[the IMF Directors] looked forward to the prompt passage of new legislation strengthening the central bank’s power in dealing with troubled banks and enhancing its independence.” (International Monetary Fund 2008a). With a similar language, the *PIN No. 04/109*, regarding Iran, expresses that the IMF Directors “looked forward to the establishment of central bank independence” (International Monetary Fund 2004:4). Four years after this document, the *PIN No. 08/86* highlights that the Directors “observed that strengthening the operational independence of the central bank and establishing low inflation as its main objective will increase the effectiveness of monetary policy and anchor inflationary expectations. They looked forward to the resumption of work on a new central bank law” (International Monetary Fund 2008b:3). This language contrast the one used in the 2008’s IMF Country Report on Iran, stating that “the authorities are strongly encouraged to resume their work on the draft of a new central bank law” (International Monetary Fund 2008c:24).

It is important to note that the IMF's appraisal is not only of interest to the IMF and the country under analysis. Other countries' government agencies and the press gather and distribute the information contained in PINs and other public documents expressing the IMF's desire to see more independent central banks, or its approval of measures towards maintaining or increasing CBI. For instance, the U.S. Department of the Treasury transmitted to the Congress the IMF concerns regarding low CBI in Algeria (U.S. Department of the Treasury 2001:10) and in Vietnam (U.S. Department of the Treasury 2006:2). Similarly, the local media highlighted the IMF's strong recommendations for CBI to countries that did not have independent central banks as a condition originally attached to their agreements with the IMF (e.g., Algeria, Georgia⁶⁹ Indonesia⁷⁰ or Mauritius⁷¹), or that had already paid its debt to the IMF (such as Serbia⁷²). Examples of the IMF praising countries for maintaining CBI are Turkey (Kiefer 2007), and for increasing CBI are Romania ("IMF Supports Continued Economic Reforms in Romania" 2004).

Even more important to show the plausibility of the argument presented here, country reports created for investors by rating agencies and financial consulting companies use the IMF documents as indicators of the prospective environment for investment (see for example, Financial Standards Foundation 2008a, 2008b, 2009b; IPR Strategic Business Information Database 2008).

⁶⁹ As reported by the newspaper *Civil Georgia* ("IMF Warns Against 'Erosion of Central Bank Independence'" 2008).

⁷⁰ CBI was not a condition originally attached to the IMF-Indonesia agreement. However, the "Second Supplementary Memorandum of Economic and Financial Policies" states that the government of Indonesia "accelerates [the] preparation of legislation on central bank independence and the draft bill will be submitted to parliament by end-September" ("Highlights of Indonesia-IMF Memorandum" 1998). CBI was included as a condition on a 5 billion dollar program in 2000, and in 2001 the *Financial Times* reported that the IMF warned Indonesia that its proposed central bank reforms "could threaten the bank's independence and jeopardise release of new IMF loans." The *Financial Times* explains that "amid political turmoil in the country, the institution is trying to walk a fine line between not adding to market uncertainty and pressing for what it sees as essential reform" (Fidler 2001).

⁷¹ The *Economist Intelligence Unit* informed that an IMF report on Mauritius recommended to strengthen the central bank's organic law to bolster the bank's independence from the government ("Mauritius Finance: IMF Urges Independence for Central Bank" 2002).

⁷² Reuters reported the IMF demand for CBI even after Serbia "fully repaid its debt to the IMF three years earlier than the Fund had expected and the outgoing government of Prime Minister Vojislav Kostunica [...] backed down on most policy pledges made under a 2002-05 loan deal" (Filipovic 2007).

This is a privileged source of data particularly for countries where there is not enough publicly available information (Financial Standards Foundation 2009a:4). Furthermore, there are reports about multinational companies' economists meeting representatives of the World Bank as another source of information to assess the risk of investing in foreign countries (Marks 1988:193).

In sum, international creditors (particularly the IMF, but also the U.S.) use legal CBI as a signal of good policy, and believe that CBI should increase investors' trust in a country's policies. CBI is positively judged not only as a sign of compliance to conditions attached to loans, but it is also commended when countries under IMF agreements adopt CBI. This assessment of CBI as a signal is not limited to the bilateral relations between the creditor and the country, but the assessment is also distributed to the public by the press, government agencies, and risk rating agencies, affecting the reputation of countries that decide to give more or less independence to their central banks.

International investors. As stated above, the relative scarcity of capital presses governments to compete against each other for investment. In particular, countries compete in terms not only of expected returns of investments, but also in terms of predictability of the economic environment they provide. One could argue that the predictability of the economic environment is part of the calculus of investments' returns. However, whereas investment returns vary across sectors and projects, and to a great extent escapes from the government's control, I argue that predictability of the economic environment can be considered a "public good" the government can provide, susceptible of improving the general conditions for investment in the country.

Whereas developed countries can rely on their reputation as stable economies, or on their political institutions to make credible commitments, developing countries need to signal their

commitment to stability to international investors.⁷³ In theory, developing countries could build a reputation of sound monetary policy. However, building that reputation would probably take more than one period of government. Given that politicians have shorter time horizons than the time it would take to build a country's reputation, signaling devices are assumed to be preferred over reputational ones. CBI can be used as a signal of a more stable monetary policy.⁷⁴

Why would investors rely on signals of the predictability of the economic environment? There is an extensive literature justifying the use of information shortcuts (Simon 1982), especially by investors who are not able to “physically follow and mentally absorb” the relevant information (Nye 1988). The argument behind the use of information shortcuts is that looking for more information is costly and, particularly in the case of investment decisions, the time demanded by the search of information might cause losing investment opportunities; therefore, “market actors will rely instead on a small set of indicators” (Mosley 2003:34).

Do investors rely on CBI as a signal of the predictability of the economic environment? CBI is a public commitment to not interfere in monetary policy with political purposes that seems to have an impact on investors' assessments. In particular, the literature suggests that markets use CBI as signal of sound economic policies (Mosley 2003; Pastor Jr. and Maxfield 1999), along with dollarization (Salvatore, Rengifo and Ozsoz 2008) and fiscal institutions (Mosley 2003:213). Qualitative evidence suggests that investors prefer a stable monetary policymaking environment; that is why countries with independent central banks often pay lower interest rates (Mosley 2003:123-124). Modya and Murshid underline that foreign investors emphasized the need to curb “monetary profligacy” (Modya and Murshid 2005:258-259), whereas *The Economist* states that foreign investors

⁷³ There is a significant literature highlighting the differences between investing in developed and developing countries (see for example, Armijo 1999; Collins 1990; Maxfield 1998; Posner 1998; Rodrik 1989; Summers 2000).

⁷⁴ Bordo and Rockoff (1996) make a similar argument. They consider the adherence to the gold standard as a signal of financial rectitude. This signal helped peripheral countries to receive capital from Western European countries.

have “indirectly prevented politicians from treating central bankers as their puppets” in more advanced developing countries. Governments attacking the independence of central bankers “will eventually find that footloose capital flees their countries” (No Strings Attached (Newly Independent Central Banks) 1996). Note that in consonance with the argument presented here, Mosley argues that although monetary and financial institutions “serve to change investors’ expectations, they are not driven by investors’ demands” (Mosley 2003:213).

My argument, however, does not rely on how reasonable it is for investor to choose CBI as a valid indicator of countries’ creditworthiness, but on the fact that CBI is considered as a valid indicator of the countries’ creditworthiness. In this sense, it is interesting to note that rating agencies also take into account CBI among the criteria to evaluate countries’ economic and political risk (IPR Strategic Business Information Database 2008; Moody's Investors Service 2008:10, 29).⁷⁵ For example, Standard and Poor’s indicator of economic risk (assessing the country’s ability to repay its debts) includes the degree of CBI (Mosley 2003:332). Furthermore, Standard and Poor’s country assessments explain the way in which CBI is affecting the countries’ creditworthiness.

The 2005 Standard and Poor’s report provides an interesting illustration about how information about CBI is used to assess countries’ creditworthiness. For example, one of the characteristics of countries in the “BB’ range” is that “generally, the central bank pursues sustainable monetary and exchange rate policies” (Standard & Poor's 2005:20), whereas countries in the “B’ range” have central banks that “tend to have limited independence, and are usually considered as policy arms of their respective governments, either explicitly or implicitly” (Standard & Poor's 2005:76). When explaining why Turkey and Brazil received the BB qualification, Standard & Poor’s state that CBI helped these countries gain credibility: “Although Brazil still lacks a formally

⁷⁵ Note that in the previous section I mentioned a related topic: rating agencies referring to IMF’s appraisal of the degree of CBI.

independent central bank, it does have de facto independence in its monetary policy decision-making process and has moved to an inflation-targeting regime. The Central Bank of Turkey's independence has been enforced, strengthening its credibility" (Standard & Poor's 2005:23).⁷⁶ The report further highlights the importance of formal CBI in Brazil by stating:

"Given its too-recent history of very high inflation, *changing the mentality of investors and consumers* to expect and believe that inflation will converge to international levels takes time. In this regard, Banco Central's commitment to and success in lowering inflation is crucial. *Standard & Poor's believes that monetary policy credibility could be further enhanced with formal central bank independence supplementing its operational independence.*" (Standard & Poor's 2005:26, emphasis added).

On the other hand, one of the reasons for Venezuela's low rating is a series of changes in the Central Bank Law that have "greatly damaged confidence" (Standard & Poor's 2005:111).

Although I rely on the literature and on rating companies' analyses to state the plausibility of investors following CBI as a signal, the actual form in which investors process CBI as a signal is not subject to empirical test here. This however, further separates my theory from Maxfield's (1997) ideas. Her argument does not distinguish between forms of capital that governments could be attracting with CBI (foreign direct investment, equity shares, debts in the form of loans, and debt in the form of bonds), probably because she was not focusing on the mechanism linking investors and governments' decision of increasing CBI, or because the focus was on the supply side of central bank reform.

⁷⁶ In the 2005 report, Standard & Poor's makes similar comments regarding India and Philippines. Although Standard & Poor's gives Mexico a lower ranking in 2005, the report considers that Mexican financial markets have developed thanks to monetary stability and low inflation that were a consequence of "an independent central bank that has gained greater credibility in recent year" (Standard & Poor's 2005:42). Regarding the future stability of Mexico, Standard & Poor's expects that "low inflation, an *independent central bank*, and skillful debt management—including ample prefunding—should insulate the government's liquidity from possible negative shocks during the 2006 election campaign" (Standard & Poor's 2005:68, emphasis added).

3.2.4.3 The supply: Developing countries *needing capital*

In the previous paragraphs, I explained how international actors can generate demands for CBI. However, the mere existence of a demand for CBI does not imply governments' automatic responses. The core of my argument is that when governments realize that the country's poor economic performance is threatening their survival, they will try to attract capital. This is consistent with formal arguments and some empirical evidence showing that "politically insecure leaders" are particularly likely to "learn" the lessons of liberalization and financial market reform (Eterovic 2009; Way 2005).⁷⁷

Even if incumbents could attribute economic problems to a wide variety of factors (and therefore, react in different forms), when incumbents perceive that their country is losing FDI or is relatively highly indebted, they will perceive the country's need for capital. Incumbents facing need for capital, as defined here, will focus on attracting foreign investors and creditors and will be more likely to accommodate to investors' and creditors' demands, independently of the incumbents' political preferences. In this section, I present three hypotheses to test this central idea. Next, I justify different expectations for developed and developing countries.

Hypothesis 1 (growth problems). *Developing countries with growth problems will increase CBI to attract foreign investment.*

Hypothesis 2 (need for FDI). *Developing countries with growth problems that are losing FDI will increase CBI to attract foreign investment.*

⁷⁷ Notice, however, that these arguments are not able to distinguish the particular mechanism leading to the adoption of reforms. According to Way (2005), reforms could be a consequence of either a higher desire to emulate more successful economies (that is, emulation, one form of diffusion), or of an increased vulnerability to international organizations' pressures (coercion).

Hypothesis 2.1. Developing countries that are losing FDI will increase CBI to attract foreign investment.

Hypothesis 2.2. Developing countries with growth problems that are losing FDI will increase CBI to attract foreign investment.

Hypothesis 3 (need for credit). *Developing countries with growth problems that are highly indebted will increase CBI to obtain loans.*

Hypothesis 3.1. Developing countries that highly indebted will increase CBI to obtain loans.

Hypothesis 3.2. Developing countries with growth problems that highly indebted will increase CBI to obtain loans.

The impact of both sources of demands for CBI (investors and creditors) is conditional on the need for capital in the country. Countries need capital when they are having “growth problems,” that is, when they are growing at a lower rate than other countries, when they are experiencing negative growth, or when they are deviating from their trajectory of growth in a negative way.

Arguably, countries also need external funding when they experience deficits in their balance of payments (Maxfield 1997:36) and when they have chronic deficits in their trade balance. However, I do not include these situations along with growth problems as generators of “need for capital.” First, I am analyzing the conditions under which incumbents may use central bank reform as a means to attract FDI or to obtain better conditions in loans. Growth problems threaten the incumbents’ survival in a way that occasional deficits in the balance of payment or in the trade balance do not. Growth problems can rapidly translate into consumption reduction and unemployment, generating pressing demands to the government, and also affect the government’s incomes through taxation. Second, although external deficits and growth problems may overlap, it is necessary to separate conceptually these two circumstances. It is possible to have growth

problems without having deficits in the balance of payments, or to have chronic deficits in the balance of payments even when the economy is growing. Finally, there are other measures to deal with trade deficits that governments are more likely to use (instead of CBI). For example, a country with trade deficits could stimulate exports or restrict imports. Ultimately, the overlap between deficits either in the balance of payments or in the trade balance, with growth problems is an empirical matter. The empirical test will shed light on the relative importance of these two conditions.

Growth problems may not necessarily translate into higher CBI. However, countries with growth problems *and* that are losing FDI, or receiving less FDI than comparable countries, would have higher incentives to use CBI attract foreign investors. Similarly, countries with growth problems *and* that are highly indebted are more vulnerable to creditors' demands for CBI. On the contrary, countries that are losing FDI or are highly indebted *but* do not experience growth problems should not have sufficient incentives to accommodate to international demands for CBI.

In other words, I argue that the existence of growth problems is a necessary but insufficient condition for countries to accommodate to international demand for increased CBI. *When coupled with decreasing FDI or high debts, growth problems limit the range of policy options for governments.* Governments whose survival depends on revitalizing the national economy will need to respond to the demands of international actors. In this way, the dependence from external capital may make CBI and central bank reform more likely.

In sum, foreign capital holders demand CBI as a signal of commitment to a stable economic policy to invest in the country or to lend money, and countries in need of capital will try to accommodate to capital holders' demands. Note that my theory does not have expectations for countries that are indebted or that have low levels of FDI but do not have growth problems (my hypotheses refer to the interaction of debt and FDI with need for capital).

A few notes regarding the contribution of these ideas to the extant literature. First, my hypotheses clearly state the conditions under which governments will attempt to increase their CBI. Maxfield (1997) argues that when the balance of payment is in deficit, politicians perceive the need to signal creditworthiness and reform their central banks. This unconditional explanation has been common in the literature; however, it can be challenged on logical and empirical grounds. On logical grounds, if CBI were the best response to balance of payment deficits, all developing countries should have independent central banks. Interestingly, as mentioned in Section 2.2.3, Maxfield's unconditional explanation does not seem to find empirical support in her book's four case studies. I argue that objective conditions configure the *need for capital* (as defined here) that motivate incumbent politicians to give more independence to their central banks. My theory integrates both an international demand for CBI, and circumstances under which this demand will be perceived by incumbent politicians. The second level of my theory integrates domestic factors that can constrain the supply of CBI, offering a systematic explanation of both the "waves" of CBI, and the lags in (or lack of) supply of CBI.

Second, according to Maxfield the main determinant for central bank reform is the existence of deficits in the balance of payments. Restricting the incumbent's problem to balance of payment problems denies the possibility of growth strategies based on foreign credit and temporary balance of payment deficits. In such a hypothesis, the deficit in the balance of payments would not be constraining the government, but would have been created and sustained by the government.⁷⁸ Furthermore, balance of payment deficits can conceal different kinds of problems in the economy causing trade or current account deficits, or the unbalance between accounts. The balance of payment deficit tells little about the underlying problems that a country might be facing.

⁷⁸ Note that the fact that an important part of the literature disagrees with the long-term effects of this kind of policy (McCombie and Thirlwall 2004) does not imply that this strategy has not been pursued for different countries.

Finally, Maxfield's explanation is restricted to middle-income developing countries. However, there is no rationale for the exclusion of developed and of low-income developing countries, or theorization about how the same variables could affect or not other cases. I provide an explanation for why economies that can rely on reputation do not need to accommodate to an international demand for CBI, and I test that explanation empirically.

Different expectations for developed and developing countries

I have argued that countries needing capital have to either attract investment or borrow funds in the international market. *Developing countries* need to signal their commitment to a stable economic policy, and CBI is one of the principal signals that international investors and lenders ask for. As the need for capital increases, developing countries will be forced to accommodate to the demands of international actors independently from the preferences of domestic actors. On the contrary, *developed countries* can rely on less costly mechanisms such as reputation when facing a relative need for capital. Furthermore, it is not a minor detail that there is a significant overlap between the decision-making power of international financial institutions and developed countries. This is an additional factor that makes unlikely that these institutions demand domestic reforms from developed countries. Therefore, I do not expect to find a significant relationship between need for capital and CBI in developed countries. Although it is beyond the scope of my theory, I speculate that for developed countries the main determinant of CBI is domestic political factors, as the literature indicates (Bernhard 2002) [See Figure 1.1].

3.2.4.4 Credibility of the signal

For a signal to be credible, it must entail some cost for the sender (Morrow 1999:484). Otherwise, if any type of sender is able to send the same signal, the signal will provide no

information at all. A signal is costly “when the act of sending it incurs or creates some cost that the sender would be disinclined to create or incur if the sender were in fact *not* willing to carry out [the commitment]” (Fearon 1997:69). And, as Morrow highlights, “the more costs a state’s leader imposes on him or herself, the higher the other side will think his or her unobservable resolve is” (Morrow 1999:484).

Fearon distinguishes two types of costly signals that state leaders might employ to communicate credibly with foreign actors. Leaders can either sink costs by taking actions that are *ex ante* costly, or they can tie their hands making public commitments and create *ex post* audience costs in case they deviate from the original commitment (Fearon 1997:69-70).⁷⁹ CBI could be considered costly in both senses, depending on the context of production of the signal.

Hypothesis 4 (sunk costs). *Developing countries with higher levels of CBI are less likely to increase their CBI.*

Consider first the sunk cost argument. Institutional reforms entail costs associated with building coalitions to support the reform and with compensating actors who could eventually be harmed or displaced by the new institutional arrangement. Examples of actors that were harmed by CBI in different countries are: sub-national authorities who might expect to be bailed out by the national government increasing money supply, domestic banks that benefit from central bank (politically oriented) decisions regarding liquidity, legislators who use central bank decisions as a form of pork, and the very executive power, who would lose monetary policy as instrument. The *reform* of the central bank can therefore be considered as a sunk cost.

⁷⁹ Note that in Fearon’s models, leaders never bluff with either type of signal in equilibria. Furthermore, leaders do better on average by tying hands (Fearon 1997).

Because the credibility of the signal is associated with the cost of producing the signal, only costly signals would be credible.⁸⁰ The cost of giving more independence to the central bank (and the credibility that the cost gives to the signal) will be higher in cases where central banks are less independent. I hypothesize that governments will not incur reform costs when their central banks are already independent: because the marginal cost of giving more independence to already independent central banks is decreasing, the marginal benefits of increasing independence are decreasing too. Additionally, said benefits may decrease at a higher rate than the costs because the international audience might ignore relative minor changes in CBI.⁸¹ This implies that countries that already enjoy high levels of CBI cannot signal commitment to sound economic policies by relying on more CBI. Countries with high levels of CBI who need to signal commitment to sound economic policies will need to rely on other signaling devices.

It is true that domestic hurdles may also affect the costs associated with the reform. Said cost can be higher when power is more fragmented (because this will affect the need and the cost of building coalitions), when there are checks and balances, and at different moments during tenure when the reform is attempted. However, these components of the cost of the signal are less transparent and harder to estimate for an international audience, compared to the previous level of CBI.

A final note on the effect of previous levels of CBI: It is possible that the effect of previous levels of CBI is not linear. In other words, it is possible for minor changes in the structure of the

⁸⁰ Although some scholars argue that Fearon refers principally to financial cost (Thyne 2006:939), I am using sunk costs in a much broader sense, including the use of political capital in order to form coalitions and compensate the losers from central bank reforms.

⁸¹ Note that the cost-threshold beyond which a signal is credible is an empirical matter and exceeds the purposes of this explanation. Determining to what signals (in terms of costs of production) investors are more likely to respond, or what is the threshold beyond which CBI is costly enough to be credible constitute interesting extensions for this research.

central bank introduced by countries with very low levels of CBI not to be credible for reasons other than sunk costs. This possibility will be empirically tested.

Hypothesis 5 (audience costs). *Democracies are more likely to use CBI as a signal than are autocracies.*

CBI can be costly as a hand-tying device too. It is true that CBI is not a signal with a “bridge-burning” effect (Fearon 1994:590). CBI can be reverted, with more or less hurdles, in the same way it was instituted (Keefer and Stasavage 2000). However, an institutional commitment that is subsequently violated or reverted is likely to generate audience costs. This is intuitively clear for the case of domestic audiences in democratic societies (Tomz 2007:836); however, reverting or violating CBI also generates audience costs in less democratic societies (Weeks 2008). Consider, for example, the domestic and international reactions to Hugo Chavez’s several attempts to restrict the independence of the Venezuelan central bank, or to different Polish administrations’ threats to the independence of their central bank.⁸²

One may argue that not only the existence audience costs, but also the incumbents’ assessment of audience costs varies across regimes. However, there are three important points to be made: (1) threats to CBI generate domestic and international audience costs; (2) domestic audience costs may have a larger impact in democratic societies, but less democratic societies are not *a priori* free from audience costs; (3) the magnitude of the cost is an indicator of the cost of the signal. I assume that a violation of CBI can cause international audience costs to all regime types, but that democracies are more vulnerable to domestic audiences, and I take into account that several scholars consider that domestic audiences are more important than international audiences for imposing

⁸² See for example the reports from *Poland Business News* ("Foreign Economists Concerned over Attacks on Central Bank Independence" 2006) or *Bloomberg.com* (Rozlal 2009).

audience costs on leaders (Smith 1998). Therefore, I expect CBI to be a more credible signal when produced by democracies (or more democratic regimes) than by less democratic regimes because democratic regimes have higher domestic audience costs. Given that central banks are reformed to send a signal to international actors, if the signal has *a priori* modest credibility, governments should not incur the costs of reforming their central banks. Furthermore, there is an additional problem for autocratic regimes. If the only cost for violating CBI will come from international audience costs, and the signal is originally sent to international actors, the signal should not be worth more than the mere commitment from the autocrat.

The expectations derived from the argument stated above are consistent with a broader literature on regime type and credibility. Autocracies' institutional commitments should be less credible (if credible at all) than democracies' commitments because institutions hardly constrain authoritarian rule. In general, democracies are more credible in the international arena because it is difficult for them to discriminate against external actors in providing domestic actors with the transparency associated with domestic freedoms (Gaubatz 1996). In particular, some scholars have distinguished the specific institutions in Western democracies that provide the technology to make credible delegation to central bank commitments (Giordani and Spagnolo 2001).

This difference in credibility is also consistent with Broz's explanation of the choice between CBI and pegged exchange rates (Broz 2002). According to Broz, both CBI and fixed exchange rates are mechanisms to solve the time-inconsistency problem. However, there is a tradeoff between the transparency and flexibility of these two mechanisms: fixed exchange rate is a more transparent but less flexible instrument.⁸³ Broz maintains that "credible monetary commitments must be transparent for governmental opportunism to be detected and punished;" however, transparency can be

⁸³ This tradeoff would also explain Leblang's findings regarding exchange rate choices in developing countries (Leblang 1999).

provided by the commitment mechanism or by institutions (Broz 2002:883). Therefore, autocracies should have more incentives to rely on pegging instead of on CBI because the commitment of respecting the independence of the central bank might not be credible. In brief, since democracies are able to make credible commitments, they can rely on relatively flexible mechanisms to commit to a stable monetary policy. Therefore, democracies should be more likely to rely on CBI than autocracies.

Note that, although Broz found empirical evidence indicating that autocracies are more prone to choose pegged exchange regimes, he did not test the choice for CBI or the effect of different “degrees” of democracy on the decision to give more independence to their central banks. Furthermore, given that he did not control for existent levels of CBI, the substitution hypothesis (“the degree of transparency of the monetary commitment mechanism is inversely related to the degree of transparency in the political system” (Broz 2002:861)) remains an assumption. Hypothesis 5 seeks a direct test of the effects of domestic audiences (and indirectly, of the transparency of the institutions) on the decision to rely on CBI as a signal to international markets.

3.2.5 *Level 2*. Domestic hurdles: Central bank reform in presidential systems

3.2.5.1 Limits of the explanation

The bulk of the literature proposes models to explain the *level* of CBI, disregarding the fact that changes in CBI are not usual or merely incremental. Changes in CBI are the result of rare reforms of the central bank.⁸⁴ I argue that it is not reasonable to examine just the levels of CBI without considering that institutional change is costly, and that such cost may vary across institutional settings. As Drazen argues, “policy choices often reflect the resolution of conflicts of

⁸⁴ Said changes are probably better conceptualized as punctuated equilibria (True, Jnes and Baumgartner 1999).

interests between groups with different goals” (Drazen 1998:39), and these conflicts are solved within institutional constraints. Response to incentives is hardly immediate, and might demand crossing certain thresholds. The second level of my theory attempts to explain what factors affect a country’s elasticity to international demands for CBI under need for capital. This section describes why some countries facing need for capital respond promptly to incentives for CBI, whereas other countries do not change their levels of CBI when facing the same set of incentives.

I have argued that countries that are unable to rely on a reputation of stable economy or on institutions that make their commitments credible will accommodate to incentives or demands from international investors and creditors to obtain capital. In particular, governments will have incentives to use CBI to signal their commitment to orthodox economic policies to international actors. As the need for capital increases, so do the incentives for developing countries to accommodate foreign demands for CBI. However, the fact that a set of incentives is recognized by the government does not necessarily mean that changes in CBI will follow immediately. Changes in CBI imply a success in promoting an institutional change. Incumbents who perceive that the poor economic performance of the country threatens their survival, and who identify the need to attract foreign capitals by signaling commitment to sound economic policies still need to form domestic coalitions that allow them to introduce reforms.

In this section, I explain how domestic institutions condition the impact of international incentives for CBI. Focusing on presidential systems, I argue that the strength of presidential powers, the capacity of the legislature, and the distance between the executive’s and the congress’s preferences condition the elasticity of the government’s response to international incentives.

Note that my explanation of how domestic institutions condition the impact of international incentives for CBI operates under two restrictions: (1) it applies to democracies (2) that are presidential systems.

My theory about the impact of domestic institutions on the likelihood of central bank reform is restricted to *democracies*. I do not include autocracies for the following reasons. First, although there are different types of autocracies, institutions play a small role (if any at all) in conditioning autocratic decision-making. Second, I assume the process of institutional change to be more costly for democracies than for autocracies because the former's need to respect procedures, and because of the (potential) existence of more veto points in democracies. That should make easier for autocracies to modify institutions in order to comply with international demands. However, the very ease for autocracies to eliminate, create, or modify institutions, coupled with the doubt about whether institutions would eventually bind autocrats, makes CBI a non-credible signal for foreign actors. If CBI is not credible to begin with, autocracies should not have incentives to rely on CBI. Finally, the attributes I consider crucial in determining the elasticity of countries responses to international demands are hardly found in autocracies (i.e., division of powers, varying strength of presidential powers, Congress's professionalization or capacity, and preference distance between the executive and the legislative power).

This theory about institutional constraints is restricted to *presidential systems*. I argue that the dynamics of presidential and parliamentary systems are substantively different. First, in presidential systems the executive can be considered a unitary actor, with a single set of preferences. This is not necessarily the case in parliamentary systems where the executive power is usually the product of legislative coalitions. Therefore, explanations based on the need to avoid intraparty or intra-coalition conflicts over monetary policy that might shorten the government's tenure in office (Bernhard 2002), or relying on informational asymmetries between the cabinet and the parliament (Bernhard 1998), cannot be applied to presidential systems.

Second, decision making in separation of power systems is, in principle, the outcome of an inter-institutional bargaining that does not parallel the one present in parliamentary systems

(Mainwaring and Shugart 1997; Moe and Caldwell 1994). In parliamentary systems, it is reasonable to assume that preferences of the executive and of the legislative majority do not diverge significantly. Given that the executive's origin and survival depend on the parliament, if the preferences of the two branches differed drastically a new government would be formed. However, in presidential systems it is possible and not unusual that the president does not share the congress's preferences (divided government). Additionally, certain features of presidential systems (such as the extent of the president's powers) might make this inter-institutional bargaining more or less costly, affecting the elasticity of the country's response to international incentives or pressures.

Third, I argue that the logic of veto players (VPs hereafter) is not a substitute for differences between presidential and parliamentary systems.⁸⁵ Tsebelis posits a negative relationship between the number of VPs, the lack of congruence among VPs, and the internal cohesion of the VP, on the one hand, and the ability of the government to implement policy changes on the other hand (Tsebelis 1995, 1999, 2002). I argue that the number of VPs does not provide sufficient information about political dynamics. First, variation in the number of VPs does not necessarily overlap with variation between parliamentarian and presidential systems. Although additional VPs may increasingly hinder decision-making processes, there is a difference in nature between bargaining in a separation of power system, (where the accountability, legitimacy, and survival of the executive is independent from the ones of the congress), and in parliamentary system. Since both presidential and parliamentary systems can have the same number of VPs, VPs may obscure the aforementioned differences in the decision-making process. Furthermore, some scholars have found that presidentialism has an impact that is independent from the number of veto players (Andrews and

⁸⁵ An interesting illustration of this point is Pérez-Liñán and Rodríguez-Raga's extension of the VPs logic to presidential systems (Pérez-Liñán and Rodríguez-Raga 2003).

Montinola 2004).⁸⁶ Second, using VPs leaves little room to explore the differences across presidential system where the strength of the presidential powers varies.

I provide an explanation of central bank reform *in presidential democracies*. My theory *does not* provide insights on the domestic dynamics in parliamentary systems, but attempts to explain variation across presidentialisms.

Changes in CBI imply a success in promoting an institutional change. Institutional change can be more or less costly in different institutional settings and political conjunctures. I argue that institutional change is easier when the president is stronger. This is particularly the case with weak legislatures and with unified government.

3.2.5.2 Particularities of presidential systems

As stated previously,⁸⁷ many scholars recognize that CBI is a case of political delegation (e.g., Keefer and Stasavage 2003). However, there is a gap between models of political delegation and models explaining delegation to central banks (CBI). Many general models of delegation have relaxed their early assumptions in order to include, for example, multiple principals (e.g., Bendor 1988; Gailmard 2007; Lindstadt 2006; Lohmann and O'Halloran 1994; Moe and Caldwell 1994; Spiller 1990; Thatcher and Stone Sweet 2003) or low quality bureaucracies (Huber and McCarty 2004). Nonetheless, most models of CBI retain the single principal assumption, or consider informational asymmetries as a constant across countries. This is problematic for several reasons: First, models of political bargaining with a single principal hardly apply to presidential systems,

⁸⁶ Andrews and Montinola test whether increasing the number of veto players strengthens the rule of law. Their model shows that as the number of veto players in government increases, their ability to collude on accepting bribes decreases; therefore, their incentive to vote on legislation strengthening the rule of law increases. Although one could predict that checks and balances could operate as additional veto players, their empirical test on 35 emerging democracies shows that, independent of the number of veto players, presidential systems have lower levels of rule of law than parliamentary systems (Andrews and Montinola 2004).

⁸⁷ See section 2.2.4.

where passing legislation involves inter-institutional bargaining. Second, the formal powers of the president and the legislature vary across countries (Shugart and Carey 1992). Finally, there is variation in the information that both institutional actors have or can handle. Because the legislature's capacity varies across developing countries, it is not possible to simply state the existence of inter-institutional bargaining. Asymmetries in information related to different legislatures' capacities may affect the outcomes of the bargaining, that is, the likelihood of observing central bank reform.

Based on formal models of delegation in presidential systems, I argue that two factors condition governments' responses to international incentives for central bank reform: the capacity of the president and the congress in the inter-institutional bargaining, and the distance between the president's and congress's preferences. Therefore, I analyze three variables to explain central bank reform in presidential systems: on the one hand, (1) the extent of the president powers; (2) the quality or efficiency of the legislature, both indications of the institutional actor's capacity; and on the other hand, (3) the preference distance between the executive and the legislative powers. Whereas the first two variables may explain differences in the likelihood of central bank reform principally between countries, the last may explain differences within countries.

3.2.5.3 Variation across presidential systems

Hypothesis 6 (president's capacity). *Central bank reform is more likely the stronger the presidential powers are.*

Based on the literature on economic voting in presidential systems (see section 3.2.2.1), I argue that the president's survival is particularly threatened by poor economic survival. I therefore assume that a president facing need for capital should have the highest incentives for increasing the independence of the central bank to attract foreign capital. The more power the president has, the

easier it is for him to promote or to avoid an institutional reform. Given incentives for increasing CBI, central bank reform should be easier the stronger the president is. The strength of presidential powers refers not only to the president's legislative capacities, but also to his increased bargaining leverage when making use (or threatening to use) his veto powers over other legislation (Nielson 2003; Shugart and Mainwaring 1997; Shugart and Carey 1992). Other things held constant, (institutionally) stronger presidents should be more likely to make their preferences prevail in the decision-making process (Cameron 2000; McCarty 1997, 2000a, 2000b).

This is consistent with the idea that strong presidentialism “frees” the presidents from their legislative copartisans promoting “policy switching” (Samuels and Shugart 2003).⁸⁸ In other words, other things being equal (and particularly, controlling for partisanship), it should be easier for strong presidents to accommodate to international pressures for CBI.

Hypothesis 7 (Congress's capacity). *Central bank reform is more likely the less effective the legislature is.*

Other things being equal, more professional legislatures are more likely to operate as a true interlocutor in the inter-institutional bargaining and to make reform more costly. Information and incentive reasons justify this hypothesis. Regarding informational reasons, monetary policy is one of the most technical matters that legislatures deal with. Understanding the implications of central bank institutional designs demands either professional legislators or a developed committee system able to analyze proposals for reform and to present eventual alternatives to it. I argue that a professional legislature is more able to identify the possible implications of different institutional features of the central bank and predict their distributive consequences. I claim that, other things being equal, the more professional the legislature is, the more likely it is to become a true actor in

⁸⁸ This also implies that the president's preferences become crucial to explaining CBI.

the inter-institutional bargaining for reform, making central bank reform more difficult. On the contrary, the less professional the congress is, the least able it is to identify the possible implications of different characteristics of central banks and their impact on policy, and to resist or propose alternatives to the president's proposals. Lack of professionalization is likely to hinder the congress's efficiency, that is, its ability to resist proposals from the president. Therefore, central bank reform should be easier the lower the professionalization (and consequently, the efficiency) of the legislature. Note that I do not imply that a more professional legislature will be necessarily against central bank reform, but that holding preferences constant, as the professionalization of the legislature increases, the congress will be able to discuss particularities surrounding the central bank's institutional design, possibly delaying the response to international demands.

Second, the literature suggests that in countries with more developed committee systems, representatives that belong to different committees are identified and eventually punished selectively by voters (McGarrity 2005).⁸⁹ Therefore, public scrutiny should give members of committees dealing with monetary matters additional incentives to carefully analyze and discuss the distributional consequences of central bank reform. This could provide additional obstacles to a rapid response to demands for increasing CBI.

A final note on variation in the capacity or professionalization of the legislatures or in the quality of the committee systems: the professionalization of legislatures or the quality of committee systems can vary across time within countries. In strict sense, constitutional reforms and even some practices⁹⁰ can also modify the strength of presidential powers. My intuition, however, is that changes in the legislatures' professionalization are relatively slow and can be better understood by

⁸⁹ McGarrity finds that the electoral impact of economic conditions on representatives that belong to the president's political party varies by committee. In particular, members of committees that manage money are among the most sensitive to economic fluctuations (McGarrity 2005).

⁹⁰ Like the executive's reliance on delegated decree authority, or the lack of challenge of the use of decrees by the executive power.

exploring the cross-national variance. Fortunately, statistical techniques allow us to distinguish both effects. The empirical analysis will shed light on whether the most important variance of the professionalization is between or within countries.

3.2.5.4 Variation within presidential systems

Hypothesis 8 (preference distance). *Central bank reform is less likely the more distant the president's and the congress's preferences are.*

I assume that in countries needing capital, the president is the most interested actor in promoting CBI because the president's survival is more likely to be threatened by the poor economic conditions. If the president promotes an institutional reform, it seems reasonable to think that, other things being equal, the reform should be more costly under divided government than under unified government (Negretto 2004).⁹¹ Reform should also be more difficult the more ideologically distant the two branches are. Different sets of preferences in the executive and in the legislative branches may demand a more costly bargaining, reducing the elasticity of the country's response to international incentives for central bank reform.

The impact of divided government on the executive has been extensively studied, including areas where international pressures or audiences play a role, such as in trade policy (Lohmann and O'Halloran 1994). The focus here is not the way in which divided government might affect credibility, nor the length of the authority delegated to the central bank, but on how divided government delays or even reduces the likelihood of central bank reform. Note that, although hypothesis 8 is grounded in the cost of the inter-institutional bargaining, it is consistent with findings in the American politics literature. For example, Epstein and O'Halloran (1996) predict that under

⁹¹ Cox and Morgenstern argue that divided government conditions the effect of presidential powers: Presidential powers play a matter when the president does not have vast support in congress, but are less relevant under unified government (Cox and Morgenstern 2002).

divided government, the Congress delegates less discretionary authority. Although the impact of ideological distance between the two branches of government on the likelihood of central bank reform is intuitively reasonable, it has not been empirically tested yet.

Hypothesis 9 (Preference distance and Congress's capacity). *Preference distance reduces the likelihood of central bank reform more in effective than in non-effective legislatures*

I argue that the magnitude of the burden that preference distance might impose on negotiations over monetary policy is conditional on the capacity of the legislature. For example, in cases of divided government, the obstacles imposed to a rapid reform of the central bank will be higher the more professional the legislature is. Stated differently, professional legislatures that oppose the executive may find inter-institutional bargaining even more difficult than professional legislatures where the president's party has the majority in congress, or when the parties in congress are ideologically more distant from the president's ideology. This expectation is consistent with Volden's conditional answer on the effect of divided government on bureaucratic discretion. He states that for highly professional legislatures, divided government is associated with a restriction in bureaucratic discretion, whereas the reverse is true for less professional legislatures (Volden 2002). Therefore, and following Volden (2002), I expect the effect of divided government to be conditional on the degree of professionalization of the legislatures.

Table 3.1. Summary of hypotheses

		Hypotheses	Independent variables	Expectations
Level 1. International incentives	<i>Signal supply</i>	<i>1. Growth problems</i> Developing countries with growth problems will increase CBI to attract foreign investment.	Growth problems	(+)
		<i>2. Need for FDI</i> Developing countries with growth problems that are losing FDI will increase CBI to attract foreign investment.	Growth problems*FDI decrease	(+)
		<i>3. Need for credit</i> Developing countries with growth problems that highly indebted will increase CBI to obtain loans.	Growth problems *Debt	(+)
	<i>Signal credibility</i>	<i>4. Sunk costs</i> Developing countries with higher levels of CBI are less likely to increase their CBI.	CBI _{t-1}	(-)
		<i>5. Audience costs</i> Democracies are more likely to use CBI as a signal than are autocracies.	Democracy	(+)
Level 2. Domestic institutional hurdles	<i>Elasticity of the signal supply</i>	<i>6. Presidential powers</i> Central bank reform is more likely the stronger the presidential powers are.	Presidential powers	(+)
		<i>7. Congress's capacity</i> Central bank reform is more likely the less effective the legislature is.	Legislative effectiveness	(-)
		<i>8. Preferences distance</i> Central bank reform is less likely under divided government.	Divided government	(-)
		<i>9. Preferences distance and Congress's capacity</i> Divided government reduces the likelihood of central bank reform more in effective than in non-effective legislatures.	Divided government* Legislative effectiveness	(-)

3.2.5.5 Other domestic incentives

There are a series of other factors that can affect the elasticity of governments' responses to incentives to reform their central banks. In the next paragraphs, I explain why although they are not necessary parts of my theory, I will include some of them in the empirical analysis.

In order to retain office, politicians need to please their constituencies. They not only need capital to have a healthy economy, but they also need to consider the distributional consequences of their decisions, and these decisions' impact on their constituencies. The association between partisanship and macroeconomic preferences (Alvarez, Garrett and Lange 1991) may affect the decision of reforming the central bank. *Partisanship* has been shown to affect monetary policy choices (Bearce 2003). Whereas rightist governments tend to prioritize inflation control, leftist governments tend to prioritize employment. Therefore, one could expect center-right governments to be more likely to increase CBI, or to be quicker in responding to demands for higher CBI. However, if the argument is about the need of CBI as a signal and its credibility, it is possible that (1) left-leaning governments find more necessary to increase CBI, and (2) for CBI to be a more credible signal when it comes from center-leftist governments, because it should be more costly. Since both forces may be at work, I do not have *a priori* expectations regarding the effect of partisanship on central bank reform.

Some scholars have explained monetary policy choices based on the relative importance of societal groups (Frieden 1991, 2002). Alvarez *et al.* argue that the ability of governments to further their partisan interests and simultaneously obtain macroeconomic outcomes that grant them reelection is dependent on the organization of the domestic economy, particularly the labor movement (Alvarez, Garrett and Lange 1991). Therefore, union strength emerges from the literature as one important control (Garrett and Lange 1995; Scruggs and Lange 2002). Similar arguments are made regarding the importance of the financial sector in the economy (Posen 1995).

The importance and organization of societal groups tends to be a relatively stable characteristic within countries, providing interesting avenues to explore differences between countries. My argument states that incumbents will reform central banks in spite of their preferences, that arguably include favoring or hurting sectoral preferences.

The fact that the second level of my theory is restricted to presidential systems is not an obstacle to recognize empirical evidence regarding the impact of territorial VPs. Federalism has been shown to affect monetary policies and institutions (Broz 1998; Hallerberg 2002), and the permeability of countries to foreign demands or pressures (Deeg and Lütz 2000). Furthermore, federalism has been shown to affect the levels of CBI and credibility of independent central banks (Banaian, Laney and Willett 1983; Lohmann 1998). Note, however, that Bernhard contends that this observed association between federalism and CBI reflects “the potential for intraparty conflicts over monetary policy” (Bernhard 2002:73). Federalism is probably the stickiest characteristic of countries, that may explain differences between countries, but it is not likely to explain dynamics within countries. However, it may have an impact on the cost of the increasing CBI or in the elasticity to reform the central bank. As with other variables that generate contradictory expectations and are not at the core of my theory, federalism is included as another control in the empirical analysis.

Timing is another factor that may have an effect on the incumbent’s decision to rely on CBI in order to attract capital, and on the complications in obtaining the reform of the central bank. The moment during the president’s tenure when the need for capital is observed or the reform of the central bank is attempted may affect the likelihood of observing a central bank reform. On the one hand, it is possible that presidents attempt to reform their central banks at the beginning of their tenure, because they would have the time to enjoy the benefits of CBI (Ames 1987:4). On the other hand, the vulnerability of incumbents seems to be higher before elections. Furthermore, Ames

suggests the existence of a U-shaped relationship between survival concern and tenure, since leaders' concern for their own survival should be greatest "*just before and just after elections*" (Ames 1987:13, emphasis added). I do not have expectations regarding the effect of timing on the likelihood of observing central bank reforms. However, given that presidential systems are characterized by fixed terms, this becomes an empirical question to be addressed in Chapter 5.

3.2.6 Alternative hypotheses

3.2.6.1 Inflation

Alternative hypothesis 1 (inflation). *Countries with inflation problems will increase CBI*

The macroeconomic literature conceives of CBI as a mere commitment device to solve the time-inconsistency problem and, therefore, curb inflationary pressures. If this literature is correct, one should observe increases in CBI after periods of high inflation (de Haan and Van't Hag 1995).⁹² In other words, changes in CBI should be directly related to previous levels of inflation.

3.2.6.2 Tying hands

Alternative hypothesis 2 (tying hands). *Conservative governments that will be replaced by less conservative ones will increase CBI to tie the successor's hands*

There is a different side of the idea of tying hands. My theory suggests that governments may tie their own hands to show commitment to a set of economic and monetary policies. Other scholars, however, have suggested that incumbents would increase CBI not to show their own commitment, but to generate costs to future incumbents in case they had different monetary

⁹² De Haan and Van't Hag found some support for the idea that high inflation between 1900 and 1940 was followed by greater CBI (de Haan and Van't Hag 1995). However, Forder points out that they do not discuss to what extent this result was influenced by the German case (Forder 2005:845).

preferences. That is Boylan's argument regarding the central bank reform conducted by Pinochet (Boylan 1998). On the contrary, leaders "who expect that their party will be in office for a long period of time will want to maintain a high degree of freedom" (Goodman 1991:333). If this argument were the main determinant of CBI, one should observe more central bank reforms, associated with changes in the political parties that are in power (Goodman 1991), and with transitions between autocracies and democracies (Boylan 1998).

3.2.6.3 Diffusion: Learning and emulation

Alternative hypothesis 3 (diffusion). Countries are more likely to increase their CBI following other countries that have already increased theirs

Learning and diffusion are alternative explanations for CBI. Regarding learning, it is possible that countries do not respond to financial incentives, but that they are imitating institutional arrangements established by other countries (Polillo and Guillén 2005). Based on two alternative channels of learning (Simmons and Elkins 2004), one could expect (1) learning from successful experiences, or (2) learning from "peers." In the first case, one should expect countries to imitate measures adopted for the world leaders. In the second case, one should expect countries that share some characteristics (for example, institutions, wealth, or inflation), to be more likely to adopt CBI as the proportion of countries with CBI in its own "group" increases.

Neither of these two alternatives (learning from successful experiences, or learning from peers) explains the incentives for the first countries in such "groups" to delegate authority to central banks, or the differences in timing and levels of delegation to central banks.

3.3 FINAL REMARKS

In this dissertation, I examine the determinants of CBI in presidential systems. However, my analysis starts by providing a unifying framework for understanding under what circumstances international incentives for CBI prevail over domestic incentives. This explanation helps integrating previous explanations that worked either for developed countries, or for parliamentary systems but that may not apply to developed countries. The integration of the domestic institutional hurdles to the theory provides a complete explanation of central bank reform in presidential systems: an explanation of both the origin of the incentives, the circumstances under which they are more pressing, and the determinants of the elasticity of the country's response to them.

My theory therefore integrates two components: an explanation of which international factors matter and under what circumstances, and an explanation of how domestic institutions condition the response to international incentives for CBI. Although I intend to explain CBI and central bank reform, this theory can be applied to other areas of policy where governments face international incentives to introduce policy or institutional reforms.

4.0 INTERNATIONAL DETERMINANTS OF CENTRAL BANK INDEPENDENCE

4.1 INTRODUCTION

In the previous chapter, I argued that CBI in developing countries is the product of vulnerable governments trying to attract foreign investors and creditors. On the demand side for CBI, investors and lenders prefer countries where the profitability of their investments or loans is not at risk of sudden decisions, other things held constant. If the owners of capital cannot rely on a country's reputation to ensure that said risk is small, they will use other pieces of information that credibly signal the government's commitment to providing a stable economic environment. There are indications that capital owners demand CBI from developing countries as a signal of commitment to sound economic policy. I have not found similar indications regarding developed countries.

Focusing on the supply side, I assume that the level of CBI represents an equilibrium solution for conflicting interests regarding the governance of monetary policy. This equilibrium will be altered when incumbents perceive the need for capital. I claim incumbents perceive the need for capital when two conditions appear: (1) when poor economic performance threatens the incumbent's survival, and (2) when the loss of FDI or high levels of indebtedness alert incumbents about the need to attract foreign investors or lenders. If vulnerable incumbents cannot rely on the

country's reputation to attract capital, they will engage in reforms that might attract foreign investors or creditors. Particularly, they will delegate monetary policy to their central banks.

This chapter presents an empirical test of the first set of hypotheses derived from that argument (see Table 4.1)

Table 4.1. Summary of hypotheses. International determinants of CBI

	Hypotheses
<i>Signal supply</i>	<p>1. <i>Growth problems</i> Developing countries with growth problems will increase CBI to attract foreign investment.</p>
	<p>2. <i>Need for FDI</i> 2.1. Developing countries that are losing FDI will increase CBI to attract foreign investment. 2.2. Developing countries with growth problems that are losing FDI will increase CBI to attract foreign investment.</p>
	<p>3. <i>Need for credit</i> 3.1. Developing countries that highly indebted will increase CBI to obtain loans. 3.2. Developing countries with growth problems that highly indebted will increase CBI to obtain loans.</p>
<i>Signal credibility</i>	<p>4. <i>Sunk costs</i> Developing countries with higher levels of CBI are less likely to reform their central banks.</p>
	<p>5. <i>Audience costs</i> Democracies are more likely to use CBI as a signal than are autocracies.</p>

4.2 EMPIRICAL EVIDENCE

4.2.1 Baseline model and description of variables

In order to test the hypotheses derived from the theory, I run the following baseline model:

$$\Delta CBI_{it} = \beta_0 + \beta_1 GROWTH_{it-1} + \beta_2 \Delta FDI_{it-1} + \beta_3 \Delta FDI_{it-1} * GROWTH_{it-1} + \beta_4 DEBT_{it} + \beta_5 DEBT_{it-1} * GROWTH_{it-1} + \beta_6 CBI_{it-1} + \beta_7 DEMOCRACY_{it-1} + \sum \beta_n CONTROL\ VARIABLES + \varepsilon$$

The dependent variable is *Change in Central Bank Independence* (ΔCBI_{it}). ΔCBI_{it} measures the change in the level of CBI between the previous year, and the year under analysis. CBI is measured using Cukierman's index of *legal* CBI. I use this de jure measure for several reasons. First, a measure of statutory CBI allows collecting comparable cross-sectional data across time. These data allow looking for systematic differences across observations. Second, and more importantly, *I attempt to explain the institutional choice: to what extent the government gives independence to the central bank*. Therefore, a measure of the statutory CBI best reflects the phenomenon I am trying to explain. Third, in spite of objections against de jure measures of CBI,⁹³ most empirical studies using CBI as dependent or independent variable base their measures of CBI on central banks statutes (Alesina 1988; Alesina, Mirrlees and Neumann 1989; Cukierman 1992; Grilli, Masciandaro and Tabellini 1991).⁹⁴ Finally,

⁹³ Measures based on statutes have been criticized because laws do not contemplate every single contingency that might affect the relations between the central bank and the government. Furthermore, deviations from the law are not infrequent. Even independent central banks can be influenced by the government's appointments and threats to the bank's independence (Balke 1991; Beck 1982; Havrilesky 1988; Lohmann 1998; Weintraub 1978; Wooley 1984). Taking that to an extreme, other scholars attribute the behavior of the central banks to "the accident of personalities" (Goodhart 1989:295).

⁹⁴ Some scholars have used measures of *de facto* CBI, based on questionnaires (Beblavy 2003; Blinder 2000; Cukierman, Webb and Neyapti 1992; Fry, Goodhart and Almeida 1996) or in the turnout rate (TOR) of central bankers (Cukierman and Webb 1995; Cukierman, Webb and Neyapti 1992; de Haan and Siermann 1996). However, questionnaires may not be the most reliable measure of central bank, particularly because of problems with cross-sectional comparability. Furthermore, they are not available for many country/years. Regarding the use of the TOR, Cukierman and others found the TOR to be a predictor of inflation in developing countries. However, other studies

Cukierman's index is preferred over other available measures of CBI (Alesina, Mirrlees and Neumann 1989; Grilli, Masciandaro and Tabellini 1991) because it has more cross-sectional and historical coverage. Since it has been widely used, it allows for reliability checks.

Cukierman, Webb, and Neyapti coded 16 (written) legal characteristics related to four components of CBI (Cukierman, Webb and Neyapti 1992): (a) CEO variables (appointment, dismissal, and term of office of the chief executive officer of the bank); (b) Policy formulation variables (who formulates and has the final decision in monetary policy, and the role of the central bank in the budget process); (c) Objectives of the central bank; (d) Limitation on lending variables (restrictions on the ability of the central bank to lend to the public sector). The 16 elements are measured and the components are weighted into a single index. CBI_{it} ranges from 0 (lowest) to 1 (highest) CBI. My dataset extends previous coding (Crowe and Meade 2007; Cukierman, Miller and Neyapti 2002; Cukierman, Webb and Neyapti 1992; Polillo and Guillén 2005), based on central banks' legislations. Cukierman *et al.* have coded CBI in 72 countries by decade (Cukierman, Webb and Neyapti 1992), and in 26 former socialist economies before and after the dissolution of the Soviet Union (Cukierman, Miller and Neyapti 2002). Polillo and Guillen (2005) built a time-series cross-sectional dataset for 71 countries, for the period 1990-2000, and Crowe and Meade (2007) coded CBI for 1989 and 2003. I extended the dataset, covering all the countries that have been coded by these authors (in order to perform reliability tests)⁹⁵ from 1970 to 2008. The dataset includes 5,278 country-year observations on central bank reform, and 3,369 country-year observations with scores for all the components of the Cukierman *et al.*'s index.

have challenged this finding because of endogeneity (Dreher, Sturm and de Haan 2008): central bankers that are unsuccessful in controlling inflation are replaced more often.

For a complete review of different measures of CBI, see Laurens, Arnone and Segalotto (2009).

⁹⁵ I have compared my coding with other works that measure legal CBI (Arnone, Laurens and Segalotto 2006; Jácome 2001; Jácome and Vázquez 2008; Polillo and Guillén 2005), and documented differences in coding.

ΔCBI is preferred over two alternative possibilities: the use of a dichotomous variable indicating reform, and the use of CBI in the left-hand side, and lagged CBI in the right-hand side. Although the use of dichotomous variables indicating the existence of a central bank reform in a given year or the direction of the reform (CBI increase or decrease) allows to include more observations, it does not provide information on the magnitude of the changes. ΔCBI provides more nuanced information not only about the direction, but also about the magnitude of the changes in CBI . The second disadvantage that the use of dichotomous variables presents refers to the methods available to analyze this kind of limited dependent variable. Whereas the analysis of dichotomous variables can include either fixed or random effects, there are statistical methods to deal with continuous variables that account for the presence of fixed and random effects.⁹⁶

Another alternative would be to use the level of CBI as dependent variable, and to include a lagged variable in the right hand side.⁹⁷ Although this specification would allow using compromise models that take care of both fixed and random effects, my theory suggest the need to include the previous level of CBI as a measure of sunk costs (hypothesis 4). This alternative specification would not allow testing hypothesis 4, as operationalized below, and could introduce bias and inconsistency in the results (Baltagi 2005:135).

Low or negative rates of growth are clear indications for politicians that the country needs capital. $Growth_{it}$ indicates the GDP growth in a country in the year under consideration. The source for this variable is the World Development Indicators (World Bank 2009). I expect a negative relationship between $Growth$ and CBI .

⁹⁶ See below.

⁹⁷ The reasoning is the following:

$$\begin{aligned}
 \Delta CBI_{it} &= \beta_0 + \sum \beta_k \text{ INDEPENDENT VARIABLES} + \sum \beta_n \text{ CONTROL VARIABLES} + \epsilon \\
 CBI_{it} - CBI_{it-1} &= \beta_0 + \sum \beta_k \text{ INDEPENDENT VARIABLES} + \sum \beta_n \text{ CONTROL VARIABLES} + \epsilon \\
 CBI_{it} &= \beta_0 + \sum \beta_k \text{ INDEPENDENT VARIABLES} + CBI_{it-1} + \sum \beta_n \text{ CONTROL VARIABLES} + \epsilon
 \end{aligned}$$

$FDI/GDP\ change_{it}$ is the difference in the ratio foreign direct investment to GDP received by a country in a given year, with respect to the previous year. The source of the data is the World Development Indicators (World Bank 2009).

According to the World Bank, total external debt is “debt owed to nonresidents repayable in foreign currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt” (World Bank 2009). Debt is measured in three ways. First, $Debt/GDP_{it}$ measures foreign debt as a percentage of GDP. Second, $Change\ in\ Debt/GDP_{it}$ ($\Delta Debt/GDP_{it}$) measures the change in the ratio debt/GDP between the previous and the current year. Data on debt and GDP are taken from the World Bank (2009). Finally, $IMF\ use$ represents “the sum of (1) the use of Fund credit within the GRA and (2) outstanding loans under the SAF, PRGF, and the Trust Fund” (International Monetary Fund 2009). The data is taken from the IMF, using the variable “Total Fund credit and loans outstanding” (series .2tl), in hundred millions of SDR (Special Drawing Rights).

To test the sunk cost hypothesis, I include a lagged measure of the level of CBI (CBI_{it-1}). As stated in hypothesis 4, I expect a negative relationship between previous levels of CBI and increases in CBI. Finally, in order to test the audience cost hypothesis, the models include *Democracy*. *Democracy* is measured using the Polity2 variable from the Polity IV project (Marshall and Jaggers 2008). Polity2 is a 21-point combined index of regime, ranging from 10 for a highly democratic country to -10 for a highly autocratic state (Marshall and Jaggers 2007).⁹⁸ I expect more democratic states to be more prone to use increases in CBI as a signal to foreign actors.

I include a series of controls for economic factors. I control for previous levels of inflation. $Inflation_{it}$ shows the log of the rate of price change in the economy as a whole. The World Bank is the source of these data. Peg_{it} controls for the de facto exchange rate regime, following Reinhard and

⁹⁸ For rules of coding, see the Polity IV User’s Manual (Marshall and Jaggers 2007).

Rogoff's coarse classification. Peg_{it} is a dichotomous variable that equals 1 when there is no separate legal tender, when there is a pre-announced peg or currency board arrangement, when there is a pre-announced horizontal band that is narrower than or equal to $\pm 2\%$, or when there is a de facto peg (Reinhart and Rogoff 2004). The source of this data is Reinhart and Rogoff updated chronology. I also control for financial openness. $Capital\ Openness_{it}$ is Chinn and Ito's index measuring the extensity of capital controls based on the information from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (Chinn and Ito 2008). Finally, $OECD$ is a dichotomous variable that equals 1 if the country is a member of the OECD in the year under consideration. I exclude Mexico, who has a value of zero in this variable.⁹⁹

In these models, I control for the following political factors: $Right_{it}$ reflects the partisanship of the executive. It is coded 1 when the EXECRLC item in the DPI dataset equals 1, and zero otherwise (Beck *et al.* 2001; Beck, Keefer and Clarke 2008; Keefer 2007). To control for institutional veto points, as suggested by Hallerberg (2002), I include $Presidential$, coded as 1 if the country is a presidential system, and 0 otherwise (Norris 2008); and $Federal$, coded 1 if the country is federal, and 0 otherwise.

To control for diffusion, I include different variables reflecting the levels of CBI and the number of central bank reforms in other countries. $\Delta CBI\ World_{it}$ is the average of ΔCBI in the world, weighted by the inverse of the distance following the formula:

$$\Delta CBI\ World_{it} = \sum_n^1 \Delta CBI_n (1/d)]\} / n,$$

⁹⁹ Although Mexico was incorporated to the OECD in 1993, it did not have the same level of economic development as other members of the OECD. Because this variable is used as a proxy for development and will also be used to split the sample between developed and developing countries, Mexico is coded as developing country for all the years under study. That being said, coding Mexico as OECD country does not change the results presented in Chapter 4. The inclusion of Mexico in models run on samples of developing countries does not alter the results, but enhances the statistical fit of the models.

where n indicates all the countries in the world in that year (except i), and d the distance between country i 's and n 's capitols. It is possible that diffusion among neighbors is more significant than world diffusion. Therefore, I create variables reflecting the average of Δ CBI in country i 's neighbors. I use two criteria to select the neighbors included in the calculations, based on different criteria of contiguity used in the Version 3.0 of the Correlates of War Direct Contiguity dataset (Stinnett *et al.* 2002): Δ CBI $Neigh3_{it}$ averages CBI in neighboring the countries that are connected by land boundary or a river, and countries that are separated by less than 24 miles of water. Δ CBI $Neigh4_{it}$ extends water contiguity to 150 miles. The data on contiguity was obtained using the Eugene software (Bennett and Stam 2000). The same procedure is used to build variables reflecting not the change in CBI, but the level of CBI in a given year. I created $CBI World_{it}$, $CBI Neigh3_{it}$ and $CBI Neigh4_{it}$ following the same procedure. Finally, to control for the number of central bank reforms (independently from the general level of CBI or the magnitude of the reform) $Sumreform_World$, $Sumreform_n3$ and $Sumreform_n4$ are counts of the number of central bank reforms in the world and among neighbors, using contiguity 3 and 4, respectively. Finally, I also include regional dummies, and $Year count$, used to de-trend the data.

Table 4.2. summarizes the hypotheses, main independent variables and expectations.

4.2.1.1 Sample and unit of analysis

For the statistical analyses, the unit of analysis is country-year. I coded CBI for all the countries where data was available, for the period 1973 (end of the Bretton Woods system) to 2008. Some model specifications restrict the number of observations that can be used for the statistical analyses. For descriptive statistics, see Table 4.3.

Table 4.2. Summary of hypotheses, independent variables, and expectations

	Hypotheses	Independent variables	Expectations
<i>Signal supply</i>	<p>1. <i>Growth problems</i> Developing countries with growth problems will increase CBI to attract foreign investment.</p>	growth problems	(+)
	<p>2. <i>Need for FDI</i> 2.1. Developing countries that are losing FDI will increase CBI to attract foreign investment.</p>	FDI decrease	(+)
	<p>2.2. Developing countries with growth problems that are losing FDI will increase CBI to attract foreign investment.</p>	growth problems*FDI decrease	(+)
	<p>3. <i>Need for credit</i> 3.1. Developing countries that highly indebted will increase CBI to obtain loans.</p>	debt	(+)
	<p>3.2. Developing countries with growth problems that highly indebted will increase CBI to obtain loans.</p>	growth problems*debt	(+)
<i>Signal credibility</i>	<p>4. <i>Sunk costs</i> Developing countries with higher levels of CBI are less likely to reform their central banks.</p>	CBI _{t-1}	(-)
	<p>5. <i>Audience costs</i> Democracies are more likely to use CBI as a signal than are autocracies.</p>	democracy	(+)

Table 4.3. Descriptive statistics (full sample)

Variable	Obs	Mean	Std. Dev.	Min	Max
ΔCBI	3131	.0068854	.051456	-.4349186	.63
Growth_{t-1}	2962	3.480358	5.62345	-44.9	85.9
ΔFDI/GDP_{t-1}	2624	349.026	9.870739	.8773804	579.2792
Debt/GDP_{t-1}	4413	63.69458	77.56738	0	1598.203
Debt/GDP change_{t-1}	2247	.7102247	20.66404	-328.3164	625.7666
IMF use_{t-1}	3145	3.000794	12.12237	0	190.565
CBI_{t-1}	3134	.4472432	.1954664	.09	.9754902
Democracy_{t-1}	2800	3.298214	7.21348	-10	10
Inflation (log)_{t-1}	2828	2.24301	1.494425	-3.498345	10.19474
Peg_{t-1}	3175	.2251969	.4177777	0	1
Capital Openness_{t-1}	2675	.3715443	1.618432	-1.797522	2.539847
Presidential	3176	.2279597	.4195825	0	1
Federal	3176	.6335013	.4819238	0	1
Right_{t-1}	2852	.3025947	.4594618	0	1
ΔCBI world_{t-1}	3174	3.77e-06	9.13e-06	-.0000403	.0001437
Year count	3176	19.25031	10.2806	0	35
OECD	3176	.2833753	.450708	0	1
Africa	3176	.1278338	.3339572	0	1
Asia	3176	.1725441	.3779121	0	1
N.America	3176	.02267	.1488727	0	1
W.Europe	3176	.1564861	.3633728	0	1
C.Europe	3176	.1675063	.3734861	0	1
Scandinavia	3176	.0566751	.2312571	0	1
M.East	3176	.1013854	.3018859	0	1
Euro	3176	.0380982	.1914636	0	1

4.2.2 Statistical analysis

The panel nature of the data imposes some restrictions to the analysis. A series of Hausman tests suggest that fixed-effects models are preferable over the random-effects models.¹⁰⁰ However, fixed effects models do not allow to include time invariant variables that are theoretically relevant. Therefore, I estimate the models through panel fixed effects regressions with vector decomposition (FEVD). FEVD estimates the models in three stages. First, a fixed effects model computes the unit-effects. Second, the unit-effects vector is decomposed into what is explained by the time-invariant variables included in the model, and the unexplained or residual variance (η). Finally, the model is re-estimated as pooled OLS, including all the variables and η (Plümper and Troeger 2007). In this way, FEVD models capture the unit-effects in a more sophisticated way than regular fixed effects, since they include relevant variables instead of dummies, and they still control for unexplained unit-effects.

Wooldridge tests suggest the presence of first order autocorrelation in the panel. Therefore, the models include AR1 Prais-Winsten transformations to correct for autocorrelation.

4.2.3 The baseline model for developed and developing countries

I first run the baseline model on the full sample, including both developed and developing countries, and democracies and non-democracies. The purpose of this analysis is to provide evidence about a distinctive behavior of developing countries and to provide justification to the restriction of the

¹⁰⁰ The chi-square of the Hausman tests are high (>131) and they are significant at a .0001 level; therefore, I can reject the null hypothesis stating that the difference in the coefficient is not systematic (that is, stating that the difference is random). This suggests that the fixed-effects models are preferable over the random-effects models.

hypothesized relationship to developing countries. The results for the baseline model are presented in Table 4.4.

Models 1a, 1b and 1c differ only in how debt is measured. Whereas in Model 1a debt is measured as a proportion of GDP, in Model 1b it is measured as the change in debt/GDP, and in Model 1c it is restricted to the use of IMF credit.¹⁰¹ The informational criteria suggest that Model 1c has the best statistical fit (see Hox 2002:45; Wang and Liu 2006). Therefore, the substantive interpretation is based on Model 1c. Note however, that the direction and magnitude of the coefficients associated with the variables of interest do not change significantly across the three models. Changes in the levels of statistical significance for Debt when measured as *IMF use* can be attributed to the addition of more than 200 observations in Model 1c.

Since the models include the interaction of the main independent variables with *OECD*, the first set of coefficients and interactions should be interpreted as the effect of these independent variables on CBI in non-OECD countries plus Mexico, holding the other variables at zero. Two things become evident by looking at Table 4.4: First, for developing countries, the coefficients associated to the main independent variables are statistically significant and have the expected direction for in all the cases except for *Democracy_{t,t}*. Second, the direction of the coefficients is the opposite for developed and developing countries, providing some indication that the determinants of CBI in developed and developing countries either are not the same or do not work in the same way.

¹⁰¹ Note that the partial correlation between *Debt/GDP* and Δ *Debt/GDP* is .19, between *Debt/GDP* and *IMF use* is .014, and between Δ *Debt/GDP* and *IMF use* is .008.

Table 4.4. Determinants of *CBI change* for developed and developing countries
Panel Fixed Effects Regression with Vector Decomposition and AR1 Prais-Winsten Transformation.
Dependent variable: Change in CBI – Full sample

	Expectation	Model 1a	Model 1b	Model 1c
		(Debt= Debt/GDP)	(Debt= ΔDebt/GDP)	(Debt= IMF use)
		Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)
Growth _{t-1}	–	-.053 (.002)***	-.053 (.002)***	-.049 (.002)***
ΔFDI/GDP _{t-1}	–	-.003 (.0004)***	-.003 (.0004)***	-.003 (.0004)***
Growth _{t-1} *ΔFDI/GDP _{t-1}	+	.0002 (6.46e-06)***	.0002 (6.43e-06)***	.0001 (6.07e-06)***
Debt _{t-1}	+	-6.68e-07 (.00004)	.00004 (.00006)	.0006 (.0002)***
Growth _{t-1} * Debt _{t-1}	–	-0.00001 (7.47e-06)	-.00004 (.00002)**	-.0001 (.00003)***
CBI _{t-1}	–	-.176 (.016)***	-.169 (.016)***	-.160 (.015)***
Democracy _{t-1}	+	-0.0002 (.0004)	-0.0002 (.0004)	-0.0004 (.0004)
OECD		-1.028 (.006)***	-1.047 (.006)***	-.949 (.006)***
OECD* Growth _{t-1}		.018 (.009)**	.025 (.009)***	.014 (.007)*
OECD* ΔFDI/GDP _{t-1}		.003 (.0001)***	.003 (.00007)***	.003 (.0001)***
OECD* Growth _{t-1} *ΔFDI/GDP _{t-1}		-.00005 (.00003)**	-.00007 (.00003)***	-.00004 (.00002)*
OECD* Debt _{t-1}		-3.70e-06 (.0002)	-.001 (.0005)**	-.0005 (.00003)*
OECD* Growth _{t-1} * Debt _{t-1}		.00005 (.00005)	.00005 (.0001)	.0001 (.00004)**
OECD*CBI _{t-1}	–	.036 (.020)*	.023 (.020)	.036 (.019)**
OECD*Democracy _{t-1}	+	-0.0007 (.002)	-0.0009 (.002)	-0.0004 (.002)
Control variables				
<i>Economic</i>				
Inflation (log) _{t-1}		-0.003 (.002)	-.003 (.002)*	-0.002 (.001)
Peg _{t-1}		.010 (.005)**	.010 (.005)**	.010 (.004)***
Capital Openness _{t-1}		-0.00004 (.002)	-0.0003 (.002)	.0003 (.002)
<i>Political and institutional</i>				
Presidential		.008 (.004)*	.007 (.004)*	.006 (.004)
Federal		.004 (.003)	.005 (.003)	.007 (.003)***
Right _{t-1}		.005 (.004)	.005 (.004)	.003 (.003)
<i>Diffusion</i>				
ΔCBI world _{t-1}		786.519 (177.840)***	829.936 (178.458)***	646.092 (160.400)***

Table 4.4 (continued)

Expectation	Model 1a	Model 1b	Model 1c
	(Debt= Debt/GDP)	(Debt= ΔDebt/GDP)	(Debt= IMF use)
	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)
<i>Other controls</i>			
Year count	.002 <i>(.0003)***</i>	.002 <i>(.0003)***</i>	.002 <i>(.0002)***</i>
Africa	-.012 <i>(.005)***</i>	-.013 <i>(.005)***</i>	-.010 <i>(.004)**</i>
Asia	-.023 <i>(.005)***</i>	-.022 <i>(.005)***</i>	-.019 <i>(.005)***</i>
North America	-.014 <i>(.011)</i>	-.015 <i>(.011)</i>	-.005 <i>(.010)</i>
Western Europe	.007 <i>(.009)</i>	.011 <i>(.009)</i>	.007 <i>(.008)</i>
Ctral. & Eastern Europe	-.0001 <i>(.008)</i>	.0006 <i>(.008)</i>	.004 <i>(.007)</i>
Scandinavia	-.015 <i>(.010)*</i>	-.015 <i>(.010)</i>	-.014 <i>(.009)</i>
Middle East	-.010 <i>(.007)</i>	-.010 <i>(.007)</i>	-.010 <i>(.006)</i>
eta	.808 <i>(.048)***</i>	.853 <i>(.051)***</i>	.881 <i>(.053)***</i>
Intercept	1.107 <i>(.005)***</i>	1.105 <i>(.005)***</i>	.982 <i>(.005)***</i>
N	1600	1581	1837
Adj. R ²	.113	.120	.108
AIC	-4813.804	-4765.88	-5646.418
BIC	-4641.716	-4594.174	-5469.909

Notes: Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression. Standard errors are in italics. $\Delta FDI/GDP_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

The coefficient associated with *Growth* is negative and statistically significant, providing support to hypothesis 1. This means that in developing countries, each additional percent point increase in growth reduces the expected change in CBI by .05, holding other things constant. Conversely, and in line with the theory, a developing country that is experiencing growth problems is expected to increase its CBI by .05 points (in the 0-1 Cukierman index) per percent point decrease

in *Growth*. Given that the dependent variable is change on an index, a few examples provide a good grasp of the substantive impact of this coefficient. Figure 4.1 shows a histogram of the countries by their CBI score in 2007 in .05 increases. The figure makes apparent that a .05 change in the Cukierman's index is not trivial, but it allows us to distinguish between countries. Furthermore, a .05 increase in the CBI index represents the difference between a central bank in which the CEO's tenure is less than 4 years, and a central bank whose governor's tenure is 8 years or longer, potentially surviving more than one administration. A .05 increase also represent the distance between lack of limits on the executive for financing its budget, and a bank with strict limits to finance the public budget.

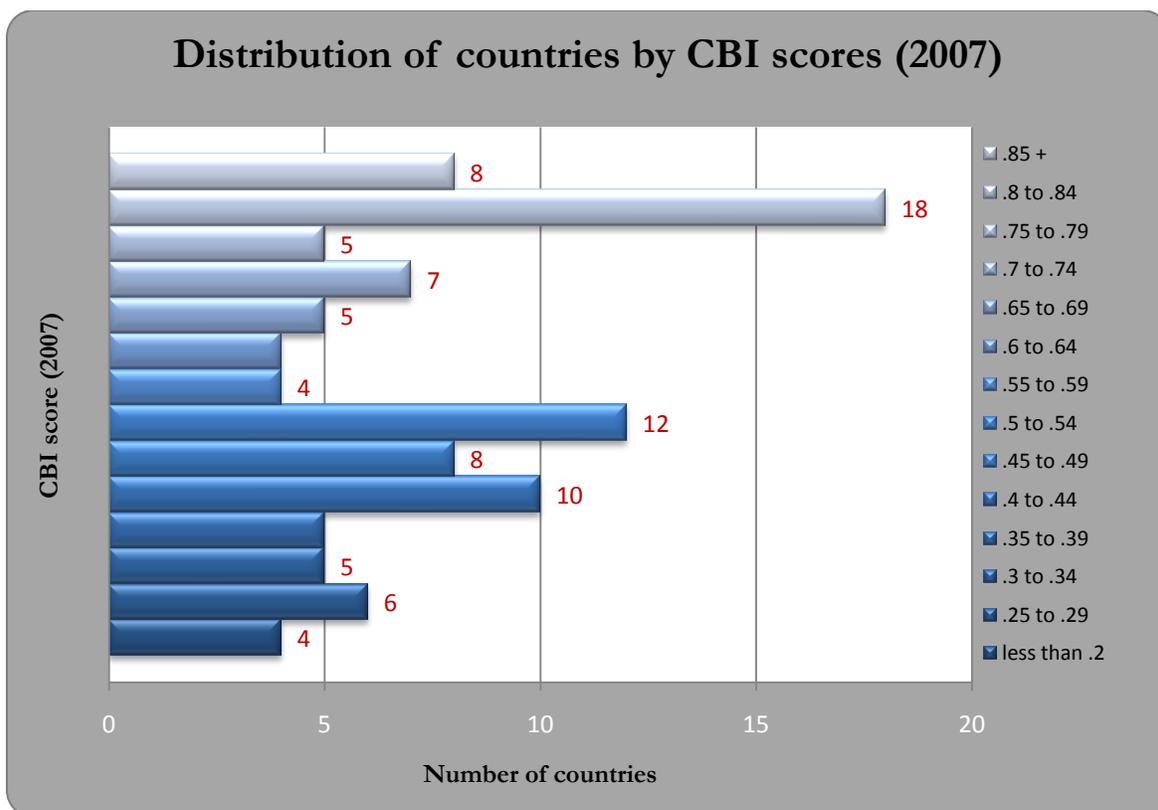


Figure 4.1. Number of countries by 2007 CBI score, in .05 increases

For developed countries, *Growth* achieves statistical significance in all the specifications. However, *Growth* has a positive sign for these countries. Model 1c suggests that one additional percent point increase in *Growth* increases the expected change in CBI by .014, holding other things constant.

In developing countries when the growth rate is zero, a one percent point drop in FDI/GDP is associated with a .003 increase in the expected level of CBI. However, and as the interaction term suggests, this impact varies at different levels of *Growth* (see Figure 4.2). Holding other things constant, in an economy growing at a 3.48% (the sample mean), a one percent point drop in FDI/GDP is associated with a .002 expected increase in the level of CBI. When *Growth* is negative (not a rare event, since 454 observations in the sample have experienced growth rates below 0), the impact of losing FDI gets magnified. For example, in a developing country experiencing 2.14% negative growth (the mean growth minus one standard deviation), a one percent point drop in FDI/GDP is associated with a .003 increase in the expected level of CBI (representing a 40% increase of the coefficient's magnitude). These results are consistent with the hypotheses 2.1 and 2.2. Note that the linear combination is statistically significant for developing countries when growth rates are below 14%.

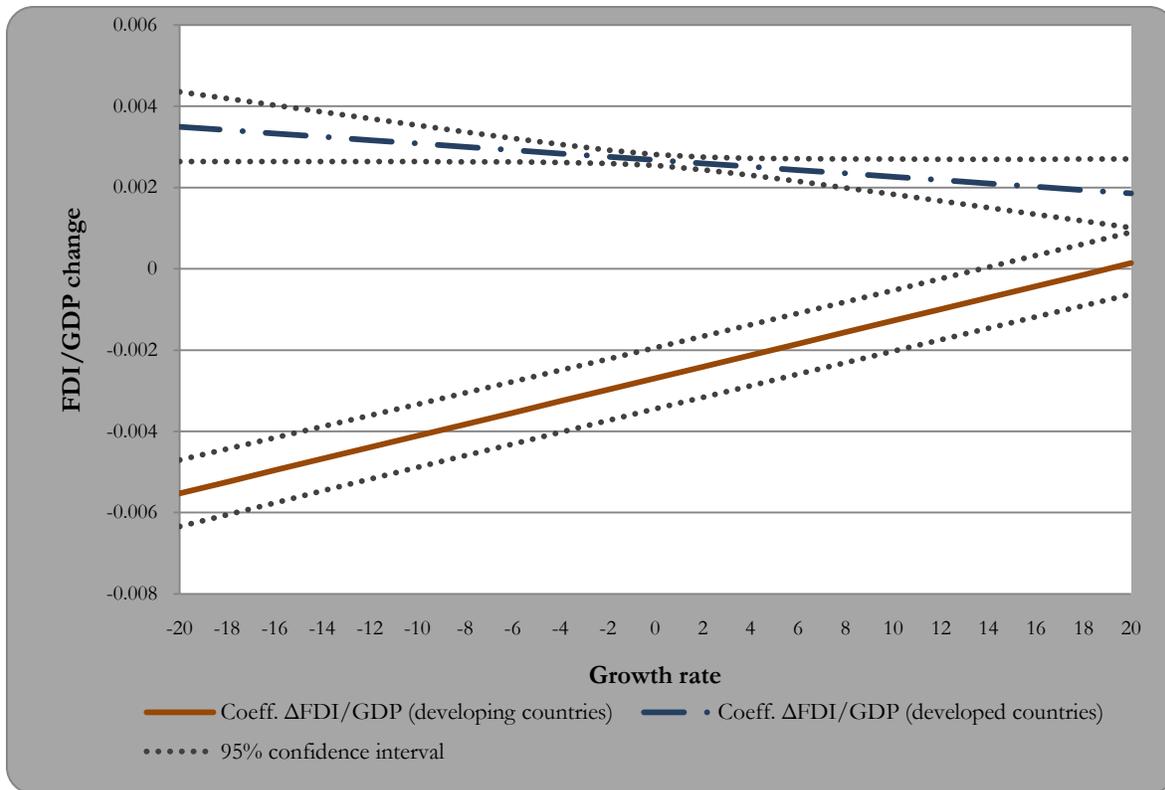


Figure 4.2. Change in CBI: Comparison of *FDI/GDP change* coefficients conditional on levels of *Growth* for developing and developed countries, 1973-2008.

Linear combination of coefficients estimated using *lincom* (Stata 10). Developing countries: $P < .001$ for all points in the slope when Growth rate $< 14\%$. Developed countries: $P < .001$ for all points in the slope

In developed countries, the coefficients associated with $\Delta FDI/GDP$ and with its interaction with *Growth* have the opposite signs. The linear combination of $\Delta FDI/GDP$ with *Growth* achieves statistical significance at all levels of *Growth*, and is shown in Figure 4.2 with a dotted line. Holding other things constant, in an economy growing at a 3.48% (the sample mean), a one percent point drop in the FDI/GDP ratio is associated with .0025 expected *decrease* in the level of CBI. A developed country experiencing 2.14% negative growth would be expected to decrease its CBI by .0028.

The contrast between the impact of $\Delta FDI/GDP$ on *CBI Change* for both developed and developing countries is clear when both curves are plotted in the same graph (see Figure 4.2). Not

only the coefficients are positive for developed countries, whereas they are negative for developing countries that experience growth rates below 14%,¹⁰² but the interaction also shows that the impact of *Growth* is the opposite for both groups of countries, that is, the slope is positive for developing countries and negative for developed countries.

The impact of *Debt/GDP change* on CBI in developing countries is positive, as hypothesized, but does not achieve statistical significance in all specifications. It is particularly robust when debt is measured as use of the IMF credit. The linear combination of the coefficients associated with *Debt (IMF use)* and the interaction term is significant at certain levels of *Growth*. For developing countries, the impact of Debt on the expected change in CBI is statistically significant when $Growth \leq 4$ and when $Growth > 13$ (see Figure 4.3). Whereas the coefficient associated with Debt is positive for developing countries growing at an annual rate below 4%, the coefficient is negative if developing countries are growing at an annual rate above 14%. For example, and holding all the other variables at zero, in a developing country experiencing 3.48% annual growth additional US\$ 100 million dollars of use of the IMF credit are associated with an expected .0003 increase in CBI. The expected impact of debt on *CBI change* is 2.6 times larger when a country is experiencing 2.14% negative growth (the sample mean for *Growth* minus one standard deviation): additional US\$ 100 million dollars of use of the IMF credit are associated with an expected .0008 increase in CBI. These results are consistent with the expectations stated in hypotheses 3.1 and 3.2.

¹⁰² There are 33 country-year observations where developing countries have experienced a growth rate higher than 20%. Most of these observations correspond to post-conflict situations or to oil exporter countries.

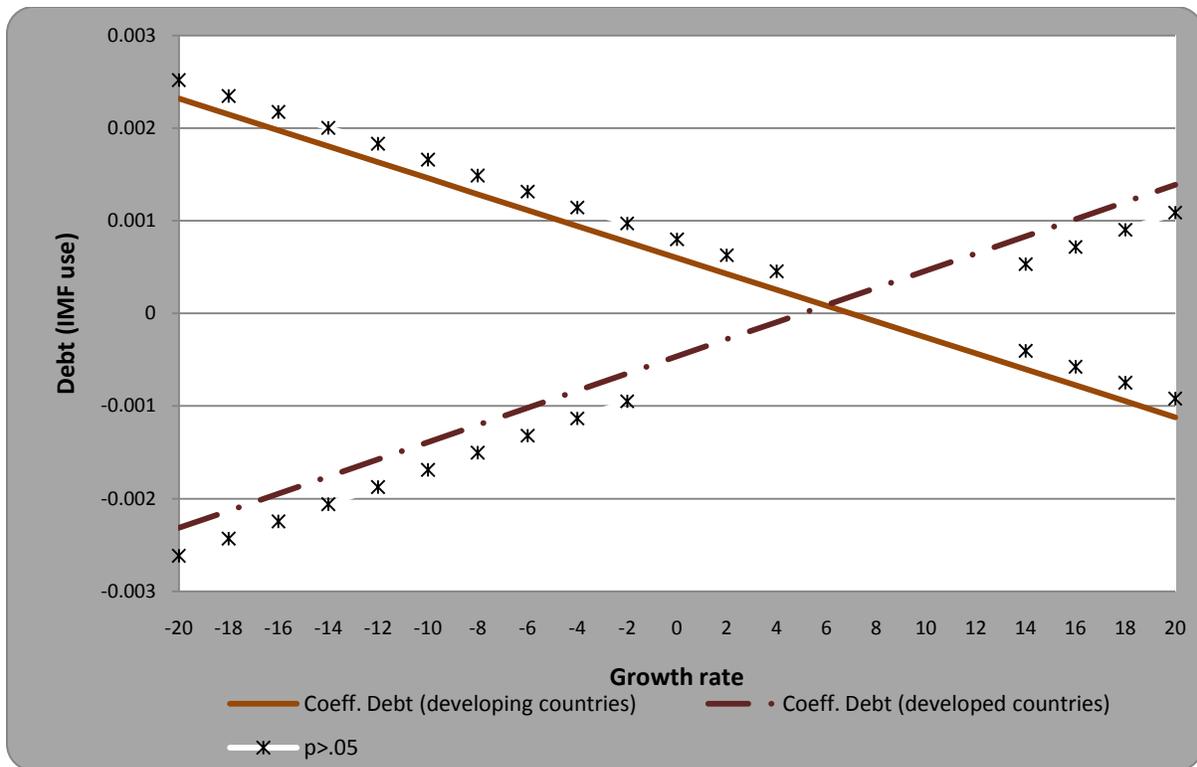


Figure 4.3. Change in CBI: Comparison of *Debt* coefficients conditional on levels of *Growth* for developing and developed countries, 1973-2008
Linear combination of coefficients estimated using *lincom* (Stata 10).

For developed countries, the expectations are exactly the opposite. Increases in foreign debt are negatively associated with changes in CBI when the country's growth rate is below zero. The relationship between these variables is reverted if growth rates are above 13% (see Figure 4.3).

Based on the notion of sunk costs, the fourth hypothesis stated that countries with higher levels of CBI should be less likely to reform their central banks. The coefficient associated with the previous level of CBI (CBI_{t-1}) is negative and statistically significant, providing support for this hypothesis in the case of developing countries. For developed countries however, the coefficient is positive, suggesting the opposite dynamic in this set of countries.

Finally, the fifth hypothesis stating that democracies should be expected to have higher levels of CBI does not find statistically significant support in this model for developed or developing

countries. This can be due to the 21-point scale used (one unit increase in Polity score might not have a significant impact on CBI).

I run the same models including a dummy variable indicating whether countries are part of the Euro zone. The coefficient associated with *Euro* is positive, but does not achieve conventional levels of statistical significance. The coefficients associated with the rest of the variables maintain their magnitude and statistical significance.¹⁰³

Regarding the control variables for the global sample, previous levels of inflation (log) are negatively associated with current levels of CBI. This relationship is not statistically significant in all specifications, providing no support for the arguments positing CBI as a mere response to concerns about inflation. Pegged exchange rates are associated with higher levels of CBI, whereas financial openness is associated with lower levels of CBI (although this relationship is not robust to most specifications). One might expect rightist governments to be more likely to have higher levels of CBI.¹⁰⁴ Although the coefficient associated with *Right* is positive, this relationship is not statistically significant. Consistent with Hallerberg's argument (2002), higher levels of CBI should be expected in countries with more veto players (federal countries, and division of powers systems), although these results are not statistically significant in all specifications. This relationship will be matter of study of the next chapter, analyzing how domestic institutions' impact of international determinants of CBI.

The control for diffusion (ΔCBI_{World}) is positive and statistically significant. Other controls for diffusion were included: neither the use of the average of *CBI Change* in the immediate territorial neighbors or neighbors separated by less than 24 miles (ΔCBI_{Neigh3_n}), nor the use of Δ

¹⁰³ Only the coefficient associated with Western Europe loses half of its magnitude, but remains statistically insignificant.

¹⁰⁴ However, a signaling argument would point to the opposite direction: leftist governments should be more concerned with signaling fiscal responsibility and be more prone to increase CBI.

CBI Neighb_{it} (extending water contiguity to 150 miles) alter the results. Both the diffusion variables, and the rest of the variables included in the models maintain their magnitude (with small changes) and statistical significance. $\Delta CBI World$ is used in the reported models because more observations are included in the models, making the estimations more efficient.¹⁰⁵ The year count indicates that the data exhibits a trend, even after controlling for geographical diffusion. Finally, the regional dummies suggest that Latin America (the omitted category) exhibits highest levels of CBI, other thing held constant. This regional difference will be further explored, in order to analyze whether it is just a difference of intercepts, or if the slope of the variables of interest is different for Latin American countries.

4.2.3.1 Remarks on the baseline model for developed and developing countries

The main purpose of the analyses performed on the global sample was to examine the existence of a distinctive behavior of developing countries regarding CBI and central bank reform. This difference was assumed to exist, before developing a theory to account for the behavior of developing countries. Not only *OECD* is consistently negative and statistically significant, but all its interactions with the variables of interest exhibit notable differences in their slopes (see Figures 4.2 and 4.3). Therefore, the results of baseline model suggest that the variables of interest behave in opposite ways for developed and developing countries.

The next sections further explore the impact of the variables of interest on changes in CBI. The empirical tests are limited to developing countries. This sample restriction is not only consistent with the theory, but it is also backed by the results on the global sample.

¹⁰⁵ I run the same models controlling not for the diffusion of the changes in CBI, but for the levels of CBI in the world and in neighboring countries following different geographical criteria (see description of diffusion variables in section 4.2.1 Baseline model and description of variables). Other models were run using the number of central bank reforms in the previous years, using the variables *Sumreform_World*, *Sumreform_n3* and *Sumreform_n4*. In all these cases, the coefficients associated with the diffusion variables are positive and statistically significant, and their inclusion does not alter the results described above.

4.2.4 CBI in developing countries

The remainder of the chapter presents empirical tests of the theory on a sample of developing countries between 1973 and 2008. Table 4.5 presents the descriptive statistics of this sample.

Models 2 show the results of the baseline model for developing countries, using different measures of debt (see Table 4.6). As expected, these results reproduce the findings obtained with triple interactions in Models 1. All the coefficients maintain their signs and most of them their magnitudes. However, there are changes in the statistical significance of some of the control variables (that were not interacted with *OECD* in Models 1).

Model 2.c, the model with the best statistical fit, will be used as the baseline for further exploring the effect of the variables of interest in developing countries.

Table 4.5. Descriptive statistics (developing countries)

Variable	Obs	Mean	Std. Dev.	Min	Max
ΔCBI	2232	.0061392	.0471399	-.4349186	.545675
Growth_{t-1}	2062	3.670475	6.524756	-44.9	85.9
2-year average Growth_{t-1}	2072	3.587961	5.886191	-42.45112	60.14479
3-year average Growth_{t-1}	2081	3.514384	5.623802	-42.45112	53.35
Growth deviation_{t-1}	2002	.4412751	6.803338	-50.54479	80.65182
ΔFDI/GDP_{t-1}	1841	349.1026	10.09744	.8773804	579.2792
Debt/GDP_{t-1}	1664	56.95346	58.94277	.1404388	1064.403
Debt/GDP change_{t-1}	1633	.7479153	23.91745	-328.3164	625.7666
IMF use_{t-1}	2245	3.514102	12.11023	0	190.565
CBI_{t-1}	2235	.4367971	.1845775	.1020833	.9754902
Democracy_{t-1}	2011	.8826455	7.063053	-10	10
Inflation (log)_{t-1}	1962	2.541618	1.550399	-3.198231	10.19474
Peg_{t-1}	2275	.2035165	.4027019	0	1
Capital Openness_{t-1}	1874	.0272626	1.575757	-1.797522	2.539847
Presidential	2276	.3022847	.4593489	0	1
Federal	2276	.6858524	.4642775	0	1
Right_{t-1}	2055	.2583942	.4378583	0	1
ΔCBI world_{t-1}	2274	3.46e-06	8.08e-06	-.0000403	.0001437
Year count	2276	19.6507	10.17749	0	35
Africa	2276	.1783831	.3829191	0	1
Asia	2276	.1876098	.3904861	0	1
W.Europe	2276	.0241652	.1535956	0	1
C.Europe	2276	.2122144	.4089657	0	1
M.East	2276	.1256591	.3315376	0	1

Table 4.6. Determinants of *CBI change* for developing countries
 Panel Fixed Effects Regression with Vector Decomposition and AR1 Prais-Winsten Transformation
 Dependent variable: Change in CBI – Developing countries

	Expectation	Model 2a	Model 2b	Model 2c
		(Debt= Debt/GDP)	(Debt= ΔDebt/GDP)	(Debt= IMF use)
		Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)
Growth_{t-1}	-	-0.062 (.002)***	-0.059 (.002)***	-0.059 (.002)***
ΔFDI/GDP_{t-1}	-	-0.003 (.0006)***	-0.003 (.0006)***	-0.003 (.0006)***
Growth_{t-1}*ΔFDI/GDP_{t-1}	+	.0002 (6.18e-06)***	.0002 (6.12e-06)***	.0002 (5.81e-06)***
Debt_{t-1}	+	-3.49e-06 (.00003)	.00003 (.00006)	.0006 (.0001)***
Growth_{t-1}* Debt_{t-1}	-	-0.00001 (6.80e-06)*	-0.00004 (.00001)***	-0.00009 (.00002)***
CBI_{t-1}	-	-0.172 (.015)***	-0.169 (.015)***	-0.162 (.015)***
Democracy_{t-1}	+	-0.0001 (.0004)	-0.0001 (.0004)	-0.00006 (.0004)
Control variables				
<i>Economic</i>				
Inflation (log) _{t-1}		-0.003 (.0016)*	-0.003 (.002)**	-0.002 (.001)*
Peg _{t-1}		.011 (.005)**	.013 (.005)***	.010 (.005)**
Capital Openness _{t-1}		-0.002 (.002)	-0.003 (.002)	-0.002 (.002)
<i>Political and institutional</i>				
Presidential		.007 (.004)*	.005 (.004)	.006 (.004)
Federal		.003 (.003)	.003 (.003)	.007 (.003)**
Right _{t-1}		.014 (.005)***	.015 (.005)***	.012 (.004)***
<i>Diffusion</i>				
ΔCBI world _{t-1}		566.203 (270.923)**	549.846 (270.137)***	348.721 (240.668)***
<i>Other controls</i>				
Year count		.002 (.0003)***	.002 (.0003)***	.002 (.0002)***
Africa		-0.012 (.004)***	-0.012 (.004)***	-0.012 (.004)***
Asia		-0.019 (.005)***	-0.018 (.005)***	-0.018 (.004)***
Western Europe		.026 (.014)*	.025 (.014)*	.035 (.014)***
Europe		.0006 (.007)	.0007 (.007)	.005 (.007)
Middle East		-0.017 (.007)***	-0.017 (.007)***	-0.015 (.006)***
eta		.972 (.055)***	.950 (.055)***	.969 (.054)***
Intercept		1.176 (.005)***	1.150 (.005)***	1.052 (.005)***

Table 4.6 (continued)

Expectation	Model 2a	Model 2b	Model 2c
	(Debt= Debt/GDP)	(Debt= ΔDebt/GDP)	(Debt= IMF use)
	Coefficient (<i>FEVD std. err</i>)	Coefficient (<i>FEVD std. err</i>)	Coefficient (<i>FEVD std. err</i>)
N	1141	1139	1238
Adj. R2	.138	.141	.142
AIC	-3646.76	-3660.584	-4048.821
BIC	-3535.888	-3549.75	-3936.154

Notes: Dependent variable is change in Cukierman’s index of CBI. Estimation is by fixed effects vector decomposition regression. Standard errors are in italics. $\Delta FDI/GDP_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

4.2.4.1 Hypothesis 1: Growth problems in developing countries

As expected, the baseline model shows a negative association between the growth rate and the expected change in CBI when all other variables equal zero. This result provides support for hypothesis 1 and is consistent with the argument suggesting that lower or negative rates of growth are clear indications for politicians that the country needs capital. This section explores more in detail the links between growth problems and CBI.

In Models 3, *Growth* is operationalized in different ways to reflect alternative conceptualizations of growth problems (see Table 4.7). In all the models, changes in the operationalization of *Growth* do not improve the overall statistical fit. The alternative specifications produce some changes in the coefficients associated with other variables: *Debt* achieves statistical significance in all models, in the direction that was expected by hypothesis 3, but the interaction with *Growth* loses statistical significance in Models 3b and 3c (and in this last model, its direction changes). The *Diffusion* variable loses statistical significance, and the control for presidentialism achieves statistical significance in two models (Models 3b and 3c).

Table 4.7. Effect of *Growth* on *CBI change* in developing countries
 Panel Fixed Effects Regression with Vector Decomposition and AR1 Prais-Winsten Transformation –
 Dependent variable: Change in CBI – Developing countries

	Model 2c (baseline)	Model 3a	Model 3b (Growth=2- year average)	Model 3c (Growth=3- year average)	Model 3c (Growth= Growth deviation)
	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)
Growth_{t-1}	-0.059 <i>(.002)***</i>	-0.059 <i>(.002)***</i>	-0.074 <i>(.002)***</i>	-0.074 <i>(.002)***</i>	-0.087 <i>(.003)***</i>
Growth_{t-2}		-.0005 <i>(.0004)</i>			
Growth_{t-3}		-.0004 <i>(.0004)</i>			
ΔFDI/GDP_{t-1}	-0.003 <i>(.0006)***</i>	-0.003 <i>(.0006)***</i>	-0.003 <i>(.0006)***</i>	-0.003 <i>(.0006)***</i>	-0.002 <i>(.0006)***</i>
Growth_{t-1}	.0002	.0002	.0002	.0002	.0002
*ΔFDI/GDP_{t-1}	(5.81e-06)***	(5.87e-06)***	(6.41e-06)***	(6.99e-06)***	(9.89e-06)***
IMF use_{t-1}	.0006 <i>(.0001)***</i>	.0006 <i>(.0002)***</i>	.0004 <i>(.0002)***</i>	.0003 <i>(.0002)*</i>	.0004 <i>(.0001)***</i>
Growth_{t-1}* IMF use_{t-1}	-0.00009 <i>(.00002)***</i>	-0.0001 <i>(.00002)***</i>	-0.00003 <i>(.00003)</i>	.00001 <i>(.00004)</i>	-0.00006 <i>(.00002)***</i>
CBI_{t-1}	-0.162 <i>(.015)***</i>	-0.161 <i>(.015)***</i>	-0.163 <i>(.015)***</i>	-0.164 <i>(.015)***</i>	-0.161 <i>(.015)***</i>
Democracy_{t-1}	-.00006 <i>(.0004)</i>	-.00009 <i>(.0004)</i>	-.00008 <i>(.0004)</i>	-.0001 <i>(.0004)</i>	-.00008 <i>(.0004)</i>
Control variables					
<i>Economic</i>					
Inflation (log) _{t-1}	-0.002 <i>(.001)*</i>	-0.003 <i>(.0015)**</i>	-0.002 <i>(.0015)*</i>	-0.002 <i>(.0015)*</i>	-0.002 <i>(.001)*</i>
Peg _{t-1}	.010 <i>(.005)**</i>	.010 <i>(.005)**</i>	.010 <i>(.005)***</i>	.010 <i>(.005)**</i>	.010 <i>(.005)**</i>
Capital Openness _{t-1}	-.002 <i>(.002)</i>	-.002 <i>(.002)</i>	-.002 <i>(.002)</i>	-.002 <i>(.002)</i>	-.002 <i>(.002)</i>
<i>Political and institutional</i>					
Presidential	.006 <i>(.004)</i>	.006 <i>(.004)</i>	.006 <i>(.004)*</i>	.007 <i>(.004)*</i>	.006 <i>(.004)</i>
Federal	.007 <i>(.003)**</i>	.007 <i>(.003)**</i>	.007 <i>(.003)**</i>	.007 <i>(.003)**</i>	.008 <i>(.003)**</i>
Right _{t-1}	.012 <i>(.004)***</i>	.012 <i>(.004)***</i>	.012 <i>(.004)***</i>	.012 <i>(.004)***</i>	.012 <i>(.004)***</i>
<i>Diffusion</i>					
ΔCBI world _{t-1}	348.721 <i>(240.668)***</i>	330.815 <i>(240.870)</i>	383.601 <i>(241.555)</i>	377.872 <i>(241.957)</i>	357.811 <i>(241.211)</i>
<i>Other controls</i>					
Year count	.002 <i>(.0002)***</i>	.002 <i>(.0002)***</i>	.002 <i>(.0002)***</i>	.002 <i>(.0002)***</i>	.002 <i>(.0002)***</i>
Africa	-.012 <i>(.004)***</i>	-.012 <i>(.004)***</i>	-.012 <i>(.004)***</i>	-.012 <i>(.004)***1</i>	-.012 <i>(.004)***</i>
Asia	-.018 <i>(.004)***</i>	-.016 <i>(.004)***</i>	-.016 <i>(.005)***</i>	-.0149 <i>(.005)***</i>	-.018 <i>(.004)***</i>
Western Europe	.035 <i>(.014)***</i>	.032 <i>(.014)**</i>	.033 <i>(.014)***</i>	.032 <i>(.014)**</i>	.035 <i>(.014)***</i>
Ctrl. & Eastern Europe	.005 <i>(.007)</i>	.007 <i>(.007)</i>	.006 <i>(.007)</i>	.007 <i>(.007)</i>	.006 <i>(.006)</i>

Table 4.7 (continued)

	Model 2c (baseline)	Model 3a	Model 3b (Growth=2- year average)	Model 3c (Growth=3- year average)	Model 3c (Growth= Growth deviation)
	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)
Middle East	-0.015 <i>(.006)***</i>	-0.014 <i>(.006)**</i>	-0.014 <i>(.006)***</i>	-0.013 <i>(.006)**</i>	-0.015 <i>(.006)***</i>
eta	.969 <i>(.054)***</i>	.969 <i>(.055)***</i>	.969 <i>(.056)***</i>	.973 <i>(.056)***</i>	.973 <i>(.054)***</i>
Intercept	1.052 <i>(.005)***</i>	1.061 <i>(.005)***</i>	1.121 <i>(.005)***</i>	1.096 <i>(.005)***</i>	.741 <i>(.005)***</i>
N	1238	1235	1238	1238	1235
Adj. R2	.142	.143	.132	.131	.143
AIC	-4048.821	-4036.25	-4035.634	-4033.705	-4039.325
BIC	-3936.154	-3913.398	-3922.966	-3921.037	-3926.711

Notes: Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression. Standard errors are in italics. $\Delta FDI/GDP_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$.

Model 3a tests the effect of deeper lags in *Growth*. Although $Growth_{t-2}$ and $Growth_{t-3}$ also are negatively associated with changes in CBI, these coefficients do not achieve statistical significance. It is possible that it is not just the existence of growth problems in the previous year, but the trajectory of growth what incentive incumbents to increase the independence of the central banks. To test that possibility, Models 3b and 3c measure *Growth* as the lagged two- and three-year growth rate averages.¹⁰⁶ Substituting the lagged rate of growth for the lagged two- and three-year growth rate averages does not alter the main results. The coefficients associated with *Growth* are negative and statistically significant. However, their magnitude is 25% larger than in when using the previous year's growth rate.

Model 3c tests the impact of the deviation from the growth trajectory on central bank reform. In this model, I measure *Growth* as the difference between the growth rate and the previous

¹⁰⁶ That is, Model 3b includes the average growth rates in $t-1$ and $t-2$, whereas Model 3c includes the average growth rates in $t-1$, $t-2$, and $t-3$.

two-year growth average, that is $Growth\ deviation_{t-1} = [(Growth_{t-2} + Growth_{t-3})/2 - Growth_{t-1}]$. Positive values represent an improvement in the country's growth trajectory, and negative values reveal growth problems. Consistent with the expectations derived from hypothesis 1, negative deviations from the growth trajectory are associated with increases in CBI. The coefficient associated with *Growth deviation* is stronger than the coefficient associated with *Growth* in the baseline model (Model 2c) and the statistical fit of the model is slightly better. However, the different operationalization of growth problems does not affect the results for other variables included in the model.

Although the coefficients associated with *Growth*, *Growth 2- and 3-year averages*, and *Growth deviation* are in the expected direction and statistically significant, my argument suggest a conditional impact of growth, FDI and debt. As stated in Chapter 3, incumbents facing a need for capital will focus on attracting foreign investors and creditors and will be more likely to accommodate to investors' and creditors' demands, independently of their preferences. The need for capital that motivates incumbents to increase the independence of the central bank is not mere growth problems, but growth problems when coupled with FDI lose and/or high foreign debt. Table 4.8 and Table 4.9 show the coefficients associated with *Growth* and *Growth deviation* at different levels of both *FDI/GDP change* and of *Debt* (as of from Models 2c and 3c, respectively).

Table 4.8. Effect of *Growth* on *CBI change* in developing countries:
Coefficient for *Growth* at different levels of *FDI/GDP change* and *Debt*

		FDI/GDP change				
		Sample minimum	Mean – 1 std deviation	Mean	Mean + 1 std deviation	Sample maximum
		Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)
Debt	Sample minimum	-0.058 <i>(.002)***</i>	-0.001 <i>(.0004)***</i>	.0005 <i>(.0004)</i>	.002 <i>(.0004)***</i>	.039 <i>(.001)***</i>
	Mean – 1 std deviation (†)	-0.058 <i>(.002)***</i>	-.0004 <i>(.0004)</i>	.001 <i>(.0005)***</i>	.003 <i>(.0005)***</i>	.040 <i>(.002)***</i>
	Mean	-0.059 <i>(.002)***</i>	-0.002 <i>(.0004)***</i>	.0002 <i>(.0004)</i>	.002 <i>(.0004)***</i>	.039 <i>(.001)***</i>
	Mean + 1 std deviation	-0.060 <i>(.002)***</i>	-0.003 <i>(.0004)***</i>	-0.0009 <i>(.0004)**</i>	.001 <i>(.0004)*</i>	.038 <i>(.001)***</i>
	Sample maximum	-0.076 <i>(.005)***</i>	-0.019 <i>(.004)***</i>	-0.017 <i>(.004)***</i>	-0.015 <i>(.004)***</i>	.022 <i>(.004)***</i>

Notes: Linear combination of coefficients estimated using *lincom* (Stata 10). Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression, baseline model on a sample of developing countries (Model 2.c). Standard errors are in italics. Δ FDI/GDP_{t-1} is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

(†) Out of sample

Table 4.9. Effect of *Growth deviation* on *CBI change* in developing countries:
Coefficient for *Growth deviation* at different levels of *FDI/GDP change* and *Debt*

		FDI/GDP change				
		Sample minimum	Mean – 1 std deviation	Mean	Mean + 1 std deviation	Sample maximum
		Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)
Debt	Sample minimum	-0.086 <i>(.003)***</i>	-0.002 <i>(.0003)***</i>	.001 <i>(.0004)***</i>	.003 <i>(.0003)***</i>	.058 <i>(.002)***</i>
	Mean – 1 std deviation (†)	-0.086 <i>(.003)***</i>	-0.001 <i>(.0004)***</i>	.0004 <i>(.0004)</i>	.004 <i>(.0004)***</i>	.059 <i>(.002)***</i>
	Mean	-0.087 <i>(.003)***</i>	-0.002 <i>(.0003)***</i>	.0004 <i>(.0003)</i>	.003 <i>(.0003)***</i>	.058 <i>(.002)***</i>
	Mean + 1 std deviation	-0.087 <i>(.003)***</i>	-0.003 <i>(.0003)***</i>	-.0004 <i>(.0003)</i>	.002 <i>(.0003)***</i>	.057 <i>(.002)***</i>
	Sample maximum	-0.098 <i>(.004)***</i>	-0.014 <i>(.003)***</i>	-0.011 <i>(.003)***</i>	-0.009 <i>(.003)***</i>	.046 <i>(.004)***</i>

Notes: Linear combination of coefficients estimated using *lincom* (Stata 10). Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression, baseline model on a sample of developing countries (Model 3.c). Standard errors are in italics. Δ FDI/GDP_{t-1} is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

(†) Out of sample

Growth and *Growth deviation* have negative and statistically significant impact on CBI change when countries are losing FDI¹⁰⁷ at almost all levels of debt.¹⁰⁸ In the sample under analysis, 1803 country-year observations fall in this subset of cases (see Table 4.10), and becomes positive when countries are receiving more FDI. This positive coefficient is significant when FDI/GDP is increasing 10 percentage points or more in a given year (that is the case for 1033 country-year observations). This change in sign is not inconsistent with the theory because it implies that countries that are having growth problems but are also receiving substantially increasing FDI (and do not have high foreign debts) do not have incentives to produce costly signals to attract investment. The behavior of this subset of countries is similar to the one of developed countries).

¹⁰⁷ The non-centered mean of *FDI/GDP change* in the sample of developing countries is 1%, and the standard deviation is almost 9.

¹⁰⁸ The only exception is the coefficient associated with *Growth* when *FDI/GDP* and *Debt* are both at their means minus a standard deviation. This coefficient does not achieve statistical significance (see Table 4.10).

Tables 4.10. Number of observations, central bank reforms, and reforms increasing CBI at different levels of *Growth*, *FDI/GDP change* and *Debt* (Developing countries, 1972-2008)

Table 4.10.a. Full sample

		$X = FDI/GDP\ change_{t-1}$				
		$X_{it} \leq (\text{mean} - 1 \text{ std deviation})$	$(\text{mean} - 1 \text{ std deviation}) < X_{it} \leq \text{mean}$	$\text{mean} < X_{it} \leq (\text{mean} + 1 \text{ std deviation})$	$(\text{mean} + 1 \text{ std deviation}) < X_{it}$	Total
$Y = Debt_{t-1}$	$Y_{it} = 0$	N = 15 R = 2 <i>R↑=2 (13.33%)</i>	N = 685 R = 33 <i>R↑=26 (3.8%)</i>	N = 443 R = 21 <i>R↑=16 (3.61%)</i>	N = 688 R = 56 <i>R↑=50 (7.27%)</i>	N = 1831 R = 112 <i>R↑=94 (5.13%)</i>
	$0 < Y_{it} \leq \text{mean}$	N = 10 R = 3 <i>R↑= 2 (20%)</i>	N = 646 R = 38 <i>R↑=26 (4.02%)</i>	N = 484 R = 30 <i>R↑=21 (4.34%)</i>	N = 190 R = 10 <i>R↑=7 (3.68%)</i>	N = 1330 R = 81 <i>R↑=56 (4.21%)</i>
	$\text{mean} < Y_{it} \leq (\text{mean} + 1 \text{ std deviation})$	N = 6 R = 1 <i>R↑=1 (16.67%)</i>	N = 339 R = 16 <i>R↑=12 (3.54%)</i>	N = 221 R = 17 <i>R↑=13 (5.88%)</i>	N = 60 R = 3 <i>R↑=1 (1.67%)</i>	N = 626 R = 37 <i>R↑=27 (4.32%)</i>
	$(\text{mean} + 1 \text{ std deviation}) < Y_{it}$	N = 0	N = 102 R = 9 <i>R↑=8 (7.84%)</i>	N = 89 R = 6 <i>R↑=5 (5.61%)</i>	N = 95 R = 2 <i>R↑=0</i>	N = 286 R = 17 <i>R↑=13 (4.55%)</i>
	Total	N = 31 R = 6 <i>R↑=5 (16.13%)</i>	N = 1772 R = 96 <i>R↑=72 (4.06%)</i>	N = 1237 R = 74 <i>R↑=55 (4.45%)</i>	N = 1033 R = 71 <i>R↑=58 (5.61%)</i>	N = 4073 R = 247 <i>R↑=190 (4.66%)</i>

Notes: N=number of country-year observations at different levels of *FDI/GDP change_{t-1}* and *Debt_{t-1}*; R=number of central bank reforms at time *t* in this subset of cases; R↑= number of central bank reforms increasing CBI in italics (percentage of observations that experienced an increase in CBI between parentheses).

Table 4.10.b. Number of observations, central bank reforms, and reforms increasing CBI when *Growth* is below the sample mean

		$X = FDI/GDP \text{ change}_{t-1}$				
		$X_{it} \leq (\text{mean} - 1 \text{ std deviation})$	$(\text{mean} - 1 \text{ std deviation}) < X_{it} \leq \text{mean}$	$\text{mean} < X_{it} \leq (\text{mean} + 1 \text{ std deviation})$	$(\text{mean} + 1 \text{ std deviation}) < X_{it}$	Total
$Y = Debt_{t-1}$	$Y_{it} = 0$	N = 7 R = 1 R↑=1 (14.29%)	N = 269 R = 16 R↑=12 (4.46%)	N = 178 R = 10 R↑=8 (4.49%)	N = 169 R = 17 R↑=16 (9.47%)	N = 623 R = 44 R↑=37 (5.94%)
	$0 < Y_{it} \leq \text{mean}$	N = 6 R = 3 R↑=2 (33.33%)	N = 304 R = 19 R↑=13 (4.28%)	N = 227 R = 15 R↑=10 (4.41%)	N = 35 R = 5 R↑=4 (11.43%)	N = 572 R = 42 R↑=29 (5.07%)
	$\text{mean} < Y_{it} \leq (\text{mean} + 1 \text{ std deviation})$	N = 2 R = 0	N = 148 R = 7 R↑=5 (3.38%)	N = 91 R = 8 R↑=6 (6.59%)	N = 25 R = 1 R↑=0	N = 266 R = 16 R↑=18 (4.14%)
	$(\text{mean} + 1 \text{ std deviation}) < Y_{it}$	N = 0	N = 39 R = 5 R↑=5 (12.82%)	N = 37 R = 2 R↑=1 (2.7%)	N = 0 R = 0	N = 76 R = 7 R↑=6 (7.89%)
	Total	N = 15 R = 4 R↑=3 (20%)	N = 760 R = 47 R↑=35 (4.61%)	N = 533 R = 35 R↑=25 (4.47%)	N = 229 R = 23 R↑=20 (8.73%)	N = 1537 R = 109 R↑=83 (5.4%)

Notes: N=number of country-year observations at different levels of *FDI/GDP change_{t-1}* and *Debt_{t-1}*; R=number of central bank reforms at time *t* in this subset of cases; R↑= number of central bank reforms increasing CBI in italics (percentage of observations that experienced an increase in CBI between parentheses).

Table 4.10.c. Number of observations, central bank reforms, and reforms increasing CBI when *Growth* is above the sample mean

		$X = FDI/GDP \text{ change}_{t-1}$				
		$X_{it} \leq (\text{mean} - 1 \text{ std deviation})$	$(\text{mean} - 1 \text{ std deviation}) < X_{it} \leq \text{mean}$	$\text{mean} < X_{it} \leq (\text{mean} + 1 \text{ std deviation})$	$(\text{mean} + 1 \text{ std deviation}) < X_{it}$	Total
$Y = Debt_{t-1}$	$Y_{it} = 0$	N = 8 R = 1 R↑=1 (12.5%)	N = 416 R = 17 R↑=14 (3.37%)	N = 265 R = 11 R↑=8 (3.02%)	N = 519 R = 39 R↑=34 (6.55%)	N = 1208 R = 4684 R↑=57 (4.72%)
	$0 < Y_{it} \leq \text{mean}$	N = 4 R = 0	N = 342 R = 19 R↑=13 (3.8%)	N = 257 R = 15 R↑=11 (4.28%)	N = 155 R = 5 R↑=3 (1.94%)	N = 758 R = 39 R↑=27 (3.56%)
	$\text{mean} < Y_{it} \leq (\text{mean} + 1 \text{ std deviation})$	N = 4 R = 1 R↑=1 (2.5%)	N = 191 R = 9 R↑=7 (3.67%)	N = 130 R = 9 R↑=7 (5.39%)	N = 35 R = 2 R↑=1 (2.86%)	N = 360 R = 21 R↑=16 (4.44%)
	$(\text{mean} + 1 \text{ std deviation}) < Y_{it}$	N = 0	N = 63 R = 4 R↑=3 (4.76%)	N = 52 R = 4 R↑=4 (7.69%)	N = 95 R = 2 R↑=0	N = 210 R = 10 R↑=7 (3.33%)
	Total	N = 16 R = 2 R↑=2 (12.5%)	N = 1012 R = 49 R↑=37 (3.66%)	N = 704 R = 39 R↑=30 (4.26%)	N = 804 R = 48 R↑=38 (4.73%)	N = 2536 R = 138 R↑=107 (4.22%)

Notes: N=number of country-year observations at different levels of $FDI/GDP \text{ change}_{t-1}$ and $Debt_{t-1}$; R=number of central bank reforms at time t in this subset of cases; R↑= number of central bank reforms increasing CBI in italics (percentage of observations that experienced an increase in CBI between parentheses).

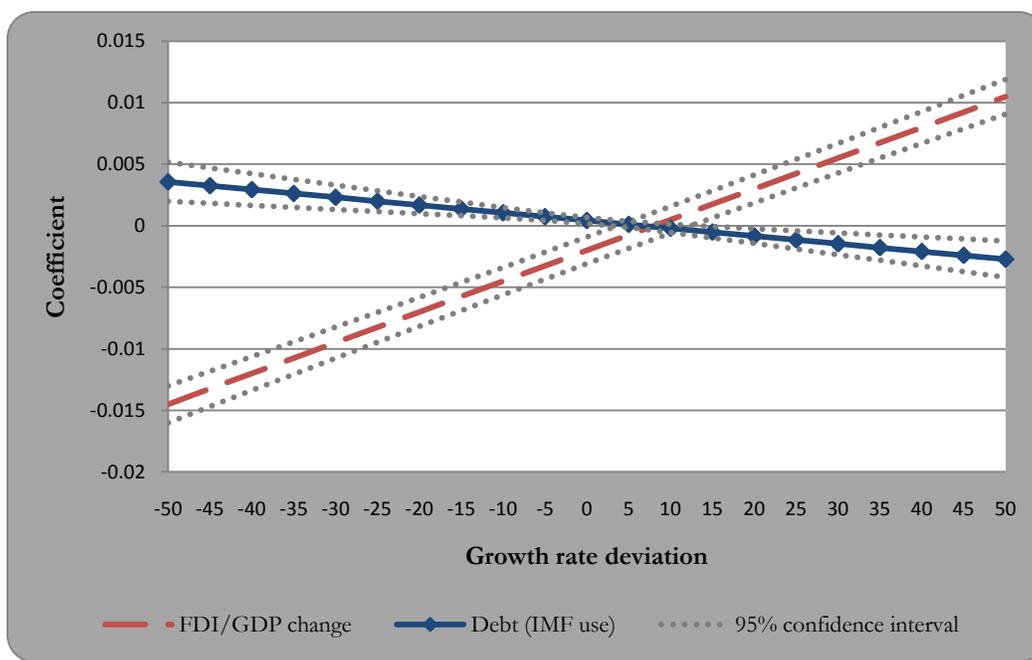
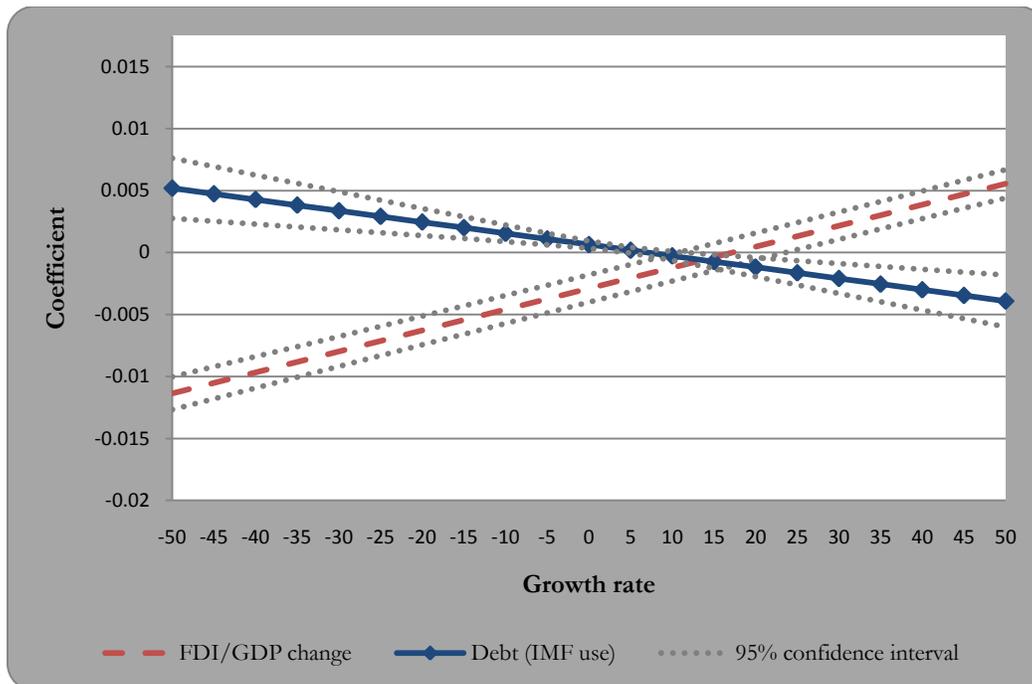
4.2.4.2 Hypotheses 2 and 3: FDI loss and debt in developing countries

The direction, magnitude and statistical significance of the coefficient associated with $FDI/GDP \text{ change}$ and its interactions with *Growth* in developing countries is the same across models (see Table 4.7), indicating a robust relationship between changes in FDI and in CBI. A percentage point drop in FDI/GDP is associated with increases in CBI as long as the growth rate of the country is below 11%. Changes in FDI do not have statistically significant impact on CBI when the

country experiences growth rates between 11% and 23.5% (see Figure 4.4.a). In countries whose economy is growing at more of 23.5%, the relationship between FDI and CBI changes becomes positive (as it was for developed countries). This means that when the economy in a developing country is growing at very high rates, FDI losses do not motivate governments to increase CBI in order to attract FDI.

When growth problems are measured as the deviation from the growth trajectory (Model 3c, Table 4.7), the linear combination of the FDI variable and its interaction has a more pronounced slope (see Figure 4.4.b). In these models, FDI losses are associated with increases in CBI when the country is experiencing negative deviations from their growth trajectory and when the countries grow up to 4.25 percentage points above their previous growth rate average. The impact of changes in FDI is statistically insignificant when the deviation from the previous growth trajectory is between 4.25 and 12.75 percentage points, and it becomes significant and positive at higher levels of *Growth deviation*.

Regarding the impact of debt, in models run on a sample of developing countries, the direction, magnitude and statistical significance of the coefficient associated with *IMF use* and its interactions with *Growth* seem to be less consistent. In the baseline model (Model 2c, Table 4.7), the coefficient associated with the debt variable and its interaction with *Growth* are negative but statistically insignificant. In the other models, *IMF use* is positive, as expected, but the interaction term does not achieve statistical significance in all models. This result, however, needs to be analyzed by looking at the combined effect of the debt variable and its interaction with *Growth*. Figure 4.4.a shows that the linear combination is positive and statistically significant (as expected) when the country is growing at a rate below 4.8%. The same effect observed with changes in FDI appears in the impact of debt on *CBI change*: when the economy is growing at a rate above 10.5% increases in debt are associated with decreases in CBI (as it happens in developed countries).



Figures 4.4 (a & b). Change in CBI: Impact of *FDI/GDP change* and *Debt (IMF use)* conditional on levels of *Growth* Developing countries, 1973-2008. Linear combination of coefficients estimated using *lincom* (Stata 10).

When growth problems are measured as the deviation from the growth trajectory (Model 3c Table 4.7), the linear combination of the debt variable and its interaction has a less pronounced slope (see Figure 4.4.b). In these models, higher debt is associated with increases in CBI when the country is experiencing negative deviations from their growth trajectory and when the countries grow up to 3.5 percentage points above their previous growth rate average. The impact of debt is statistically insignificant when the deviation from the previous growth trajectory is between 3.5 and 11.85 percentage points, and it becomes significant and positive at higher levels of *Growth deviation*.

Tables 4.10 present some descriptive statistics that illustrate the frequency of central bank reform and increases in CBI at different levels of changes in FDI/GDP and debt. On the sample of developing countries (1972-2008), out of 4073 observations, 247 country-years experienced central bank reforms (6.06% of the sample), and 190 of these reforms increased CBI (4.66% of the sample). Not controlling for the existence of growth problems, 16% of the cases with high FDI losses (between the sample minimum and the mean minus a standard deviation) increased the independence of the central bank (see Tables 4.10). Once growth rates are taken into consideration, 20% of the cases with high FDI losses and growing at a rate below the mean have increased their CBI (see Table 4.10.b), whereas 12.5% of similar cases increased CBI when their growth rates were above the sample mean (see Table 4.10.c). On the opposite end of FDI change, out of the 1033 country-years that are receiving high amounts of FDI (above the sample mean plus a standard deviation), 5.6% increased the independence of their central banks (see Table 4.10.a). Separating those observations based on growth rate, 8.7% of the observations with high FDI inflows and that experienced low growth rates increased their CBI, whereas only 4.7% of the observations with high FDI inflows and that experienced high growth rates increased their CBI.

4.2.4.3 Hypothesis 4: Sunk costs and central bank reform

Hypothesis 4 states that “*developing countries with higher levels of CBI are less likely to increase their CBI.*” This hypothesis relies on the idea that only costly signals would be credible. Marginal increases in CBI are less costly the more independent the central bank is; therefore, increases in CBI should be less efficient (and therefore, less likely to be used) the more independent central banks are. In other words, countries that already enjoy high levels of CBI cannot signal commitment to sound economic policies by relying on more CBI.

The baseline model includes a one-year lag of the level of CBI. As expected, the coefficient is negative and statistically significant. However, it is possible that the effect of previous levels of CBI is not linear. To test for that possibility, Model 4a (see Table 4.11) includes the lagged square level of CBI. The coefficients associated with both CBI_{t-1} and CBI_{t-1}^2 are both negative but do not achieve statistical significance. However, the linear combination of both coefficients (see Figure 4.5) indicates that the previous level of CBI has a negative statistically significant impact on *CBI Change* at any level above .15 (with P values below .001 when $CBI_{t-1} \geq .35$), and shows that the relationship is not linear. Consistent with the theory, the negative impact of CBI_{t-1} is stronger at higher levels of CBI_{t-1} . For example, a unit increase in CBI_{t-1} is associated with a .02 decrease in CBI (at time t) when CBI_{t-1} equals .2, but the magnitude of the impact doubles when CBI_{t-1} equals .35. When CBI_{t-1} is at its mean minus a standard deviation, at its mean, and at its mean plus a standard deviation, the coefficients associated with CBI_{t-1} are -.012, -.052 and -.081, respectively.

Table 4.11. Effect of previous level of CBI on CBI change
 Panel Fixed Effects Regression with Vector Decomposition and AR1 Prais-Winsten Transformation
 Dependent variable: Change in CBI – Developing countries

	Model 2c (baseline)	Model 4a (squared CBI _{t-1})	Model 4b	Model 4c
	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)
Growth_{t-1}	-0.059 (.002)***	-0.059 (.002)***	-0.062 (.002)***	-0.062 (.002)***
ΔFDI/GDP_{t-1}	-0.003 (.0006)***	-0.003 (.0006)***	-0.003 (.0006)***	-0.003 (.0006)***
Growth_{t-1}	.0002	.0002	.0002	.0002
*ΔFDI/GDP_{t-1}	(5.81e-06)***	(5.81e-06)***	(5.80e-06)***	(5.80e-06)***
IMF use_{t-1}	.0006 (.0001)***	.0006 (.0001)***	.0006 (.0001)***	.0006 (.0002)***
Growth_{t-1}* IMF use_{t-1}	-0.00009 (.00002)***	-0.00009 (.00002)***	-0.0001 (.00002)***	-0.0001 (.00002)***
CBI_{t-1}	-0.162 (.015)***	-0.092 (.066)		
CBI²_{t-1}		-0.063 (.059)		
CBI_{t-1} ≤ .25			.089 (.012)***	
.25 < CBI_{t-1} ≤ .5			.066 (.007)***	-.023 (.008)***
.50 < CBI_{t-1} ≤ .75			.027 (.008)***	-.062 (.010)***
CBI_{t-1} > .75				-.089 (.012)***
Democracy_{t-1}	-0.00006 (.0004)	-7.02e-06 (.0004)	.00007 (.0004)	.00007 (.0004)
<i>Control variables</i>				
<i>Economic</i>				
Inflation (log)_{t-1}	-0.002 (.001)*	-0.002 (.001)*	-0.002 (.001)	-0.002 (.002)
Peg_{t-1}	.010 (.005)**	.010 (.005)**	.007 (.005)	.007 (.005)
Capital Openness_{t-1}	-0.002 (.002)	-0.002 (.002)	-0.001 (.002)	-0.001 (.002)
<i>Political and institutional</i>				
Presidential	.006 (.004)	.006 (.004)	.005 (.004)	.005 (.004)
Federal	.007 (.003)**	.007 (.003)**	.005 (.003)*	.005 (.003)*
Right_{t-1}	.012 (.004)***	.012 (.004)***	.013 (.004)***	.013 (.004)***
<i>Diffusion</i>				
ΔCBI world_{t-1}	348.721 (240.668)***	339.176 (240.912)	308.783 (242.672)	314.238 (242.164)
<i>Other controls</i>				
Year count	.002 (.0002)***	.002 (.0003)***	.002 (.0002)***	.002 (.0003)***
Africa	-0.012 (.004)***	-0.012 (.004)***	-0.004 (.004)	-0.004 (.004)

Table 4.11 (continued)

	Model 2c (baseline)	Model 4a (squared CBI _{t-1})	Model 4b	Model 4c
	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (FEVD std. err)
Asia	-0.18 <i>(.004)***</i>	-0.17 <i>(.004)***</i>	-0.08 <i>(.004)*</i>	-0.08 <i>(.005)*</i>
Western Europe	.035 <i>(.014)***</i>	.034 <i>(.014)***</i>	.028 <i>(.014)**</i>	.027 <i>(.014)**</i>
Central. & Eastern Europe	.005 <i>(.007)</i>	.005 <i>(.007)</i>	.008 <i>(.007)</i>	.008 <i>(.007)</i>
Middle East	-0.015 <i>(.006)***</i>	-0.016 <i>(.006)***</i>	-0.008 <i>(.006)</i>	-0.008 <i>(.006)</i>
eta	.969 <i>(.054)***</i>	.969 <i>(.056)***</i>	.980 <i>(.061)***</i>	.981 <i>(.062)***</i>
Intercept	1.052 <i>(.005)***</i>	1.040 <i>(.005)***</i>	.971 <i>(.005)***</i>	1.057 <i>(.005)***</i>
N	1238	1238	1238	1238
Adj. R2	.142	.142	.132	.132
AIC	-4048.821	-4047.65	-4033.393	-4033.394
BIC	-3936.154	-3929.861	-3910.483	-3910.484

Notes: Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression. Standard errors are in italics. $\Delta\text{FDI}/\text{GDP}_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

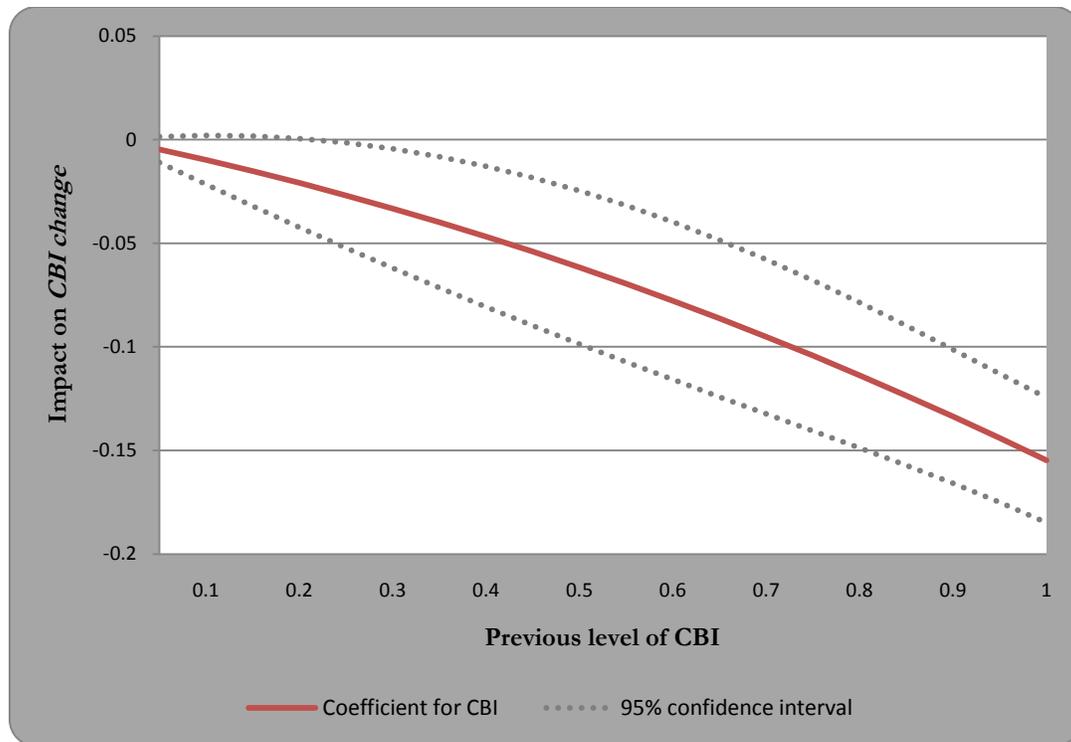


Figure 4.5. Change in CBI: Impact of CBI_{t-1} conditional on levels of CBI_{t-1} Developing countries, 1973-2008. Linear combination of coefficients estimated using *lincom* (Stata 10).

Models 4b and 4c present an alternative way to show the effects of the non-linearity of the impact of previous levels of CBI on *CBI Change*. The previous level of CBI is measured as a set of dichotomous variables indicating whether CBI is below .25, between .25 and .5, between .5 and .75, or above .75. In Model 4b the omitted category is the highest level of CBI ($CBI_{t-1} > .75$), and in Model 4c the omitted category is the lowest level of CBI ($CBI_{t-1} \leq .25$). Both models show there is a statistically significant difference between the coefficients of the omitted category, and the other three categories, and provide further support to the hypothesized negative relationship between previous levels of CBI and change in CBI.

Although the relationship between previous levels of CBI and *CBI change* seems to be non-linear, this finding does not affect the utility of the baseline model because the variables of interests maintain their direction, magnitude and statistical significance.

4.2.4.4 Hypothesis 5: Tying hands argument and central bank reform

According to hypothesis 5, democracies should be more likely to use CBI as a signal than are autocracies. This expectation is grounded on the idea that CBI can be costly as a hand-tying device. Although CBI can be reverted (Keefer and Stasavage 2000), an institutional commitment that is subsequently violated or reverted is likely to generate audience costs. The literature shows the existence of audience costs in democratic societies (Tomz 2007:836), and in less democratic societies (Weeks 2008). This is why the models included *Democracy* measured as a continuous variable. However, I assume that a violation of CBI can cause international audience costs to all regime types, but that democracies are more vulnerable to domestic audiences (Smith 1998). Therefore, I expect CBI to be a more credible signal when produced by democracies (or more democratic regimes) than by less democratic regimes because democratic regimes have higher domestic audience costs.

Neither of the statistical analyses performed with different samples and different specifications found statistical support for this hypothesis. I tried different measures of regime type that could affect the credibility of the government or the incentives for the government to reform the central bank. First, I substituted the continuous measure of democracy for a dichotomous variable (*Autocracy_{t-1}*) coded 1 when Polity is equal or greater than 6, and zero otherwise. Second, I included both *Democracy_{t-1}* and *Autocracy_{t-1}*, and the interaction between both variables, in order to test whether different “degrees” of democracy matter for any of the regime types. Third, I included a squared term of democracy, in order to test the existence of a non-linear effect. Fourth, I substituted *Democracy* for a measure of executive constraints (Marshall and Jaggers 2007). Whereas

these changes did not affect the main variables of interest, none of these variables achieved statistical significance.¹⁰⁹

I also examined the possibility that regime type would affect the credibility of the signal depending on the ideological orientation of the executive. I included interactions between the regime variables and *Right* and found no statistically significant results for the regime variables or the interactions.¹¹⁰

There is another impact of democracy that is relevant for the theory. It is possible that the regime credibility does not have an independent direct effect, but an indirect effect, affecting the whole dynamics hypothesized. A way to examine this possibility is to run separate analyses for democracies and non-democracies. Table 4.12 presents the results of this analysis.

¹⁰⁹ These models are not reported for space considerations.

¹¹⁰ The statistical significance of *Right* improved in all these models.

Table 4.12. Effect of regime on *CBI change*
 Panel Fixed Effects Regression with Vector Decomposition and AR1 Prais-Winsten Transformation
 Dependent variable: Change in CBI – Developing countries

	Model 2c (baseline)	Model 5a (democracies)	Model 5b (autocracies)	Model 5c
	Coefficient (FEVD <i>std. err</i>)			
Growth_{t-1}	-.059 (.002)***	-.104 (.003)***	.005 (.002)**	-.050 (.002)***
ΔFDI/GDP_{t-1}	-.003 (.0006)***	-.004 (.001)***	-.00007 (.0005)	-.002 (.0006)***
Growth_{t-1} *ΔFDI/GDP_{t-1}	.0002 (5.81e-06)***	.0003 (8.81e-06)***	-.00001 (5.87e-06)**	.0001 (6.35e-06)***
IMF use_{t-1}	.0006 (.0001)***	-.0001 (.0002)	.0003 (.0002)	.001 (.0002)***
Growth_{t-1}* IMF use_{t-1}	-.00009 (.00002)***	.00004 (.00004)	.00001 (.00003)	-.0002 (.00003)***
CBI_{t-1}	-.162 (.015)***	-.238 (.020)***	-.185 (.018)***	-.171 (.018)***
Democracy_{t-1}	-.00006 (.0004)	.001 (.0007)	-.001 (.0005)**	.054 (.001)***
Democracy_{t-1}*Growth_{t-1}				-.004 (.0003)***
Democracy_{t-1} *ΔFDI/GDP_{t-1}				-.0002 (4.24e-06)***
Democracy_{t-1}*Growth_{t-1} *ΔFDI/GDP_{t-1}				.00001 (9.55e-07)***
Democracy_{t-1} *IMF use_{t-1}				-.0002 (.00003)***
Democracy_{t-1}*Growth_{t-1} * IMF use_{t-1}				.00003 (4.54e-06)***
Democracy_{t-1}*CBI_{t-1}				.002 (.002)
Control variables				
<i>Economic</i>				
Inflation (log)_{t-1}	-.002 (.001)*	-.001 (.002)	-.004 (.001)***	-.002 (.001)
Peg_{t-1}	.010 (.005)**	.009 (.007)	.006 (.005)	.009 (.005)**
Capital Openness_{t-1}	-.002 (.002)	.004 (.002)*	-.001 (.002)	-.002 (.002)
<i>Political and institutional</i>				
Presidential	.006 (.004)	.043 (.007)***	-.007 (.003)**	.003 (.004)
Federal	.007 (.003)**	.004 (.005)	.003 (.003)	.007 (.003)**
Right_{t-1}	.012 (.004)***	.010 (.005)**	.014 (.005)***	.012 (.004)***
<i>Diffusion</i>				
ΔCBI world_{t-1}	348.721 (240.668)***	374.599 (292.346)	856.776 (309.851)***	427.644 (237.161)*
<i>Other controls</i>				
Year count	.002 (.0002)***	.003 (.0004)***	.002 (.0002)***	.002 (.0002)***

Table 4.12 (continued)

	Model 2c (baseline)	Model 5a (democracies)	Model 5b (autocracies)	Model 5c
	Coefficient (FEVD <i>std. err</i>)			
Africa	-0.12 <i>(.004)***</i>	-0.026 <i>(.007)***</i>	-.007 <i>(.005)</i>	-0.010 <i>(.004)***</i>
Asia	-0.018 <i>(.004)***</i>	.005 <i>(.008)</i>	-0.020 <i>(.005)***</i>	-0.019 <i>(.004)***</i>
Western Europe	.035 <i>(.014)***</i>	.068 <i>(.015)***</i>		.024 <i>(.014)***</i>
Ctral. & Eastern Europe	.005 <i>(.007)</i>	.064 <i>(.011)***</i>	-.016 <i>(.008)**</i>	.003 <i>(.007)</i>
Middle East	-0.015 <i>(.006)***</i>	.024 <i>(.012)**</i>	-0.021 <i>(.006)***</i>	-0.014 <i>(.006)***</i>
eta	.969 <i>(.054)***</i>	.817 <i>(.049)***</i>	.200 <i>(.013)***</i>	.969 <i>(.056)***</i>
Intercept	1.052 <i>(.005)***</i>	1.341 <i>(.008)***</i>	.085 <i>(.005)***</i>	.793 <i>(.004)***</i>
N	1238	607	572	1238
Adj. R2	.142	.180	.152	.186
AIC	-4048.821	-1919.731	-2199.314	-4107.728
BIC	-3936.154	-1822.744	-2107.983	-3964.333

Notes: Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression. Standard errors are in italics. $\Delta\text{FDI}/\text{GDP}_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

The sample was split using Polity2=6 as cutting point. Model 5a presents the results for the subsample of observations with Polity scores ≥ 6 (democracies), and Model 5b, the results for the subsample of observations with lower Polity scores (autocracies). Model 5a's results are consistent with the theory and similar to the results in the baseline model. In the subsample of developing democracies, the coefficients associated with the variables of interest have the same direction but larger magnitude than in the full sample. However, developing autocracies seem to have a distinctive behavior. Autocracies do not seem to respond to growth problems by increasing their CBI. This behavior is consistent with the idea that when signals have *a priori* modest credibility, governments should not incur the costs of reforming their central banks. Furthermore, if the only

cost for violating CBI will come from international audience costs, and the signal is originally sent to international actors, the signal should not be worth more than the mere commitment from the autocrat.

Finally, Model 5.c (see Table 4.12) presents a finer analysis of the impact of regime type and, according to the theory, of the credibility of the signal on the impact of the variables of interest on *CBI Change*. Almost all the variables, alone and interacted with *Democracy*, maintain their direction and statistical significance. The exceptions are *Democracy* and *IMF use*, that are positive and statistically significant, and the interactions of *Democracy* with *IMF use* and with the previous level of CBI. In Model 5c, *Democracy* is positive and statistically significant, as expected by hypothesis 5. However, this model also suggests that *Democracy* has not only a direct impact, but an indirect impact, affecting the relationship of the main independent variables with *CBI Change*. For example, when *Democracy* = 0 (in the -10 to 10 scale), the direct impact of Growth is negative (-.046); however, at higher levels of *Democracy*, that impact becomes stronger. Because *Democracy* is measured using Polity 2 (it ranges from -10 to 10), and Growth interacts with other variables in the model, the easier way to grasp the impact of *Democracy* on the relationship between *Growth* and *CBI change* is by plotting the linear combination of coefficients, at different levels of *Democracy*.

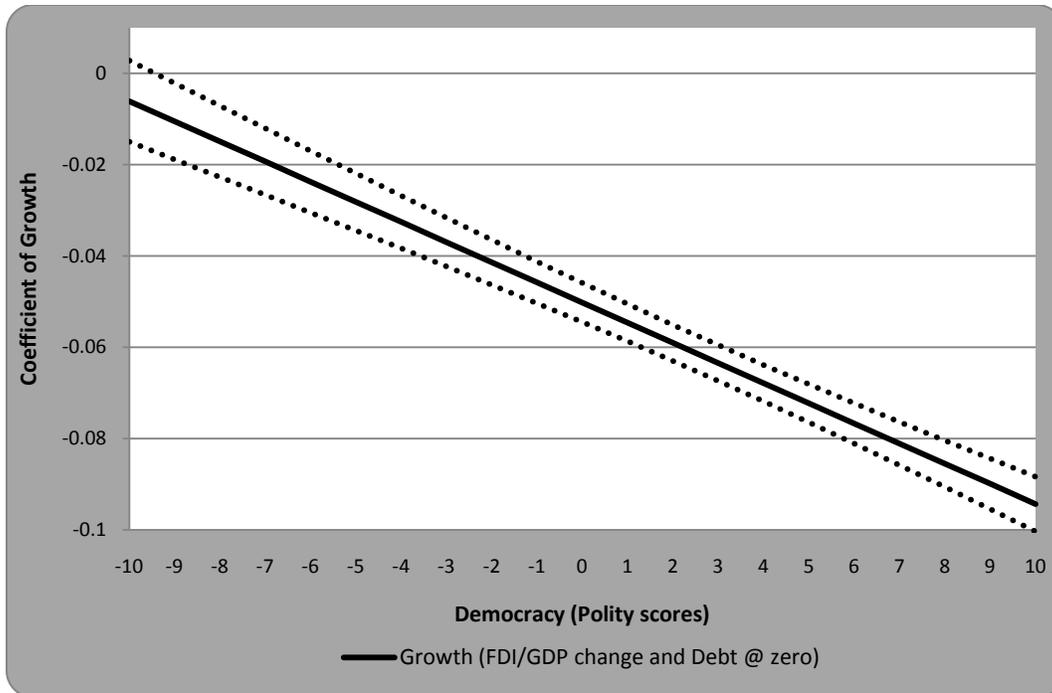
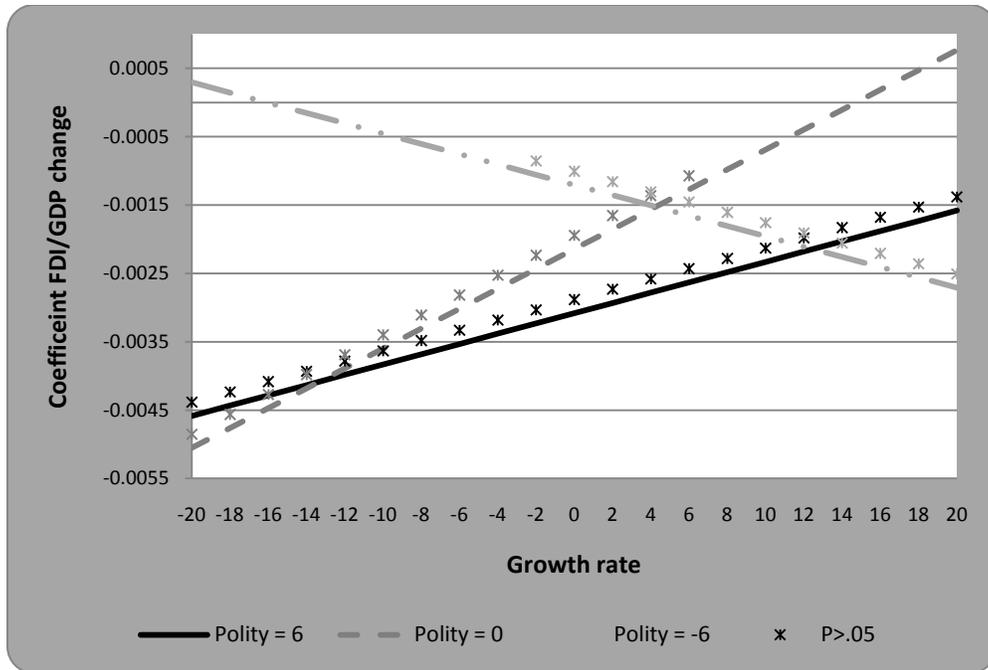


Figure 4.6. Change in CBI: Coefficient of *Growth* at different levels of *Democracy* *FDI/GDP change* and *Debt* (IMF use) at zero. Developing countries, 1973-2008
 Linear combination of coefficients estimated using *lincom* (Stata 10). $P < .0001$ at all points in the curve.

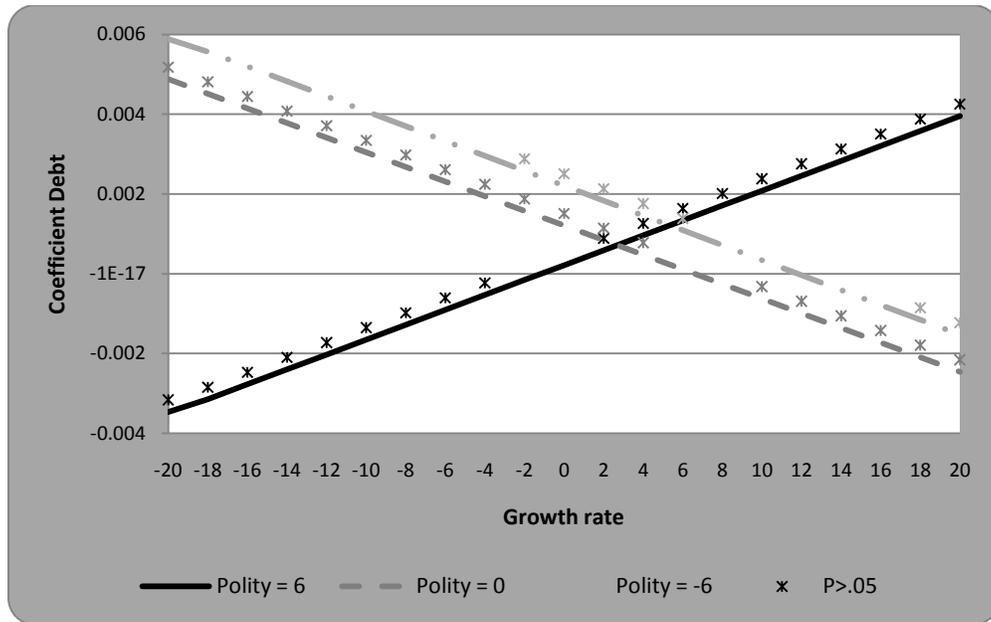
Figure 4.6 shows the coefficients associated with *Growth* (derived from Model 5c) at different levels of Democracy. In order to simplify the presentation, I only plot this relationship holding *Debt* at zero and *FDI/GDP change* at the sample minimum (that is, when countries are losing the maximum levels of FDI). As shown in Table 4.8, in a model that does not include the set of interaction terms with *Democracy*, the coefficient for *Growth* when *Debt* and *FDI/GDP change* and *Democracy* are held at zero is -0.058 and it is statistically significant. Once the indirect effect of *Democracy* is accounted for, the relationship between *Growth* and *CBI change* is negative and statistically significant at .01 level at almost all levels of *Democracy* (it is insignificant only when Polity = -10), as shown in Figure 4.6. However, the impact of *Growth* is stronger in more democratic countries. For example, and holding *FDI/GDP change* (centered) and *Debt* at zero, the coefficient associated with *Growth* is -0.01 when *Democracy* = -9 , -0.05 when *Democracy* = 0 , and -0.08 when *Democracy* = 6 . This is

consistent with my argument: on the one hand, more democratic countries should be more concerned with growth problems because they can increase their electoral vulnerability. On the other hand, more democratic countries should rely more on CBI as a signal (because of the signal costs). Therefore, facing similar growth problems, more democratic countries will increase CBI more than less democratic countries.

Figures 4.7.a and b show the conditioning impact of *Democracy* on the effect that *FDI/GDP change* and *Debt* have on *CBI change*, at different levels of *Growth*. Figure 4.4.a shows the coefficients associated with both *FDI/GDP change* and *Debt* at different levels of *Growth* when *Democracy* equals zero. However, the model on which Figure 4.4.a is based (Model 2c, Table 4.6) did not include the interactions of the variables of interest with *Democracy*. Whereas Figure 4.7.a shows a similar result for when *Democracy* = 0, it is interesting to note that this impact is always negative and statistically significant in democratic countries (when *Democracy* = 6). In democratic developing countries, FDI loss is associated with increases of CBI at all levels of *Growth*. It is interesting to note the change in the slope of the curve representing the impact of *FDI/GDP change* on *CBI change* at different levels of *Growth* for more authoritarian states: When *Democracy* = -6, the impact of *FDI/GDP change* on *CBI change* is negative and statistically significant when the country's growth rates are above -2%.



4.7.a. Change in CBI: Coefficient of *FDI/GDP change* at different levels of *Democracy* (Model 5c)



4.7.b. Change in CBI: Coefficient of *Debt (IMF use)* at different levels of *Democracy* (Model 5c)

Figures 4.7 (a & b). Change in CBI: Coefficient of *FDI/GDP change* and *Debt (IMF use)* at different levels of *Democracy* Developing countries, 1973-2008. Linear combination of coefficients estimated using *lincom* (Stata 10).

Finally, Figure 4.7.b shows the conditioning impact of *Democracy* on the effect that *Debt* has on *CBI change*, at different levels of *Growth*. Whereas Figure 4.7.b is similar to Figure 4.4.a when *Democracy* = 0, it is interesting to note that the impact of *Debt* is impact is the opposite in democratic countries (when *Democracy* = 6). In democratic developing countries, debt increases are associated with CBI decreases when the growth rate is below -3% , and with CBI increases when democratic developing countries are growing at an annual rate above 1% . This unexpected result can be driven by very few democratic developing countries ($Democracy \geq 6$), with high FDI loses (notice that *FDI/GDP change* is hold at zero),¹¹¹ or democratic developing countries ($Democracy=6$), with growth rates below -3% (13 country-year observations).¹¹²

4.2.4.5 Control variables

Although the control variables are not at the core of the theory, this section describes the behavior of these variables. With few exceptions, the control variables have the same direction across models.

Regarding the economic controls, the previous level of *Inflation* is consistently negative, although in some models it does not achieve statistical significance (see Models 4b, 4c, and 5a). The direction of the variable suggests that governments do not increase CBI as a response to high inflation, as suggested by some literature (see Section 2.2.1). If that was the case, the coefficients associated with inflation should be positive.

Countries with pegged exchange rates are expected to increase their CBI. Although this relation is not robust to all specification, *Peg* does never lose the positive sign. *Capital openness*, measured with the Chinn-Ito index, is generally negatively associated with *CBI change*. However, this

¹¹¹ Armenia 1994 is the only case in this category.

¹¹² The observations are: Dominican Republic (1991), Venezuela (2003-2004), Macedonia (1994 and 2002), Russian Federation (1993), Estonia (1992-1994), Ukraine (1992-1993), Zambia (1995), and Malawi (1995).

relationship never achieves statistical significance. In the only model this variable is statistically significant (Model 5a, for developing democracies), the coefficient is positive.

Regarding the political controls, the inclusion of both *Presidential* and *Federal* attempted to control for the effect of veto players. In general, both variables are positively associated with *CBI Change*, although their statistical significance is not robust to different specifications. Governments in the right of the political spectrum are positively associated with increases in CBI. This relationship is particularly robust in samples that include developing countries. The relationships between veto players and CBI, and between partisanship and CBI will be further explored in the next chapter, along with other political dynamics that may affect CBI and central bank reform.

Interestingly, the control for diffusion is not robust to different specifications. As expected, in the baseline model the coefficient associated with world changes in CBI (weighed by distance) is positive, even in the presence of a year count de-trending the data, both in the full sample and on a subsample of developing countries. However, it is statistically insignificant when alternative measures of *Growth* (Models 3, Table 4.6) or previous levels of CBI (Models 4, Table 4.7) are used, and when the models are run on a subsample of developing democracies (Model 5a, Table 4.13).

As the *Year count* variable suggests, there is a trend towards more CBI. Finally, regional dummy variables indicate that there are some regional differences in the changes in CBI. In concrete, Latin American countries seem to have larger increases in CBI than African, Middle Eastern, and Asian countries, both in models run with the full sample, and in models run on subsamples of developing countries.

4.2.5 Analyses on different samples

The second level of the theory applies to a subset of countries: developing countries with separation of power systems. In order to see the effect restrictions in the sample on the baseline model, and to individualize the true impact of the variables that are incorporated to the analysis, I re-run the baseline model (Model 2c) on different subsamples. Table 4.13 compares the results obtained on a sample of presidential developing countries (Model 6a), Latin American countries (Model 6b), and Latin American presidential countries (Model 6c).

Model 6a presents the results of the baseline model run on a sample of presidential developing countries. Although the results are generally similar to the ones obtained on a sample of developing countries, FDI does not achieve statistical significance. The linear combination of FDI/GDP and its interaction with $Growth$ is negative and significant only when $Growth \leq -5$ and positive and statistically significant when $Growth > 9$.¹¹³ If the sample is restricted to presidential democracies, some results change from the baseline model. Consistent with Model 5a (democratic developing countries, Table 4.12), the coefficients for $Debt$, its interaction term with $Growth$, and $Democracy$ have the opposite signs that in the sample including non-democracies.

It is interesting to note that in the analyses performed in this chapter, most of the regional controls were statistically significant, indicating that Latin American countries were expected to have larger increases of CBI than African, Asian and Middle Eastern developing countries, and to have smaller increases of CBI than developing Western European countries. However, those analyses were not sufficient to explore whether the relationships of interest were different in Latin American countries or not. Models 6c, 6d and 6e show the results of the baseline model on samples of all

¹¹³ In the sample of developing countries, changes in FDI have a negative and statistically significant impact on CBI when the country experiences growth rates below 11%, and a positive significant impact when $Growth \geq 23.5\%$ (see Figure 4.4.a).

Latin American countries, Latin American presidential countries, and Latin American presidential democracies, respectively.

On samples of Latin American countries, there is significant difference on the impact of *Debt*, *Inflation*, and *Presidentialism* (Models 6c, 6d, and 6e). In the three Latin American samples, the impact of *Debt* and its interaction with *Growth* have the opposite direction than in the baseline model. In Latin American countries, the impact of *Debt* and its interaction with *Growth* is negative and significant only when $Growth \leq -5$ and positive and statistically significant when $Growth > 9$.¹¹⁴ A similar effect is found on a subsample of Latin American presidential countries: the impact of *Debt* and its interaction with *Growth* is negative and when $Growth < 3$ and positive and statistically significant when $Growth > 3$. This relationship is statistically significant at all levels of *Growth* for Model 6c. The second difference is the behavior of *Inflation*. As expected by some literature, and in contrast with the results in models run on the samples of all developing countries and presidential developing countries, previous levels of inflation are positively associated with changes in CBI. Finally, whereas *Presidentialism* does not achieve statistical significance in all models presented in Chapter 4, in all these models *Presidentialism* had a positive sign. In Model 6b, the coefficient associated with *Presidentialism* is statistically significant but is negative.

¹¹⁴ In the sample of developing countries, the linear combination of *Debt* and its interaction with *Growth* is positive and statistically significant (as expected) when the country is growing at a rate below 4.8%. The same effect observed with changes in FDI appears in the impact of debt on *CBI change*: when the economy is growing at a rate above 10.5% increases in debt are associated with decreases in CBI (as it happens in developed countries) (see Figure 4.4.a).

Table 4.13. Determinants of *CBI change*. Baseline model for different samples
 Panel Fixed Effects Regression with Vector Decomposition and AR1 Prais-Winsten Transformation – Dependent variable: Change in CBI

	Developing countries			Latin American countries		
	Model 2c (baseline)	Model 6a (presidentialisms)	Model 6b (presidential democracies)	Model 6c (baseline)	Model 6d (presidentialisms)	Model 6e (presidential democracies)
	Coefficient (FEVD std. err)	Coefficient (robust FEVD std. err)	Coefficient (FEVD std. err)	Coefficient (robust FEVD std. err)	Coefficient (robust FEVD std. err)	Coefficient (FEVD std. err)
Growth_{t-1}	-0.059 (.002)***	-0.068 (.0003)***	-0.050 (.0003)***	-0.079 (.0001)***	-0.043 (.0003)***	-0.115 (.0003)***
ΔFDI/GDP_{t-1}	-0.003 (.0006)***	-0.0004 (.0008)	-0.0006 (.0007)	-0.001 (.0008)**	-0.0004 (.002)	-0.001 (.001)
Growth_{t-1}	.0002	.0002	.0001	.0002	.0001	.0003
*ΔFDI/GDP_{t-1}	(5.81e-06)***	(7.81e-07)***	(8.36e-07)***	(4.36e-07)***	(9.31e-07)***	(9.18e-07)***
IMF use_{t-1}	.0006 (.0001)***	.0008 (4.29e-06)***	-0.0003 (2.36e-06)***	-0.00006 (1.31e-06)***	-0.00003 (1.05e-06)***	-0.0002 (4.24e-06)***
Growth_{t-1}* IMF use_{t-1}	-0.00009 (.00002)***	-0.0001 (8.99e-07)***	.00006 (3.71e-07)***	.00002 (4.77e-07)***	.00001 (3.19e-07)***	.00004 (2.28e-07)***
CBI_{t-1}	-0.162 (.015)***	-0.172 (.0001)***	-0.227 (.0004)***	-0.182 (.0009)***	-0.189 (.0001)***	-0.211 (.0002)***
Democracy_{t-1}	-0.00006 (.0004)	-0.0004 (7.10e-06)***	.0005 (6.80e-06)***	-0.0009 (.00002)***	-0.001 (6.06e-06)***	.0004 (4.24e-06)***
Control variables						
<i>Economic</i>						
Inflation (log) _{t-1}	-0.002 (.001)*	-0.0003 (.00004)***	.0002 (.00004)***	.0003 (.00005)***	.00004 (.00002)***	.0005 (.00003)***
Peg _{t-1}	.010 (.005)**	.023 (.0001)***	.011 (.00007)***	.023 (.0002)***	.020 (.0003)***	.016 (.0003)***
Capital Openness _{t-1}	-0.002 (.002)	-0.003 (.00004)***	.002 (.00004)***	-0.002 (.00002)***	-0.0008 (.00006)***	.0008 (.00007)***
<i>Political and institutional</i>						
Presidential	.006 (.004)			-0.005 (.0002)***		
Federal	.007 (.003)**	.009 (.0001)***	-0.003 (.00008)***	.004 (.00005)***	.0009 (.0002)***	-0.003 (.0001)***
Right _{t-1}	.012 (.004)***	.016 (.0002)***	.011 (.0001)***	.015 (.0002)***	.015 (.0003)***	.015 (.0002)***

Table 4.13 (continued)

	Developing countries			Latin American countries		
	Model 2c (baseline)	Model 6a (presidentialisms)	Model 6b (presidential democracies)	Model 6c (baseline)	Model 6d (presidentialisms)	Model 6e (presidential democracies)
	Coefficient (FEVD <i>std. err</i>)	Coefficient (robust FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)	Coefficient (robust FEVD <i>std. err</i>)	Coefficient (robust FEVD <i>std. err</i>)	Coefficient (FEVD <i>std. err</i>)
<i>Diffusion</i>						
Δ CBI world t_{-1}	348.721 (240.668)***	478.314 (10.687)***	587.219 (9.257)***	539.917 (3.438)	565.070 (8.637)***	441.875 (7.141)***
<i>Other controls</i>						
Year count	.002 (.0002)***	.003 (.00001)***	.003 (.00001)***	.003 (.00001)***	.003 (1.91e-06)***	.003 (2.69e-06)***
Africa	-.012 (.004)***	-.020 (.00002)***	-.031 (.00002)***			
Asia	-.018 (.004)***	.014 (.00007)***	.040 (.00004)***			
Western Europe	.035 (.014)***					
Ctrl. & Eastern Europe	.005 (.007)	.032 (.001)***				
Middle East	-.015 (.006)***					
eta	.969 (.054)***	.943 (.004)***	.244 (.0008)***	.996 (.001)***	.992 (.007)***	.797 (.004)***
Intercept	1.052 (.005)***	.150 (.00003)***	.267 (.00001)***	.524 (.0002)***	.182 (.00008)***	.438 (.00009)***
N	1238	477	354	405	323	276
Adj. R2	.142	.129	.115	.100	.100	.113
AIC	-4048.821	-1545.268	-1181.492	-1322.716	-1039.508	-906.7008
BIC	-3936.154	-1466.086	-1111.845	-1254.65	-979.0659	-848.7744

Notes: Dependent variable is change in Cukierman's index of CBI. Estimation is by fixed effects vector decomposition regression. Standard errors are in italics. Δ FDI/GDP $_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.013.

4.2.6 Evaluating the predictions of the models

This last section evaluates the baseline model by comparing its predictions with the observed changes in CBI. Figures 4.8 plot the predicted values for *CBI Change*, and the actual changes in CBI. Notice that the values are plotted in both axes, to facilitate the examination of the data. Figure 4.8.1 shows Latin American cases, Figure 4.8.2 shows European and former Soviet countries, Figure 4.8.3 plots African countries, and Figure 4.8.4 shows the rest of the developing countries for which the model is able to predict the dependent variable for at least three consecutive years.

Two interesting things are apparent. First, the model computes predictions for every year, but observed changes in CBI are sporadic. This is consistent with models that do not yet incorporate the domestic determinants of the country's response elasticity to international determinants.¹¹⁵ Second, in spite of the possible underspecification of the baseline model, there is an apparent correlation between the predicted changes in CBI and the observed changes.

The baseline model predicts no change in many years. None of the changes in CBI occurred on a year for which the model predicted no change. Furthermore, actual changes in CBI generally happen after a couple of years of increases in the predicted change in CBI. There are many examples of this situation, notably Argentina 1992, Bolivia 1995, Colombia 1992, Peru 1992 (Figure 4.8.1); Latvia 2002 and Macedonia 2003 (Figure 4.8.2); Ghana 2002, Morocco 1993, South Africa 1996, Zaire 1985 and 1999, Zambia 1996 (Figure 4.8.3); and Indonesia 1999, Nepal 2003, and Philippines 1993 (Figure 4.8.4).

¹¹⁵ Notice also that these models plots are generated after running the baseline model. Other specifications have better statistical fit and make more accurate predictions but for a smaller set of countries.

The model satisfactorily predicts reductions in CBI as well. This is particularly the case of the 2000 central bank reform in Belarus, the 1980 reform in Korea, and of the 1985 reform in Zambia (this latter happened after seven consecutive years of predicted reductions in CBI). The model does not predict well the 2003 CBI reduction in Egypt, or the 1999 central bank reform in Singapore. The 2003 reform was publicized by the government as an increase in CBI (Central Bank of Egypt 2003). However, the overall effect of the reform (taking into account the 16 indicators used in the Cukierman *et al.*'s index of CBI) was a reduction in the level of CBI.

The baseline model does not perform well in some cases that did not experience central bank reforms affecting CBI. That is the case of Brazil, Ecuador, and Panama. The Brazilian case will be analyzed in Chapter 6. Ecuador and Panama opted for dollarization, limiting the functions of the central bank to a mere currency board.

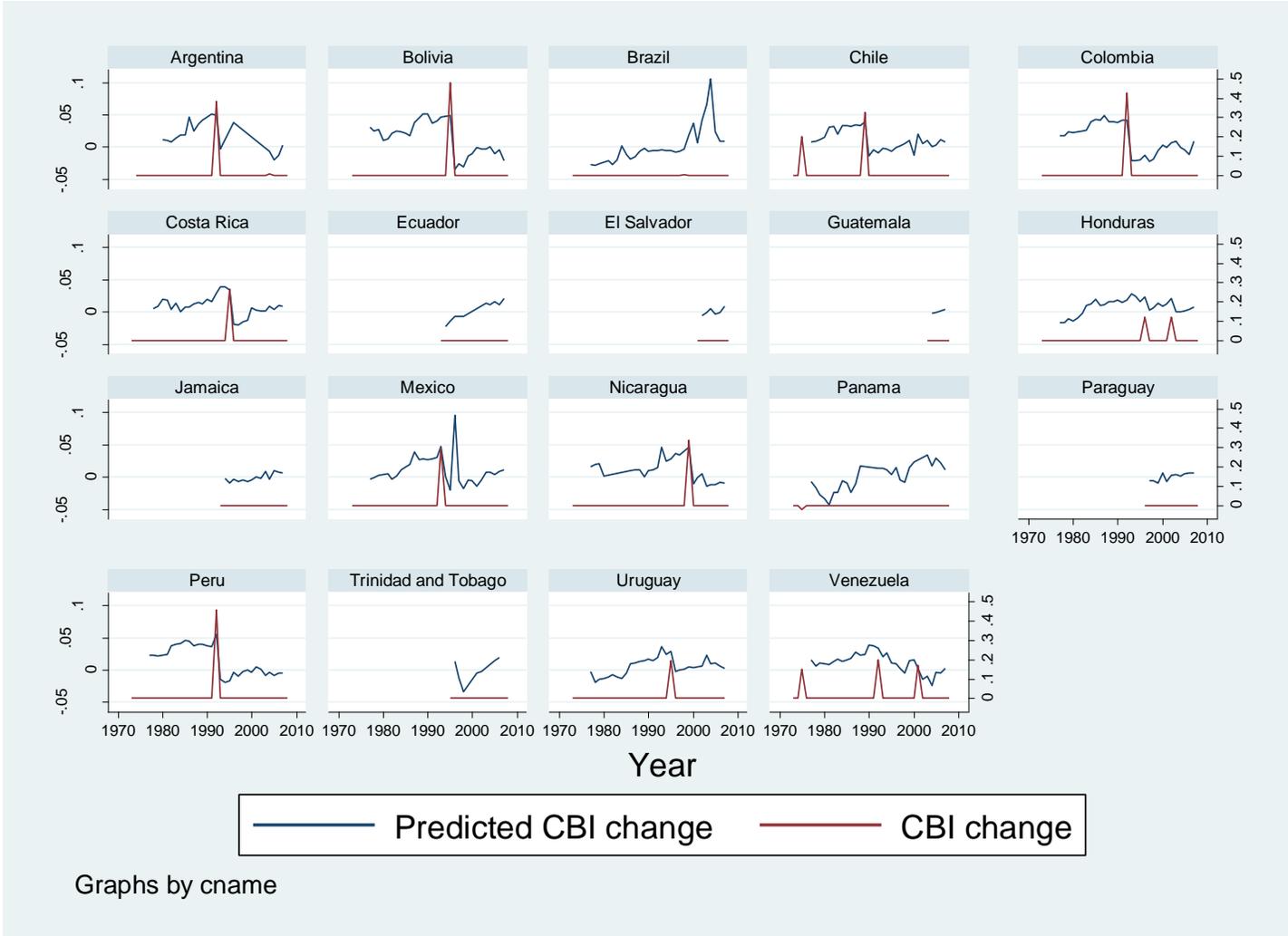


Figure 4.8.1. Predicted *CBI change* and actual CBI changes

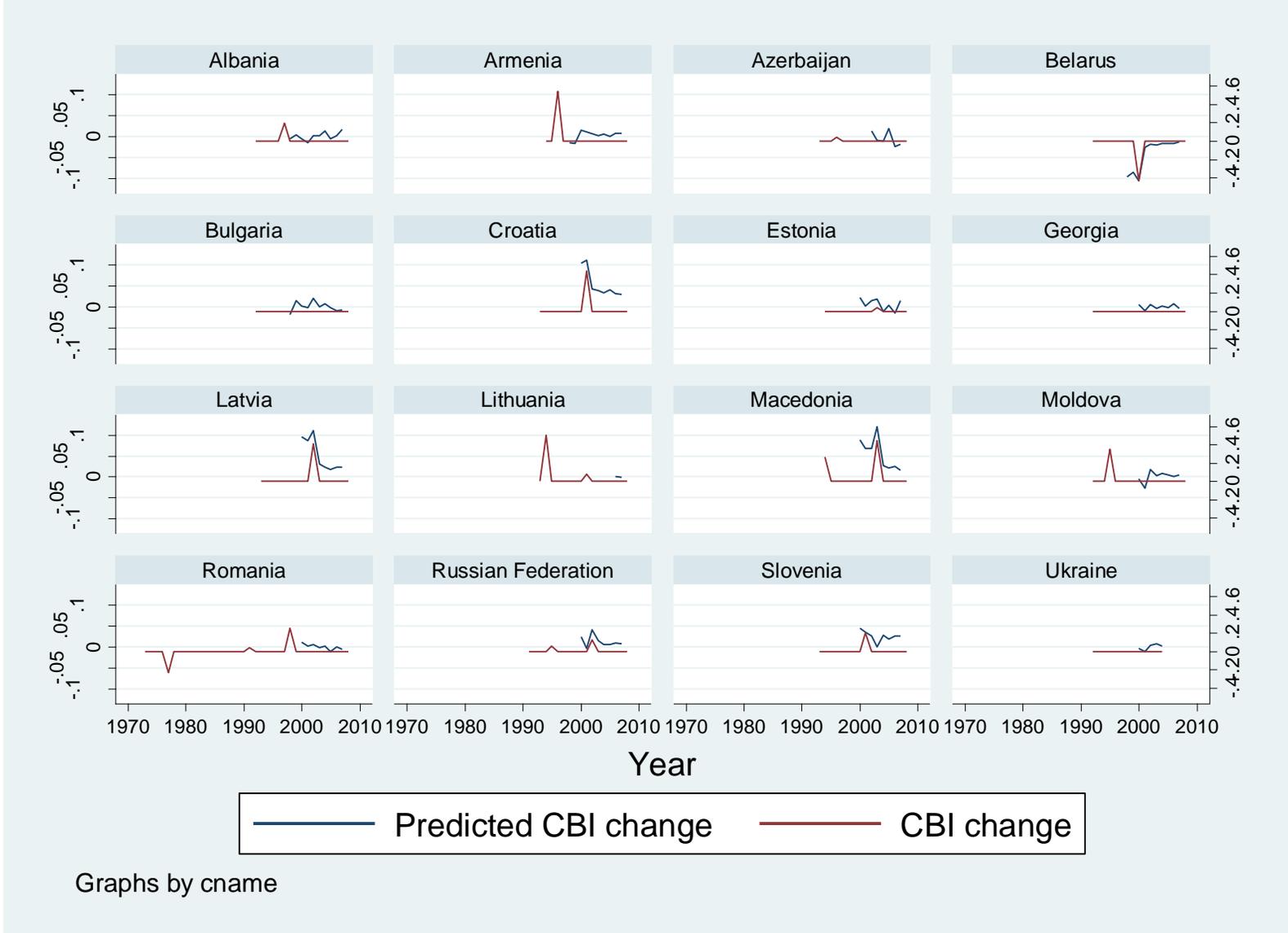


Figure 4.8.2. Predicted *CBI change* and actual CBI changes

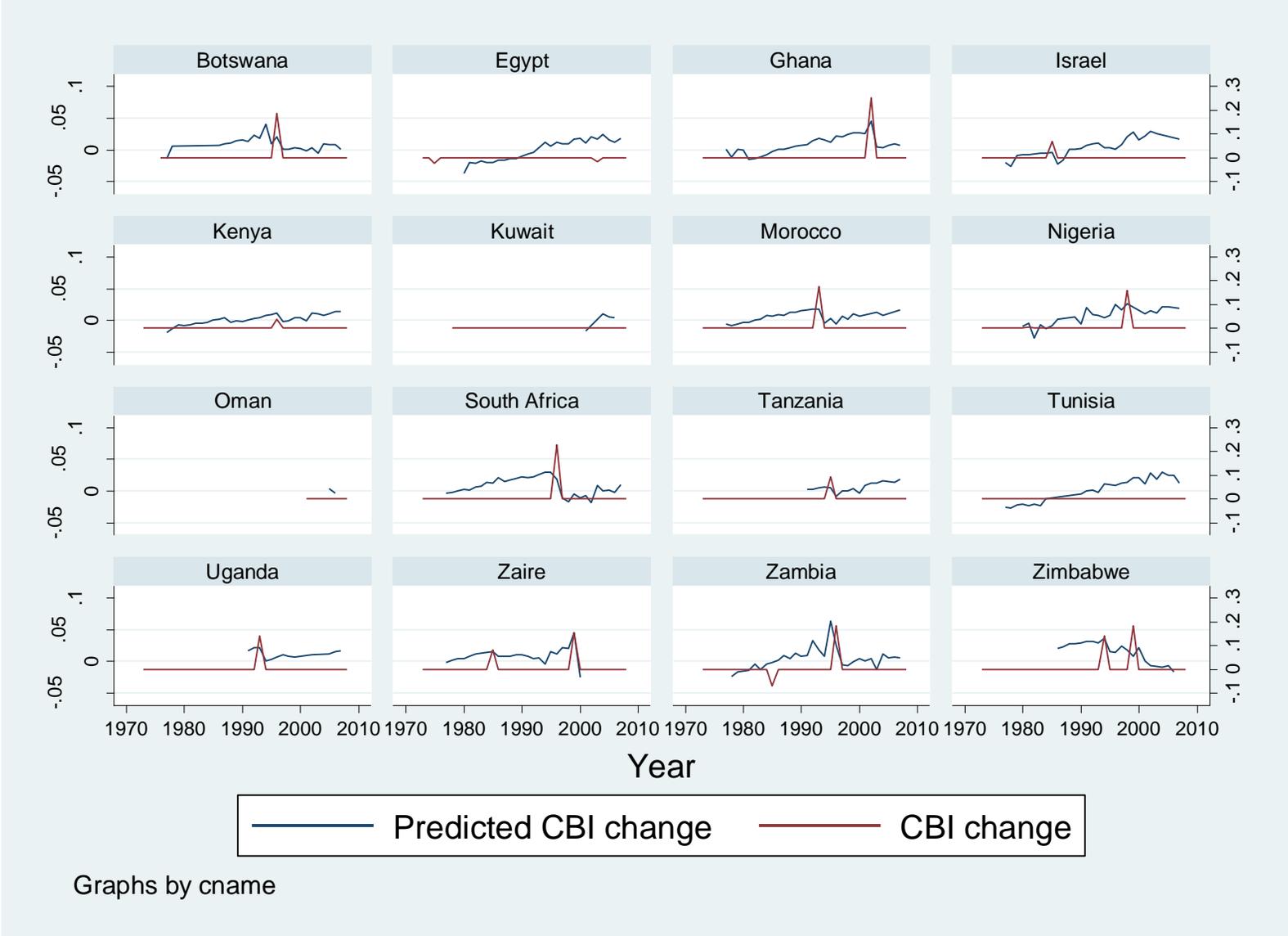


Figure 4.8.3. Predicted *CBI change* and actual CBI changes

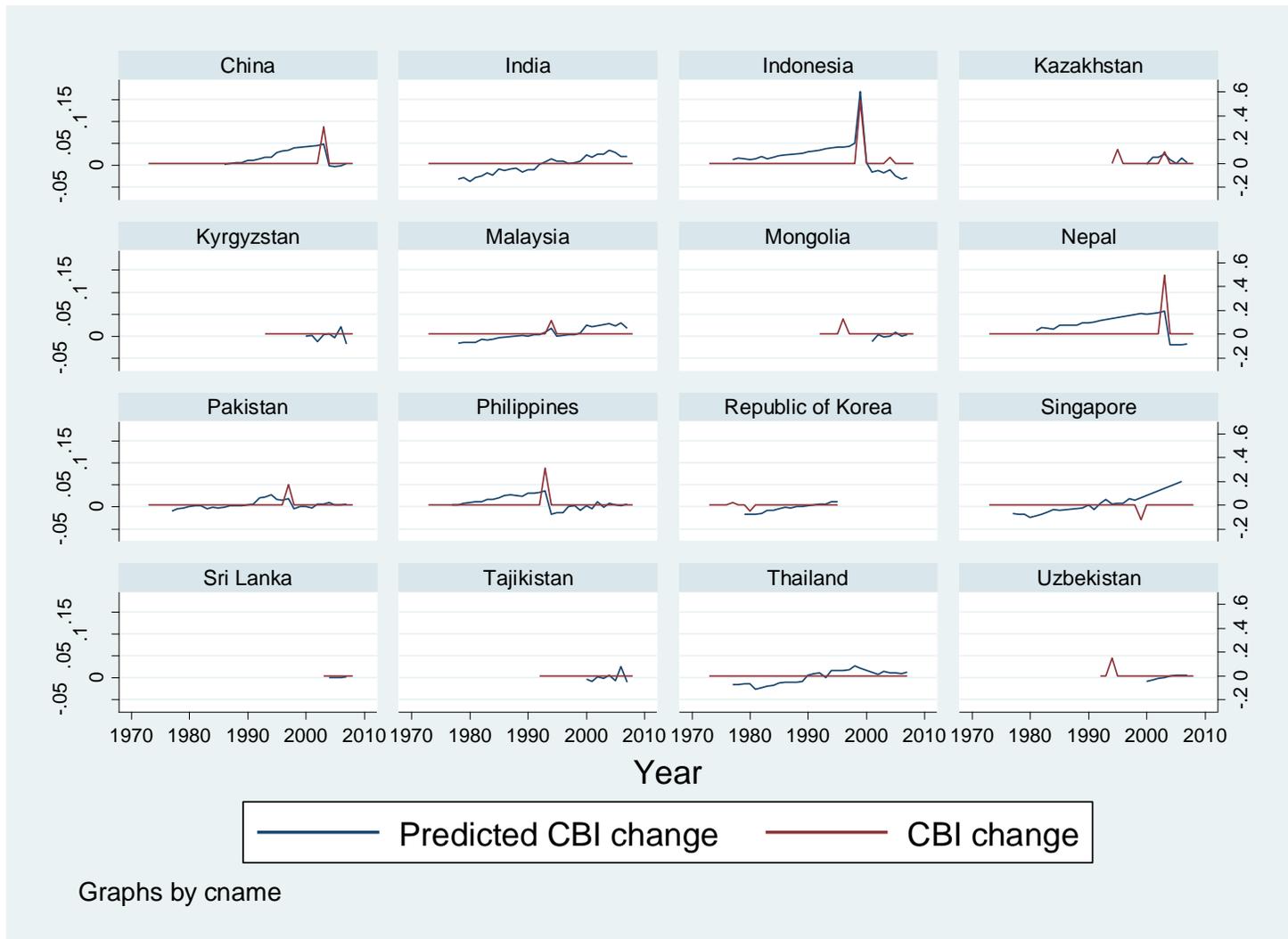


Figure 4.8.4. Predicted *CBI change* and actual CBI changes

Figure 4.8. Predicted *CBI change* and actual CBI changes
 Predictions generated after running the baseline model

4.2.7 A note on endogeneity

The negative and statistically significant result associated with the variable *Growth* may raise concerns about endogeneity. There are two answers to these concerns. First, the literature has failed to show a robust association between CBI and growth in different samples (Akhand 1998; de Haan and Kooi 2000; Fuhrer 1995).¹¹⁶

Second, Table 4.14 presents results of basic models predicting *Growth* and including *CBI change* as independent variable. I have run these models on the sample used in this dissertation in order to test the existence of a statistically significant relationship between *CBI change* and *Growth*. I run two types of models: random effect GLS regressions with AR(1) disturbances, and fixed effects (within) OLS regressions with AR(1). I run models incorporating and omitting *CBI change* on the full sample and on a subsample of developing countries. *CBI change* does not achieve statistical significance in any of the models. Furthermore, its inclusion does not seem to affect the results obtained in models without *CBI change*. These results provide some confidence regarding the absence of an endogenous relationship.

¹¹⁶ For a complete review of the empirical studies on the consequences of CBI, see Laurens, Arnone and Segalotto (2009:81-87).

Table 4.14. Effect of *CBI change* on *Growth*
Dependent variable: *Growth*

	Full sample				Developing countries			
	Model E1	Model E2	Model E3	Model E4	Model E1'	Model E2'	Model E3'	Model E4'
	Coefficient (<i>std. err</i>)							
Growth _{t-1}	.070 (.027)***	.070 (.027)***	.001 (.029)	.001 (.029)	.068 (.034)**	.070 (.034)**	.0005 (.038)	.002 (.036)
Population (log)	.113 (.151)	.113 (.151)	3.106 (1.146)***	3.102 (1.149)***	-.018 (.251)	-.021 (.251)	3.452 (1.448)**	3.397 (1.453)**
GDP per capita _{t-1}	-.125 (.038)***	-.125 (.038)***	-.817 (.133)***	-.817 (.133)***	-.248 (.069)***	-.247 (.069)***	-1.227 (.200)***	-1.225 (.199)***
GDP (log) _{t-1}	.00001 (.00003)	.00001 (.00003)	.0001 (.00005)**	.0001 (.00005)**	.0002 (.0003)	.0002 (.0003)	-.0003 (.0004)	-.0003 (.0004)
Government consumption _{t-1}	-3.69e-08 (8.54e-07)	-3.72e-08 (8.55e-07)	3.65e-06 (1.40e-06)***	3.65e-06 (1.40e-06)***	2.47e-06 (2.24e-06)	2.47e-06 (2.24e-06)	.00001 (4.35e-06)**	.00001 (4.34e-06)**
Peg _{t-1}	.560 (.377)	.560 (.377)	.200 (.493)	.199 (.494)	.324 (.538)	.324 (.538)	.229 (.702)	.215 (.702)
Capital Openness _{t-1}	.284 (.135)**	.284 (.136)**	.581 (.186)***	.581 (.187)***	.390 (.189)**	.386 (.189)**	.653 (.266)***	.648 (.266)***
Democracy _{t-1}	.010 (.026)	.010 (.026)	-.017 (.038)	-.017 (.038)	.020 (.033)	.019 (.033)	-.021 (.047)	-.021 (.047)
Conflict _{t-1}	1.491 (1.536)	1.491 (1.536)	.401 (1.733)	.401 (1.733)	1.64 (1.772)	1.65 (1.773)	.030 (2.028)	.032 (2.029)
Δ CBI_{t-1}		.019 (2.524)		.113 (2.494)		1.995 (3.969)		1.600 (3.882)
Africa	-.297 (.589)	-.297 (.589)			.160 (.671)	.174 (.671)		
Asia	2.175 (.513)***	2.175 (.514)***			3.007 (.711)***	3.025 (.712)***		
Western Europe	.259 (.543)	.259 (.543)			-4.643 (6.060)	-4.595 (6.055)		
Ctral. & Eastern Europe	-6.957 (2.041)***	-6.957 (2.042)***			-6.610 (2.327)***	-6.596 (2.325)***		
Middle East	1.337 (.629)**	1.337 (.629)**			2.234 (.836)***	2.242 (.836)***		
Intercept	3.175 (.561)***	3.175 (.562)***	-.207 (2.686)	-.198 (2.692)	3.270 (.741)***	3.250 (.740)***	-2.702 (3.390)	-2.559 (3.407)

Table 4.14 (continued)

	Full sample				Developing countries			
	Model E1	Model E2	Model E3	Model E4	Model E1'	Model E2'	Model E3'	Model E4'
	Coefficient <i>(std. err)</i>							
N	1330	1330	1265	1265	858	858	813	813
R ² : within	0.0541	0.0541	0.0435	0.0435	0.0516	0.0522	0.0645	0.0645
Between	0.4879	0.4879	0.1258	0.1258	0.5454	0.5459	0.0673	0.0673
Overall	0.1463	0.1463	0.0374	0.0374	0.1631	0.1642	0.0263	0.0263
Wald χ^2	(15)101.25	(16)101.17			(15) 85.30	(16) 85.93		0
F			(10,1192) 6.03	(9,1191) 5.42			(9,760) 5.83	(10,759) 5.25
Prob > χ^2 / Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is change in *Growth*. Estimation is by random effect GLS regression with AR(1) disturbances in models E1, E2, E1', and E2'. Estimation is by fixed effects (within) regression with AR(1) disturbances in models E3, E4, E3', and E4'. Standard errors are in italics. Observations with missing values for the variable $\Delta CBI_{i,t}$ have been omitted from the models in order to facilitate comparison. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

4.3 FINAL REMARKS

This chapter presents the empirical test of the first level of the theory: the international determinants of CBI in developing countries. The analysis provides support for most of the implications derived from the theory. First, CBI seems to respond to a different set of determinants in developed and in developing countries. Second, and focusing on developing countries, the empirical analysis provides strong support for the first four hypotheses. Developing countries seem to respond to growth problems by increasing their CBI. Low growth rates or negative deviations from the growth trajectory are associated with increases in CBI. The same is happens when countries are losing FDI or are more indebted. The effect of these factors is magnified when combined: countries growing at low rates or experiencing negative growth that are also losing FDI and/or are highly indebted are expected to increase their central bank independence even more.

Regarding the effect of the expected credibility of the signal, although I have found support for the sunk cost hypothesis, the relationship between previous levels of CBI and central bank reform seems to be non-linear. Finally, regarding the audience costs hypothesis, although democracy does not seem to have a significant impact on the decision to reform the central bank, finer analyses show that democracy has both a direct and an indirect impact on CBI change: when I account for the indirect effect of democracy, the empirical analysis shows that democracy not only has the expected positive effect on CBI change, but it also conditions the effect of the variables of interest on CBI.

The baseline model satisfactorily predicts changes in CBI in most of the cases. In this chapter, however, politics are static. In part because of the need to determine the existence of a

particular behavior in developing countries, and in part because of the characteristics of a sample that combines democracies and non-democracies, presidential and parliamentary systems, I did not test how domestic political dynamics affect the decision to reform central bank. The next chapter explores the political dynamics behind the decision to reform central banks.

5.0 DOMESTIC DETERMINANTS OF CENTRAL BANK INDEPENDENCE

5.1 INTRODUCTION

In the previous chapter, I show that changes in CBI respond to a series of factors defined as need for capital. Developing countries experiencing growth problems, losing FDI and/or highly indebted seem to increase their CBI in order to attract foreign capital. The use of CBI as a signal to attract foreign investors or lenders is conditional to the credibility of the signal.

The second level of my theory explains what factors should affect a country's elasticity to international demands for CBI under need for capital. I argue that two factors condition governments' responses to international incentives for central bank reform: the capacity of the president and the congress in the inter-institutional bargaining, and the distance between the president's and congress's preferences. This chapter presents an empirical test of the second set of hypotheses derived from that argument (see Table 5.1).

Table 5.1. Summary of hypotheses. Domestic institutional hurdles

	Hypotheses
<i>Elasticity of the signal supply</i>	<p>6. <i>Presidential powers</i> Central bank reform is more likely the stronger the presidential powers are.</p>
	<p>7. <i>Congress's capacity</i> Central bank reform is more likely the less effective the legislature is.</p>
	<p>8. <i>Preference distance</i> Central bank reform is less likely the more distant the executive and the congress's preferences are.</p>
	<p>9. <i>Preference distance and Congress's capacity</i> Preference distance reduces the likelihood of central bank reform more in effective than in non-effective legislatures.</p>

5.2 EMPIRICAL EVIDENCE

5.2.1 Baseline model and description of variables

In order to test the hypotheses derived from the theory, I run the following baseline model:

$$\text{REFORM}_{it} = \beta_0 + \beta_1 \text{PRESIDENTIAL POWERS} + \beta_2 \text{CONGRESS'S CAPACITY} + \beta_3 \text{PREFERENCE DISTANCE} + \beta_4 \text{PREFERENCE DISTANCE*CONGRESS'S CAPACITY} + \sum \beta_k \text{INTERNATIONAL DETERMINANTS} + \sum \beta_n \text{CONTROL VARIABLES} + \epsilon$$

The dependent variable is *Reform*. Reform_{it} is a dichotomous variable that indicates a central bank reform increasing CBI in a given year. Out of 734 country-year observations, there are 38

instances of central bank reforms increasing CBI (5% of the sample of developing democratic countries).

I proxy *Presidential powers* with the Executive constraints variable from Polity IV (Marshall and Jaggers 2008). Executive constraints measures the institutionalized constraints that “accountability groups” impose on the decisionmaking powers of chief executives (Marshall and Jaggers 2007:23). In Western democracies, said “accountability groups” are principally the legislatures. This variable ranges from 1 (Unlimited Authority) to 7 (Executive Parity or Subordination) (Marshall and Jaggers 2007:23-24). Although this variable measures institutionalized constraints, it is not only coded based on *de jure* constraints. For example, the suspension of the Constitution or the repeated uses of decree, as well as failed executive’s attempts to change some constitutional restrictions or legislation affect the scores assigned to countries. I have made two changes in the coding of this variable: First, I have re-scaled this variable from 0 to 6 in order to facilitate the interpretation of the models. Second, I have inverted the scale: zero indicates the highest levels of constraints on the executive, and fewer constraints are reflected as increases in *Presidential powers*.

To measure the *Congress’s capacity* I use the Bank’s measure of effectiveness of the legislature (variable S19F3). Legislative effectiveness is an ordinal variable indicating the relative leverage of the legislature (if any) in the political process. It ranges from 0 (no legislature exists) to 3. It is coded 1 (*ineffective*) if the legislature is a “rubber stamp;” if turmoil makes the implementation of legislation impossible; or if the executive prevents the legislature’s exercise of its functions. It is coded 2 (*partially effective*) when the executive outweighs, but does not completely dominate the legislature.

Finally, it is coded 3 (*effective*) when the legislature includes substantial legislative authority over taxation and spending, and the power to override executive vetoes (Banks 2005:15).¹¹⁷

To proxy the distance between the executive and the legislature's preferences I use different measures. First, I include a measure of *Opposition share* built on the Database on Political Institutions' (DPI) variable MARGIN OF MAJORITY (Beck *et al.* 2001). Margin of majority is the fraction of seats held by the government in the legislature. It is calculated by dividing the number of government seats by total seats (that is, seats that are aligned with the government plus opposition plus non-aligned) (Keefer 2007:14). *Opposition share* indicates the proportion of seats in the legislature that are occupied by the party or parties in the executive power and proxies the party-distance between the executive and the legislature. The source of the data is Beck *et al.* (2008).

I also include *Polarization*, using the POLARIZ variable from DPI (Beck *et al.* 2008). This variable measures "the maximum polarization between the executive party and the four principal parties of the legislative party" (Keefer 2007:20). It is computed as the maximum difference between (a) the head of the executive's party's value (according to the variable EXECRLC, used here to build the variable *Right*), and the values of the three largest government parties, and (b) the largest opposition party. *Polarization* equals zero both when chief executive's party has absolute majority in Congress, and when elections are not competitive (Keefer 2007:20).¹¹⁸

I include variables already defined in Chapter 4: the international determinants of CBI (*Growth*, *FDI change*, *Debt*, and previous level of CBI), economic and political controls (*Inflation*, *Peg*, *Capital Openness*, *Federal*, and *Right*), and temporal and regional controls (*Year count*, *Latin America*, *Africa*, and *Asia*). To control for diffusion, I replace Δ CBI world, used in Chapter 4's models, with

¹¹⁷ Note that only 8 observations in the dataset score 0 in this variable: Haiti 1990, Panama 1989, Sierra Leone 1998-2001, and Indonesia 2005-2006.

¹¹⁸ Notice however, that the sample used in this chapter includes developing *democratic* countries. Therefore, most cases coded zero in this variable corresponds to cases of unified government.

World reforms, a count of central bank reforms increasing CBI in a given year in the rest of the world. The change in the control variable for diffusion is made to be consistent with the change in the dependent variable

Table 5.2. Summary of hypotheses, independent variables, and expectations

		Hypotheses	Independent variables	Expectations
Level 2. Domestic institutional hurdles	<i>Elasticity of the signal supply</i>	<i>6. Presidential powers</i> Central bank reform is more likely the stronger the presidential powers are.	Presidential powers	(+)
		<i>7. Congress's capacity</i> Central bank reform is more likely the less effective the legislature is.	Congress's capacity	(-)
		<i>8. Preference distance</i> Central bank reform is less likely the more distant the executive and the congress's preferences are.	Opposition share Polarization	(-)
		<i>9. Preference distance and Congress's capacity</i> Preference distance reduces the likelihood of central bank reform more in effective than in non-effective legislatures.	Opposition share* Congress's capacity Polarization* Congress's capacity	(-)

Sample and unit of analysis. For the statistical analyses, the unit of analysis is country-year. The models are run on a sample of presidential democratic developing countries, between 1973 and 2008. Some model specifications restrict the number of observations that can be used for the statistical analyses. In particular, models including variables from the Database on Political Institutions (Beck et al. 2008) restrict the sample to 1975-2007.

For descriptive statistics, see Table 5.3. For means and standard deviation of political variables by country in the years included in the sample, see Table 5.4.

Table 5.3. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Reform	734	.0517711	.2217157	0	1
Presidential powers	620	1.169355	1.104564	0	5
Congress's capacity	736	2.033967	.6620426	0	3
Polarization	570	.6140351	.8804533	0	2
Opposition share	563	.3798071	.2011139	0	.8916667
Growth_{t-1}	809	3.677043	5.012826	-44.4441	27.46172
ΔFDI/GDP_{t-1}	688	349.0998	2.051266	338.1952	362.8128
IMF use_{t-1}	821	4.272136	16.09712	0	190.565
CBI_{t-1}	490	.5183234	.203773	.21	.8607843
Need for capital (index)_{t-1}	835	1.390419	.8723871	0	3
Need for capital (dichotomous)_{t-1}	835	.4287425	.4951929	0	1
Inflation (log)_{t-1}	762	2.343842	1.361837	-1.35939	9.518681
Peg_{t-1}	839	.2693683	.4438962	0	1
Capital Openness_{t-1}	732	.1574588	1.493527	-1.797522	2.539847
Federal	852	.7394366	.4391999	0	1
Right_{t-1}	660	.4409091	.4968725	0	1
World reforms_{t-1}	827	7.25393	4.156543	0	14
Year count	852	21.91197	9.452236	0	35
Latin America	852	.5399061	.4986977	0	1
Africa	852	.258216	.4379104	0	1
Asia	852	.17723	.3820876	0	1

Table 5.4. Political variables' descriptive statistics
Mean and standard deviation per country for the years included in the sample (years of democracy)

Country	Presidential powers		Congress capacity		Polarization		Opposition share	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Argentina	1.222	.801	2	0	.708	.751	.485	.046
Bolivia	.192	.981	2	0	1.269	.827	.430	.169
Botswana	1.118	.844	2	0	0	0	.180	.086
Brazil	1.136	.351	2	0	1.5	.859	.381	.138
Chile	0	0	2.944	.236	1.333	.970	.426	.031
Colombia	.882	.327	2.471	.507	.286	.713	.274	.285
Comoros	.5	1	1.75	.5	0	0	0	0
Costa Rica	0	0	3	0	1.125	.942	.511	.055
Cyprus	.059	.243	2	0	1.231	1.013	.366	.195
Dominican Rep.	1.971	.969	2	0	.903	.908	.460	.196
Ecuador	.393	.497	2	0	1.864	.468	.616	.156
El Salvador	2	0	2	0	1.217	.902	.514	.090
Gambia	2	0	2	0	0	0	.190	.057
Ghana	2.313	1.195	1.188	.403	.5	.894	.281	.204
Guatemala	2.9	1.470	1.7	.466	0	0	.457	.037
Honduras	1.88	.332	2	0	0	0	.474	.028
Indonesia	1	0	1	0	0	0	.436	.108
Kenya	2.333	1.581	1	0	0	0	.466	.042
Malawi	1.923	.641	2	0	0	0	.471	.156
Mexico	1.2	.422	2	0	.6	.516	.533	.065
Nicaragua	1.364	1.677	1.773	.429	.5	.889	.392	.146
Nigeria	1.333	.985	1.333	.492	0	0	.413	.036
Panama	1	0	1.667	.594	0	0	.451	.218
Paraguay	.722	1.526	2	0	.889	1.023	.428	.078
Philippines	.75	.444	1.952	.218	.286	.463	.254	.127
Sierra Leone	2	0	.6	.516	0	0	.302	.029
South Africa	0	0	3	0	0	0	.246	.158
Uruguay	0	0	2	0	1.364	.953	.267	.211
Venezuela	1.265	.511	2.912	.288	.5	.889	.524	.120
Zambia	2	0	2	0	0	0	.14	.080

5.2.2 Statistical analysis

The limited dependent variable and the panel nature of the data impose some restrictions to the analysis. There are two common techniques to analyze binary dependent variables: logit and probit analyses. Although both models have similar assumptions, they differ in the assumed functional form.¹¹⁹ However, the results produced by logistic and probit regressions are very similar. I run probit regressions because the statistical software in use has more convenient post-estimation features for panel probit than for panel logit analyses. Re-running the models using logistic regressions produces comparable results. Because the data under analysis is cross-sectional time-series, I run probit analyses for panel data (*xtprobit*).

A series of Hausman tests suggest that fixed-effects models are *not* preferable over the random-effects models.¹²⁰ Wooldridge tests suggest the presence of first order autocorrelation in the panel,¹²¹ and the convenience of including AR1 Prais-Winsten transformations to correct for autocorrelation. In order to include AR1 correction, the *xtprobit* analyses need to be population averaged. Finally, since I am particularly concerned about heteroskedasticity in these models, I include robust standard errors.

5.2.2.1 A word of caution on the interpretation of results

The results presented in this chapter (Tables 5.5 to 5.10) are coefficients produced by probit analyses and are conditional on the level of interactions. The coefficients produced by these models

¹¹⁹ Logistic distributions have “flatter tails,” that is, their curve approaches the horizontal axis more quickly than the normal or probit curves.

¹²⁰ The χ^2 of the Hausman tests are very low (<10) and with probability $>\chi^2 >.4$. Therefore, I *cannot* reject the null hypothesis stating that the difference in the coefficient is not systematic (that is, stating that the difference is random). This suggests that the fixed-effects models are not necessary.

¹²¹ Wooldridge tests for autocorrelation in panel data indicate that it is possible to reject the null hypothesis stating that no first-order autocorrelation, at a .01 level of statistical significance.

do not have a direct interpretation. Like all maximum likelihood estimates, they indicate the direction and the statistical significance of the impact of the independent variables, when other variables included in the model are held to zero. However, the likelihood varies at different levels of the rest of the independent variables. These models are also conditional on *Congress capacity* and on *Polarization*. Therefore, the direction of the coefficients is true only when the rest of the variables included in the model equal zero. Although this is a common interpretation, note that the coefficients of variables included in the interactions change their direction as soon as the other variable included in the interaction differs from zero.

In the next sections I first show the robustness of the results to different model specifications without speculating about the direction of the coefficients included in interactions. The direct and indirect substantive effect of said variables will be analyzed in each in section 6.2.4 and onward.

5.2.3 The baseline model for domestic determinants of central bank reform

Tables 5.5 and 5.6 show a series of models in order to justify the selection of the baseline model to test the second level of the theory. Some of the models presented in Table 5.5 are knowingly overspecified. However, the purpose of these models is not to draw causal inferences, but to show the robustness of the coefficients included in the more parsimonious baseline model.

Table 5.5. Domestic determinants of *central bank reform*. Baseline model selection
Panel Logit Generalized Estimating Equations with AR1 Correction, and standard errors adjusted for clustering on country

	Model 7a	Model 7b	Model 7c	Model 7d	Model 7e	Model 7f	Model 7g	Model 7h
	Coefficient (semi-robust std. err)							
Presidential powers	.055 (.087)	-.068 (.089)	.068 (.090)	.044 (.091)	.067 (.092)	.339 (.144)**	.315 (.159)**	.358 (.158)**
Congress capacity	.499 (.196)***	.619 (.408)	.526 (.187)***	1.222 (.209)***	1.102 (.212)***	.943 (.242)***	2.140 (.485)***	2.059 (.493)***
Polarization	1.061 (.364)***		1.103 (.388)***	.142 (.105)	.807 (.447)*	1.546 (.455)***	.323 (.163)**	1.100 (.506)***
Opposition share		3.927 (1.684)**	.386 (.369)	5.926 (1.507)***	4.013 (1.689)**	.821 (.634)	9.797 (2.771)***	7.768 (2.916)***
Polarization * Congress capacity	-.425 (.155)***		-.451 (.170)***		-.308 (.200)	-.575 (.185)***		-.351 (.208)*
Opposition share * Congress capacity		-1.659 (.680)**		-2.595 (.642)***	-1.685 (.751)**		-3.996 (.995)***	-3.045 (1.098)***
<i>International determinants</i>								
Growth _{t-1}						-2.130 (1.702)	-2.615 (1.626)*	-2.627 (1.745)
ΔFDI/GDP _{t-1}						-0.034 (.045)	-0.047 (.044)	-0.045 (.045)
Growth _{t-1} *ΔFDI/GDP _{t-1}						.006 (.005)	.008 (.005)	.008 (.005)
IMF use _{t-1}						.005 (.004)	.005 (.003)	.005 (.003)
Growth _{t-1} * IMF use _{t-1}						-.003 (.0009)***	-.004 (.0008)***	-.004 (.0009)***
CBI _{t-1}						-1.026 (.659)	-1.447 (.727)**	-1.293 (.725)*
Intercept	-2.837 (.506)***	-2.984 (1.017)***	-3.026 (.481)***	-4.500 (.590)***	-4.279 (.586)***	7.553 (15.342)	9.503 (15.243)	8.931 (15.467)
N	523	510	466	466	466	340	340	340
Wald χ^2	(4) 10.98	(4) 8.95	(5) 12.19	(5) 71.41	(6) 102.22	(11) 382.10	(11) 248.75	(12) 227.66
Prob > χ^2	0.0267	0.0624	0.0323	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is *Reform* (increase in CBI). Estimation is by panel probit generalized estimating equations (*xtprobit*) with AR1 correction, and standard errors adjusted for clustering on country. Semi-robust standard errors are in italics. ΔFDI/GDP_{t-1} is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

Models 7a to 7e include only the variables that address the domestic level of the theory. Models 7f to 7h include the variables shown to determine changes in CBI in developing countries in the previous chapter. There is one change in this set of variables: the exclusion of *Democracy*. I exclude *Democracy* because the composite index Polity2 is highly correlated with one of its components, executive constraints, used to measure *Presidential powers*.¹²² Furthermore, given that the sample is restricted to democratic presidential systems, the theoretical contribution of *Democracy* and its substantive impact are greatly reduced.

In almost all these models,¹²³ the coefficients maintain their direction; however, the statistical significance of them is lost in some specifications. The coefficient associated with *Presidential powers* is positive, as expected, and achieves statistical significance in models that include the international determinants of CBI. The coefficients associated with *Congress capacity*, *Polarization* and *Opposition share* are positive and statistically significant. The direction of the coefficients is the opposite to the expected direction; however, these coefficients represent the effect of unit increases in these variables when the other variables included in the interaction terms equal zero (at some levels of other variables, these coefficients become negative, as expected). Finally, the interaction terms are consistently negative and achieve statistical significance in most of the specifications.

Because of the sample size, it is not reasonable to include all the control variables used in the previous chapter's baseline model. Models 7f to 7h include the variables shown to determine changes in CBI in developing countries in the previous chapter, with the exclusion of *Democracy*. Two notes on these models: First, the coefficients associated with the international determinants of the levels of CBI have the same direction than in Chapter 4's models. However, in most cases, they

¹²² In the sample of presidential developing countries used for these models, the correlation is .85.

¹²³ The only exception is the non-statistically significant *negative* coefficient associated with *Presidential powers*, in Model 7b (see Table 5.4).

do not achieve statistical significance. This can be attributed to changes in the dependent variable, in the modeling technique, the omission of controls, and in the sample.

Because of concerns about overspecification, I replace the set of variables that controlled for the existence of need for capital for a *Need for capital index*. This index equals zero when a country does not experience growth problems, is not losing FDI and is not using of IMF credit. The presence of each of these problems is registered as a unit increase in the index: if a country is growing at a rate below the sample mean, if a country has lost FDI or if the country is using IMF credit. *Need for capital index* ranges between zero and three. Although there is an important information loss, this operationalization of need for capital allows running models with controls that are specific for the relationships under study in this chapter.

Replacing the growth, FDI, and debt variables and their interactions with *Need for capital index* does not alter the coefficients associated with the variables of interest (see Model 8a, Table 5.6). The remaining models in Table 5.6 include additional controls that were part of the models of the changes in CBI in developing countries. Model 8b includes the economic controls: the previous level of inflation, the exchange rate system and capital openness. None of these variables is statistically significant. Model 8c includes the political controls except for *Presidentialism* because the sample is restricted to presidential systems. Neither *Right* nor *Federal* achieves acceptable levels of statistical significance. Model 8d includes a control for diffusion, regional and a year count. In this model, I replace ΔCBI_{world} with *World reforms*, the sum of reforms in the world in a given year to be consistent with the change in the dependent variable. The control for diffusion is positive and statistically significant both in models including the temporal and regional controls, and when it is included alone (not reported). *Year count* does not achieve statistical significance. Finally, the regional controls suggest a statistically significant difference between Asian countries and Latin

American and African countries: holding other things constant, Asian developing presidential countries are more likely to reform their central banks than Latin American or African¹²⁴ countries.

Model 8f includes all the control variables that were included in the baseline model in the previous chapter. Finally, Models 8f and 8g include a selection of controls, based on theoretical reasons. These models include controls for partisanship, diffusion, and Model 8g includes a control for inflation.

As shown in Table 5.6, the inclusion of different controls does not affect the direction of the coefficients associated with the variables of interest. *Polarization* and its interaction with *Congress capacity* do not achieve statistical significance in some models. In particular, the interaction term does not achieve statistical significance in any of the models with controls. *Polarization* loses statistical significance in models that include *World reforms*.

Because of parsimony and because the results do not change significantly with the addition of other controls, Model 8g is used as baseline model. The following paragraphs describe the baseline model's results. Inferences from the models will be made once appropriate controls are added in the sections that follow this description.

In this model, the coefficient associated with *Presidential powers* is positive and achieves statistical significance. The coefficient associated with *Congress capacity* is positive and statistically significant, suggesting that increases in legislative efficiency make central bank reform more likely. This result contradicts hypothesis 7's expectations. However, the model includes interaction terms between *Congress capacity* and *Opposition share*, between *Congress capacity* and *Polarization*. Section 5.2.5 discusses the direct and indirect effects of *Congress capacity*.

¹²⁴ These results are found in models changing the omitted category. Models not reported.

Table 5.6. Domestic determinants of *central bank reform*. Different controls
Panel Logit Generalized Estimating Equations with AR1 Correction, and standard errors adjusted for clustering on country

	Model 7h	Model 8a	Model 8b	Model 8c	Model 8d	Model 8e	Model 8f	Model 8g
	Coefficient (<i>semi-robust std. err</i>)							
Presidential powers	.358 (.158)**	.300 (.131)**	.410 (.127)***	.305 (.151)**	.341 (.159)**	.577 (.303)*	.285 (.150)*	.345 (.193)*
Congress capacity	2.059 (.493)***	1.769 (.363)***	1.883 (.337)***	2.129 (.538)***	1.729 (.412)***	2.755 (1.000)***	1.761 (.422)***	1.864 (.478)***
Polarization	1.100 (.506)***	1.034 (.459)**	1.101 (.551)**	.990 (.494)**	.979 (.601)*	.946 (.753)	.775 (.507)	.740 (.567)
Opposition share	7.768 (2.916)***	6.618 (2.392)***	5.884 (2.032)***	8.671 (2.718)***	5.769 (2.359)***	9.560 (2.904)***	7.145 (2.568)***	6.559 (2.761)**
Polarization *								
Congress capacity	-.351 (.208)*	-.342 (.200)*	-.375 (.241)	-.311 (.222)	-.357 (.250)	-.327 (.311)	-.255 (.218)	-.255 (.249)
Opposition share *								
Congress capacity	-3.045 (1.098)***	-2.601 (.939)***	-2.334 (.815)***	-3.567 (1.091)***	-2.102 (.965)**	-3.979 (1.203)***	-2.816 (.997)***	-2.720 (1.062)***
<i>International determinants</i>								
Growth _{t-1}	-2.627 (1.745)							
ΔFDI/GDP _{t-1}	-.045 (.045)							
Growth _{t-1} *ΔFDI/GDP _{t-1}	.008 (.005)							
IMF use _{t-1}	.005 (.003)							
Growth _{t-1} * IMF use _{t-1}	-.004 (.0009)***							
CBI _{t-1}	-1.293 (.725)*	-.982 (.804)	-1.833 (1.042)*	-1.005 (.890)	-1.808 (1.114)*	-3.224 (1.958)*	-1.206 (.848)	-1.886 (.884)**
Need for capital (index) _{t-1}		-.016 (.158)	-.118 (.153)	-.025 (.172)	-.097 (.183)	-.327 (.204)	-.076 (.184)	-.181 (.162)
Control variables								
Inflation (log) _{t-1}			-.015 (.056)			-.021 (.091)		-.030 (.073)
Peg _{t-1}			-.500 (.532)			-1.120 (1.140)		
Capital openness _{t-1}			.200 (.129)			.153 (.165)		

Table 5.6 (continued)

	Model 7h	Model 8a	Model 8b	Model 8c	Model 8d	Model 8e	Model 8f	Model 8g
	Coefficient <i>(semi-robust std. err)</i>							
Right _{t-1}				.244 <i>(.203)</i>		.746 <i>(.354)**</i>	.174 <i>(.182)</i>	.428 <i>(.237)*</i>
Federal _{t-1}				.153 <i>(.357)</i>		.035 <i>(.488)</i>		
World reforms _{t-1}					.074 <i>(.030)***</i>	.109 <i>(.027)***</i>	.100 <i>(.029)***</i>	.124 <i>(.020)***</i>
Year count					.018 <i>(.024)</i>	.028 <i>(.050)</i>		
Africa					-.162 <i>(.323)</i>	-.247 <i>(.298)</i>		
Asia					.575 <i>(.316)*</i>	1.433 <i>(.570)***</i>		
Intercept	8.931 <i>(15.467)</i>	-5.865 <i>(.961)***</i>	-5.525 <i>(.783)***</i>	-6.886 <i>(1.310)***</i>	-6.382 <i>(1.115)***</i>	-8.805 <i>(2.569)***</i>	-6.648 <i>(1.134)***</i>	-6.643 <i>(1.286)***</i>
N	340	345	325	342	345	323	342	329
Wald χ^2	(12) 227.66	(8) 104.07	(11) 218.14	(10) 79.54	(12) 263.81	(17) 3883.22	(10) 155.97	(11) 365.73
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is *Reform* (increase in CBI). Estimation is by panel probit generalized estimating equations (*xtprobit*) with AR1 correction, and standard errors adjusted for clustering on country. Semi-robust standard errors are in italics. $\Delta\text{FDI}/\text{GDP}_{t-1}$ is centered for all computations. The omitted category for the regional dummies is Latin America (South and Central America plus Mexico). Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

The coefficient associated with *Opposition share* is positive and statistically significant, contrary to hypothesis 8's expectations. The possible reasons for this result will be discussed below. However, note that in the baseline model, the coefficient associated with *Opposition share* becomes negative and statistically significant as expected when the congress is efficient, that is, when *Congress capacity* equals 3 (see Figure 5.1).

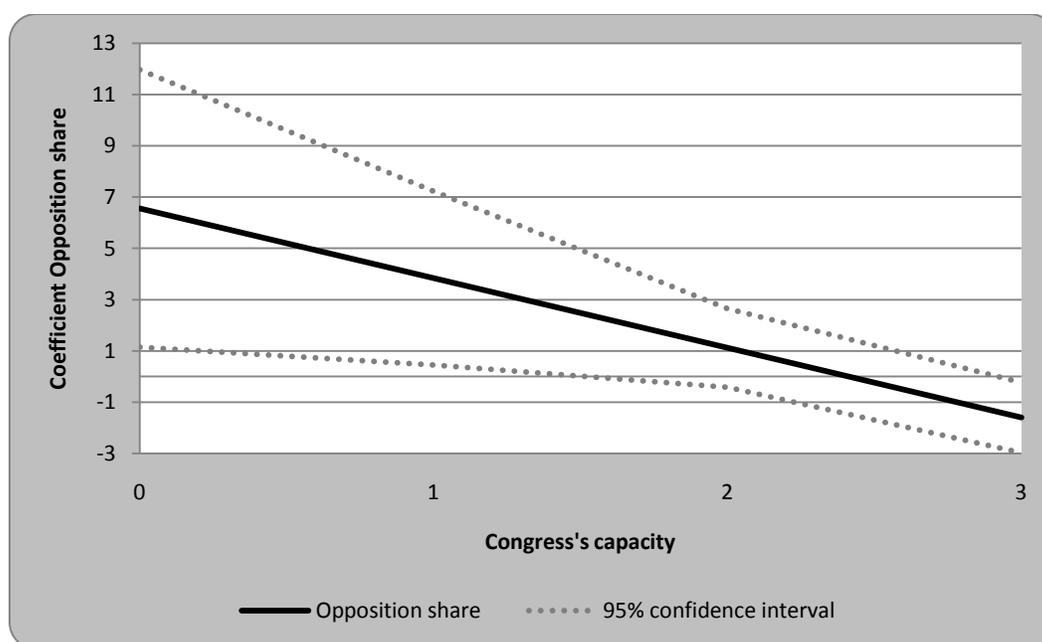


Figure 5.1. Central bank reform: Coefficient associated to *Opposition share*, conditional on *Congress capacity*
 Presidential democratic developing countries, 1975-2006
 Linear combination of coefficients estimated using *lincom* (Stata 10).

The coefficient associated with *Polarization* is positive but does not achieve statistical significance in the baseline model at any level of *Congress capacity*.

Regarding the control variables included in the baseline model, the previous level of CBI decreases the likelihood of central bank reform. However, this coefficient is statistically significant

in some specifications. In the baseline model, the previous level of CBI achieves statistical significance when *Inflation* is included.

The coefficient associated with *Inflation* is negative but does not achieve statistical significance. Partisanship seems to influence the likelihood of central bank reform: the coefficient associated with *Right* is positive, but it is not robust to all specifications. Finally, central bank reforms in the world increase the probability of reform in a given country.

5.2.3.1 Need for capital in the baseline model

In the baseline model, the variable used to control for the existence of growth problems, FDI loss, and debt (*Need for capital index*) does not achieve statistical significance. However, the theory does not predict need for capital to have a direct impact of the likelihood of central bank reform, but to offer the incentives for presidents to promote central bank reform. Therefore, *Need for capital* should condition the effects of the domestic determinants of central bank reform: for example, presidential powers should matter especially when the president has incentives to reform the central bank, and not necessarily under any circumstances.

In order to analyze this possibility, I run the baseline model (with and without *Inflation*) on two subsamples. First, I run the models on a subsample of countries needing capital, that is, of country-year observations that score 2 or 3 in the *Need for capital index* (Models 9a and 9b, Table 5.7).¹²⁵ Models 9c and 9d present the results of the same models, run on a subsample of countries scoring 0 or 1 in the *Need for capital index* (See Table 5.7).

¹²⁵ The cut point was chosen for theoretical reasons. In the previous chapters I have argued that need for capital appears not with mere growth problems, losses in FDI or debt, but when growth problems are coupled with any of the other two situations. There are no observations in the sample that score 2 in the *Need for capital index* and do not have growth problems. In other words, a score of 2 in the *Need for capital index* reflects a country that has growth problems and is either losing FDI or indebted.

Table 5.7. Domestic determinants of *central bank reform*. Samples split on capital need
Panel Logit Generalized Estimating Equations with AR1 Correction, and standard errors adjusted for clustering on country

	Model 8g		Model 9a (need for capital)		Model 9b (need for capital)		Model 9c (no need for capital)		Model 9d (no need for capital)	
	Coefficient <i>(semi-robust std. err)</i>	dy/dx (‡)	Coefficient <i>(semi-robust std. err)</i>	dy/dx (‡)	Coefficient <i>(semi-robust std. err)</i>	dy/dx (‡)	Coefficient <i>(semi-robust std. err)</i>	dy/dx (‡)	Coefficient <i>(semi-robust std. err)</i>	dy/dx (‡)
Presidential powers	.345 <i>(.193)*</i>	.017*	.150 <i>(.206)</i>		.216 <i>(.233)</i>		1.000 <i>(.479)**</i>	.019**	1.120 <i>(.418)***</i>	.015**
Congress capacity	1.864 <i>(.478)***</i>	.091***	2.512 <i>(.765)***</i>	.108***	2.541 <i>(.836)***</i>	.044	2.850 <i>(.854)***</i>	.053*	3.302 <i>(.684)***</i>	.045*
Polarization	.740 <i>(.567)</i>		1.686 <i>(.407)***</i>	.073**	1.748 <i>(.465)***</i>	.030	.448 <i>(1.793)</i>		.961 <i>(1.762)</i>	
Opposition share	6.559 <i>(2.761)**</i>	.319**	12.005 <i>(3.659)***</i>	.517***	11.718 <i>(3.780)***</i>	.201	4.779 <i>(5.955)</i>		6.730 <i>(5.586)</i>	
Polarization *	-255 <i>(.249)</i>		-670 <i>(.186)***</i>	-.029**	-663 <i>(.185)***</i>	-0.11	-119 <i>(.682)</i>		-276 <i>(.691)</i>	
Congress capacity										
Opposition share *	-2.720 <i>(1.062)***</i>	-.132***	-4.925 <i>(1.482)***</i>	-.212***	-4.78 <i>(1.530)***</i>	-0.82	-2.152 <i>(2.105)</i>		-2.819 <i>(2.031)</i>	
Congress capacity										
<i>International determinants</i>										
CBI _{t-1}	-1.886 <i>(.884)**</i>	-.092**	-.340 <i>(.911)</i>		-.675 <i>(.931)</i>		-4.090 <i>(1.211)***</i>	-0.76	-5.099 <i>(1.534)***</i>	-.070*
Need for capital (index) _{t-1}	-.181 <i>(.162)</i>									
<i>Control variables</i>										
Inflation (log) _{t-1}	-.030 <i>(.073)</i>				-.002 <i>(.001)</i>	-.00002**			-.001 <i>(.0004)***</i>	-0.00002
Right _{t-1} (†)	.428 <i>(.237)*</i>	.021**	-.179 <i>(.296)</i>		-.119 <i>(.320)</i>		1.164 <i>(.420)***</i>	.022	1.167 <i>(.377)***</i>	.016
World reforms _{t-1}	.124 <i>(.020)***</i>	.006***	.114 <i>(.061)**</i>	.005*	.106 <i>(.061)*</i>	-0.002	.165 <i>(.037)***</i>	.003	.176 <i>(.0418)***</i>	.016
Intercept	-6.643 <i>(1.286)***</i>		-8.995 <i>(2.397)***</i>		-8.875 <i>(2.625)***</i>		-9.650 <i>(2.859)***</i>		-10.614 <i>(2.198)***</i>	
Baseline probability y = normprob(xb)		.020		.017		.006		.007		.005
N	329		193		193		144		144	
Wald χ^2	(11) 365.73		(9) 180.10		(10) 129.43		(9) 335.45		(10) 621.22	
Prob > χ^2	0.0000		0.0000		0.0000		0.0000		0.0000	

Notes: Dependent variable is *Reform* (increase in CBI). Estimation is by panel probit generalized estimating equations (*xtprobit*) with AR1 correction, and standard errors adjusted for clustering on country. Semi-robust standard errors are in italics. Δ FDI/GDP_{t-1} is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<.10, ** P<.05, *** P<.01. (†) dy/dx is for discrete change of dummy variable from 0 to 1, holding the other regime dummy variable at zero. (‡) Marginal effects calculated using *mfx* command, holding all other variables at their *mean*. The statistical significance of the marginal effects may differ from the statistical significance in *xtprobit* analyses because the coefficients produced by *xtprobit* hold the other variables at zero.

Table 5.7's results suggest that the extent of presidential powers matters when the country is not in need of capital, but it is not relevant in predicting central bank reform when countries need capital. Similarly, preference distance between the executive and legislative branches seem to affect the likelihood of central bank reforms increasing CBI when the country is experiencing need for capital, but does not have a statistically significant impact when the country is not experiencing need for capital. The following sections describe these results in detail, and Section 5.2.8 interprets the findings.

5.2.4 Hypothesis 6: Presidential powers

The coefficient associated with *Presidential powers* in the baseline model is positive and statistically significant. This result is consistent with hypothesis 6: fewer constraints on the president are associated with a higher likelihood of reform increasing CBI. Because probit coefficients have no straightforward interpretation, I compute the marginal effects in order to provide a substantive interpretation of the impact of the independent variables. In Table 5.7, the column next to the coefficients shows the marginal effects (dy/dx) of a unit increase in the variable of interests, holding the rest of the variables at their mean (see Appendix A). Because the marginal effects and their standard errors are computed holding the other variables at their mean and not at zero, as the coefficients in the *xtprobit* regression, and the relationships modeled are not linear, the statistical significance of the marginal effects presented in Table 5.7 do not always identical to the statistical significance of the coefficients. To simplify the presentation of results, I report the marginal effects of the variables that achieve statistical significance in the *xtprobit* models, and the marginal effects of variables that achieve statistical significance when marginal effects are computed.

When all variables included in Model 8g are at their means, the probability of observing a central bank reform increasing CBI is .020 (for simplicity, I call this probability “baseline probability”). A unit increase in *Presidential powers* increases this baseline probability in .017. This is a very important effect, especially given that *Presidential powers* ranges between 0 and 6.¹²⁶ I re-run this analysis after Model 8f (without inflation). In this case, the baseline probability is .028, and the marginal effect of *Presidential powers* is .018.¹²⁷

In the subsample of countries not needing capital (Models 9c and 9d, Table 5.7), the marginal effect of *Presidential powers* is of a similar magnitude. However, in the subsample of countries needing capital (Models 9a and 9b, Table 5.7), neither the coefficient, nor the marginal effects of *Presidential powers* fall close of achieving statistical significance.

Table 5.8 shows the results of the baseline model with and without a control for *Inflation*, in the full sample and in a sample of countries needing capital, introducing two temporal controls: *Years to go* and *Presidential election*. Although the literature stresses the importance of the electoral cycle on the president’s legislative success (e.g., Altman Olin 2000; Amorim Neto 2002; Molinas, Pérez-Liñán and Saiegh 2004; Morgenstern 2001), neither of these controls achieves statistical significance or alters the results obtained in the baseline model.¹²⁸

¹²⁶ In the sample under analysis, *Presidential powers* ranges between 0 and 5. There are no cases of virtually unconstrained presidents. Most of the cases score between 0 and 2 (mean \pm 1 standard deviation). **Error! Reference source not found.** shows the mean and standard deviation for the observations included in the sample (democratic developing countries, after 1972), by country (See **Error! Reference source not found.**).

¹²⁷ Not reported.

¹²⁸ Note that models that include *Presidential election* do not converge in samples restricted countries in need of capital. Therefore, these models are not reported.

Table 5.8. Domestic determinants of *central bank reform*. Additional controls for *Presidential powers*
 Panel Logit Generalized Estimating Equations with AR1 Correction, and standard errors adjusted for clustering on country

	Model 10a (full sample)	Model 10a' (full sample)	Model 10b (full sample)	Model 10b' (full sample)	Model 10c (need for capital)	Model 10c' (need for capital)
	Coefficient (<i>semi-robust std. err</i>)					
Presidential powers	.288 (.149)***	.354 (.190)*	.308 (.154)**	.339 (.188)*	.142 (.219)	.258 (.244)
Congress capacity	1.774 (.402)***	1.905 (.439)***	1.745 (.454)***	1.834 (.474)***	2.642 (.731)***	2.709 (.824)***
Polarization	.782 (.503)	.7610 (.562)	.773 (.520)	.734 (.539)	1.749 (.432)***	1.907 (.497)***
Opposition share	7.213 (2.462)***	6.755 (2.625)***	7.068 (2.802)***	6.702 (2.808)**	12.950 (3.373)***	12.482 (3.603)***
Polarization *						
Congress capacity	-.257 (.218)	-.261 (.248)	-.240 (.223)	-.247 (.236)	-.666 (.208)***	-.682 (.213)***
Opposition share *						
Congress capacity	-2.833 (.980)***	-2.776 (1.036)***	-2.682 (1.079)***	-2.711 (1.089)***	-5.202 (1.413)***	-4.968 (1.537)***
<i>International determinants</i>						
CBI _{t-1}	-1.2087 (.852)	-1.884 (.886)**	-1.512 (.949)*	-1.848 (.967)*	-.618 (1.010)	-1.119 (1.077)
Need for capital (index) _{t-1}	-.076 (.186)	-.182 (.169)	-.088 (.184)	-.187 (.164)		
Control variables						
Inflation (log) _{t-1}		-.030 (.073)		-.033 (.080)		-.002 (.002)
Right _{t-1}	.177 (.179)	.436 (.235)*	.188 (.188)	.433 (.233)*	-.115 (.291)	-.038 (.337)
World reforms _{t-1}	.101 (.032)***	.127 (.025)***	.111 (.032)***	.131 (.022)***	.123 (.074)*	.110 (.068)*
Years to go	.011 (.069)	.023 (.073)			.149 (.145)	.171 (.135)
Presidential elections			-.808 (.512)	-.632 (.529)		
Intercept	-6.724 (.963)***	-6.868 (.967)***	-6.593 (1.185)***	-6.640 (1.274)***	-9.808 (2.000)***	-9.745 (2.204)***

Table 5.8 (continued)

	Model 10a (full sample)	Model 10a' (full sample)	Model 10b (full sample)	Model 10b' (full sample)	Model 10c (need for capital)	Model 10c' (need for capital)
	Coefficient <i>(semi-robust std. err)</i>					
N	342	329	342	329	193	193
Wald χ^2	(11) 189.62	(12) 350.69	(11) 175.43	(12) 293.44	(10) 166.73	(11) 115.65
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is *Reform* (increase in CBI). Estimation is by panel probit generalized estimating equations (*xtprobit*) with AR1 correction, and standard errors adjusted for clustering on country. Semi-robust standard errors are in italics. $\Delta\text{FDI}/\text{GDP}_{t-1}$ is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<0.10, ** P<0.05, *** P<0.01.

The lack of statistical significance for *Presidential powers* in a subsample of developing democratic countries needing capital is puzzling. It is possible that presidential powers matter under certain circumstances. For example, Cox and Morgenstern argue the effect of presidential powers is conditional on congress support: Presidential powers play an matter when the president does not have vast support in congress, but are less relevant under unified government (Cox and Morgenstern 2001, 2002). In order to test this argument, Models 11 include the interaction between *Presidential powers* and *Opposition share* (See Table 5.9). The coefficient associated with *Presidential powers* is negative and statistically insignificant, suggesting that when all the variables included in the model are held at zero (particularly, when the party of the president controls all the seats in the congress), increases in presidential powers do not alter the likelihood of central bank reform. However, this statistically insignificant and negative effect becomes positive and statistically significant when the distance between the president and the congress increases. As Figure 5.2 shows, the coefficient associated with *Presidential powers* becomes positive when the opposition controls 40% or more of the legislature's seats, but this effect is not statistically significant.¹²⁹

¹²⁹ Figure 5.2 plots the coefficients obtained in Model 11d. The relationship is similar when plotting the linear combination of coefficients obtained in Models 11a, b, or c.

Table 5.9. Domestic determinants of *central bank reform*. *Presidential powers* and *Opposition share*
 Panel Logit Generalized Estimating Equations with AR1 Correction, and standard errors adjusted for clustering on country

	Model 11a (full sample)		Model 11b (full sample)		Model 11c (need for capital)		Model 11d (need for capital)	
	Coefficient (<i>semi-robust std. err</i>)	dy/dx (₡)	Coefficient (<i>semi-robust std. err</i>)	dy/dx (₡)	Coefficient (<i>semi-robust std. err</i>)	dy/dx (₡)	Coefficient (<i>semi-robust std. err</i>)	dy/dx (₡)
Presidential powers	-0.417 (.455)	-0.024	-0.166 (.412)	-0.007	-1.23 (1.103)		-0.973 (.680)	
Congress capacity	1.424 (.464)***	.082***	1.550 (.547)***	.072***	1.697 (.933)*	.052	1.812 (1.031)*	.032
Polarization	.799 (.535)		.743 (.594)		1.888 (.535)***	.059***	1.908 (.568)***	.033
Opposition share	4.379 (2.744)		4.102 (3.289)		6.553 (5.459)		6.964 (5.797)	
Polarization * Congress capacity	-0.277 (.238)		-0.267 (.264)		-0.786 (.267)***	-0.025***	-0.765 (.266)***	-0.013
Opposition share * Congress capacity	-2.014 (1.014)**	-0.116*	-1.968 (1.197)*	-0.091	-3.005 (2.041)		-3.123 (2.155)	
Opposition share * Presidential powers	1.619 (.923)**	.093*	1.219 (.903)	.056	2.898 (2.471)		2.469 (2.488)	
<i>International determinants</i>								
CBI _{t-1}	-1.127 (.878)		-1.826 (.892)**	-0.085	-0.221 (.968)		-0.491 (.999)	
Need for capital (index) _{t-1}	-0.102 (.197)		-0.210 (.180)					
<i>Control variables</i>								
Inflation (log) _{t-1}			-0.015 (.073)				-0.001 (.001)	-0.00002*
Right _{t-1}	.100 (.198)		.357 (.248)		-0.347 (.360)		-0.286 (.393)	
World reforms _{t-1}	.100 (.030)***	.006***	.123 (.022)***	.006***	.132 (.062)**	.004*	.120 (.059)**	
Intercept	-5.432 (1.271)***		-5.579 (1.472)***		-6.769 (2.863)**		-6.887 (3.182)**	

Table 5.9 (continued)

	Model 11a (full sample)		Model 11b (full sample)		Model 11c (need for capital)		Model 11d (need for capital)	
	Coefficient <i>(semi-robust std. err)</i>	dy/dx (‡)						
Baseline probability y = normprob(xb)		.025		.019		.012		.006
N	342		329		193		193	
Wald χ^2	(11) 139.68		(12) 232.11		(10) 197.64		(11) 146.26	
Prob > χ^2	0.0000		0.0000		0.0000		0.0000	

Notes: Dependent variable is *Reform* (increase in CBI). Estimation is by panel probit generalized estimating equations (*xtprobit*) with AR1 correction, and standard errors adjusted for clustering on country. Semi-robust standard errors are in italics. $\Delta\text{FDI}/\text{GDP}_{t-1}$ is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<.10, ** P<.05, *** P<.01. (†) dy/dx is for discrete change of dummy variable from 0 to 1, holding the other regime dummy variable at zero. (‡) Marginal effects calculated using *mf* command, holding all other variables at their *mean*. The statistical significance of the marginal effects may differ from the statistical significance in *xtprobit* analyses because the coefficients produced by *xtprobit* hold the other variables at zero.

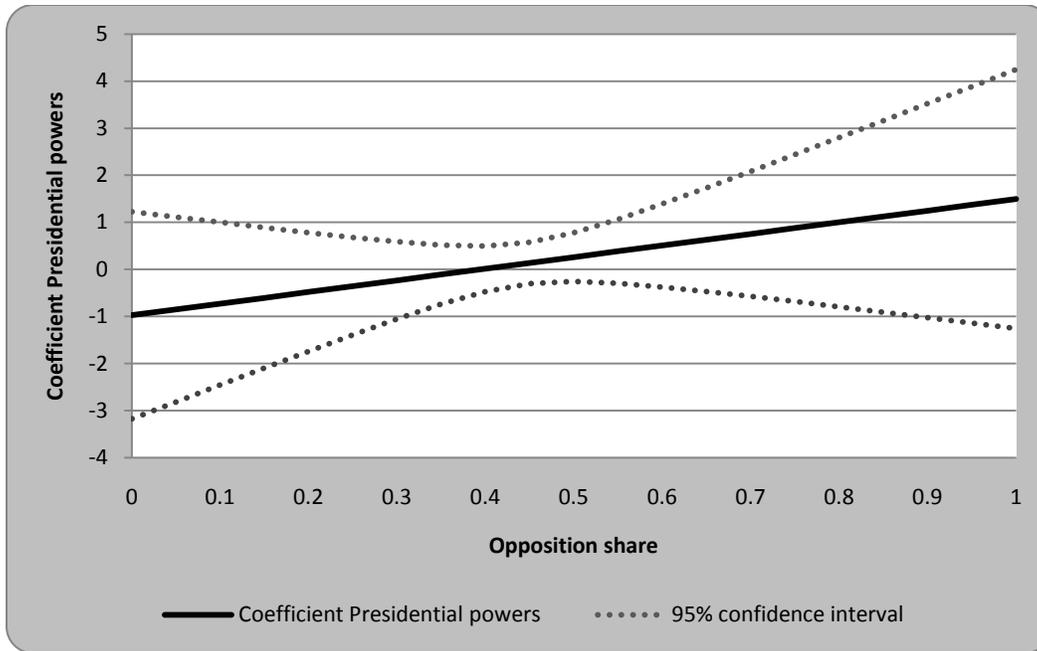


Figure 5.2. Central bank reform: Coefficient associated to *Presidential powers*, conditional on *Opposition share* Presidential democratic developing countries, 1975-2006
 Linear combination of coefficients obtained in Model 11d, estimated using *lincom* (Stata 10).

5.2.5 Hypothesis 7: Congress capacity

In all specifications, the coefficient associated with *Congress capacity* is positive and statistically significant. This contradicts the expectations stated in hypothesis 7. Other things held constant, more efficient congresses are more likely to introduce reforms increasing CBI. This result is the same when using the full sample, or in sub-samples of countries needing and not needing capital (see Table 5.7). Note, however, that all these models include interactions between *Congress capacity* and *Opposition share* and/or *Polarization*. Models 12 further explore this relationship (see Table 5.10). Models 12a and 12c reproduce the baseline model, but omitting the interaction terms (Model 12a presents the results for the full sample, and Model 12c presents the results for the countries in need for capital). Models 12b and 12d (on the full and on the restricted sample, respectively) include a

triple interaction among *Congress capacity*, *Opposition share* and *Polarization*. The statistically significant positive result is robust to most of these specifications in both samples. The only exception is Model 12c, run without interactions on the restricted sample.¹³⁰ These results suggest that more efficient legislatures are more likely to pass central bank reforms increasing CBI.

Given that the interaction is part of the theory, I analyze the impact of *Congress capacity* conditional on *Opposition share* and on *Polarization*, using Model 12d's results. Figure 5.3 shows the coefficients associated with *Congress capacity* at different levels of *Opposition share*, holding *Polarization* at 0, 1 and 2. *Congress capacity* increases the likelihood of central bank reform when the president's party or coalition dominates the congress, that is, when the opposition controls less than 30% of the legislature's seats. When the opposition controls a larger share of seats, the effect of *Congress capacity* becomes statistically insignificant. This is true at different levels of *Polarization*. However, as the ideological distance between the president and the congress increases (that is, at higher levels of *Polarization*), the impact of *Congress capacity* is weaker and loses statistical significance at lower levels of *Opposition share* (see Figure 5.3).

¹³⁰ Note that Model 12c has a notably low χ^2 .

Table 5.10. Domestic determinants of *central bank reform*. Effects of *Congress capacity*
 Panel Logit Generalized Estimating Equations with AR1 Correction, and standard errors adjusted for clustering on country

	Model 12a		Model 8g		Model 12b		Model 12c		Model 9b		Model 12d	
	(full sample)		(full sample)		(full sample)		(need for capital)		(need for capital)		(need for capital)	
	Coefficient (SR std. err)	dy/dx (₡)										
Presidential powers	.225 (.133)*	.009	.345 (.193)*	.017*	.376 (.161)**	.009	.020 (.184)		.216 (.233)		.210 (.239)	
Congress capacity	.401 (.200)**	.016	1.864 (.478)***	.091***	1.969 (.446)***	.047	.064 (.247)		2.541 (.836)***	.044	2.200 (1.048)**	.037
Polarization	.185 (.131)		.740 (.567)		.971 (.515)*	.023	.217 (.201)		1.748 (.465)***	.030	-1.727 (.461)***	.029
Opposition share	.750 (.606)		6.559 (2.761)**	.319**	7.757 (2.764)***	.184	.717 (.777)		11.718 (3.780)***	.201	9.582 (5.130)**	.029
Polarization * Congress capacity			-.255 (.249)		-.282 (.271)	-.007			-.663 (.185)***	-.011	-.795 (.262)***	-.013
Opposition share * Congress capacity			-2.720 (1.062)***	-.132***	-3.009 (1.019)***	-.072			-4.78 (1.530)***	-.082	-4.107 (1.878)**	-.069
Congress capacity * Opp share * Polariz					-.050 (.271)						.299 (.439)	
<i>International determinants</i>												
CBI _{t-1}	-1.522 (.807)*	-.061*	-1.886 (.884)**	-.092**	-1.703 (.862)**	-.040	-.888 (.943)		-.675 (.931)		-.790 (1.017)	
Need for capital (index) _{t-1}	.011 (.158)		-.181 (.162)		-.059 (.215)							
<i>Control variables</i>												
Inflation (log) _{t-1}	-.002 (.001)	-.0001 ***	-.030 (.073)		-.003 (.002)*	-.0001 ***	-.002 (.002)	-.00006 **	-.002 (.001)	-.00002 **	-.002 (.001)	
Right _{t-1}	.070 (.200)		.428 (.237)*	.021**	.236 (.214)		-.180 (.290)		-.119 (.320)		-.070 (.309)	
World reforms _{t-1}	.101 (.028)***		.124 (.020)***	.006***	.099 (.031)***	.002	.117 (.050)**	-.006	.106 (.061)*	-.002	.106 (.061)*	-.0003 **
Intercept	-3.333 (.534)***		-6.643 (1.286)***		-7.052 (1.200)***		-2.759 (.973)***	.004	-8.875 (2.625)***		-7.786 (3.513)**	.002

Table 5.10 (continued)

	Model 12a (full sample)		Model 8g (full sample)		Model 12b (full sample)		Model 12c (need for capital)		Model 9b (need for capital)		Model 12d (need for capital)	
	Coefficient <i>(SR std. err)</i>	dy/dx (‡)	Coefficient <i>(SR std. err)</i>	dy/dx (‡)	Coefficient <i>(SR std. err)</i>	dy/dx (‡)						
Baseline probability y = normprob(xb)		.015		.020		.009		.011		.006		.006
N	342		329		342		193		193		193	
Wald χ^2	(9) 67.22		(11) 365.73		(12) 350.07		(8) 40.83		(10) 129.43		(11) 124.28	
Prob > χ^2	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Notes: Dependent variable is *Reform* (increase in CBI). Estimation is by panel probit generalized estimating equations (*xtprobit*) with AR1 correction, and standard errors adjusted for clustering on country. Semi-robust standard errors are in italics. $\Delta FDI/GDP_{t-1}$ is centered for all computations. Two-Tailed Test reported for each estimate. Statistical significance is indicated as follows: * P<.10, ** P<.05, *** P<.01. (‡) dy/dx is for discrete change of dummy variable from 0 to 1, holding the other regime dummy variable at zero. (‡) Marginal effects calculated using *mfx* command, holding all other variables at their *mean*. The statistical significance of the marginal effects may differ from the statistical significance in *xtprobit* analyses because the coefficients produced by *xtprobit* hold the other variables at zero.

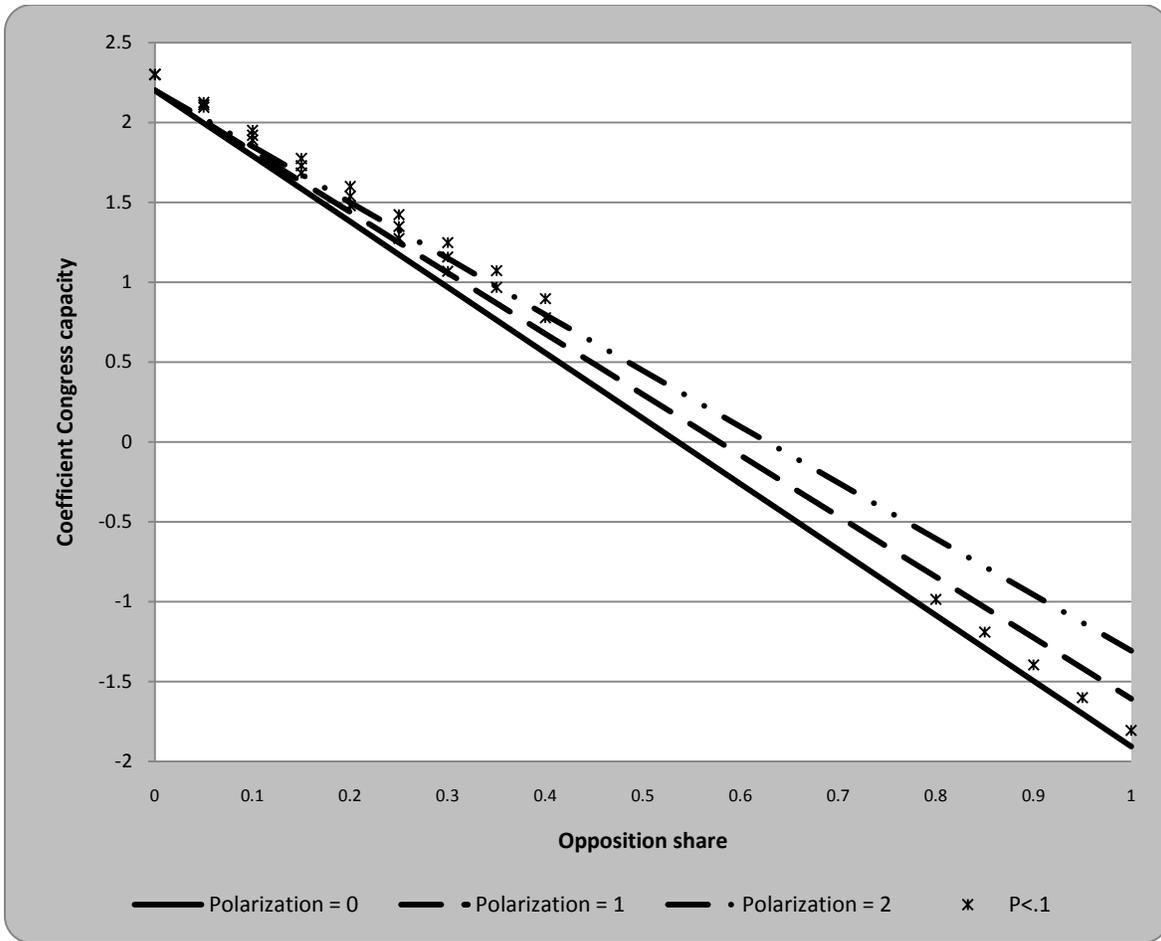


Figure 5.3. Central bank reform: Coefficient associated to *Congress capacity*, conditional on *Opposition share*
 Presidential democratic developing countries, 1975-2006
 Linear combination of coefficients estimated using *lincom* (Stata 10) from Model 12d.

The coefficient associated with *Congress capacity* is negative and statistically significant, as expected by the theory, only in cases of divided government (when the opposition controls more than 80% of the legislature's seats) in which there is practically no ideological distance between the two branches of government. This prediction, however, is out of sample.

Another way to represent the impact of *Congress capacity* on central bank reform, conditional on *Opposition share* and on *Polarization* is to plot the coefficients associated to *Congress capacity* at different levels of *Polarization*. The coefficient associated with *Congress capacity* is positive and

statistically significant at almost all levels of *Polarization* when the opposition controls more than the majority of the seats in Congress. However, at higher levels of *Polarization*, *Congress capacity*'s coefficients are larger when there is unified government. However, *Congress capacity*'s coefficients are smaller at higher levels of *Polarization*, and smaller under divided government. As shown in Figure 5.3, *Congress capacity* does not have a statistically significant impact on the likelihood of central bank reform in cases of unified government and medium-high polarization.

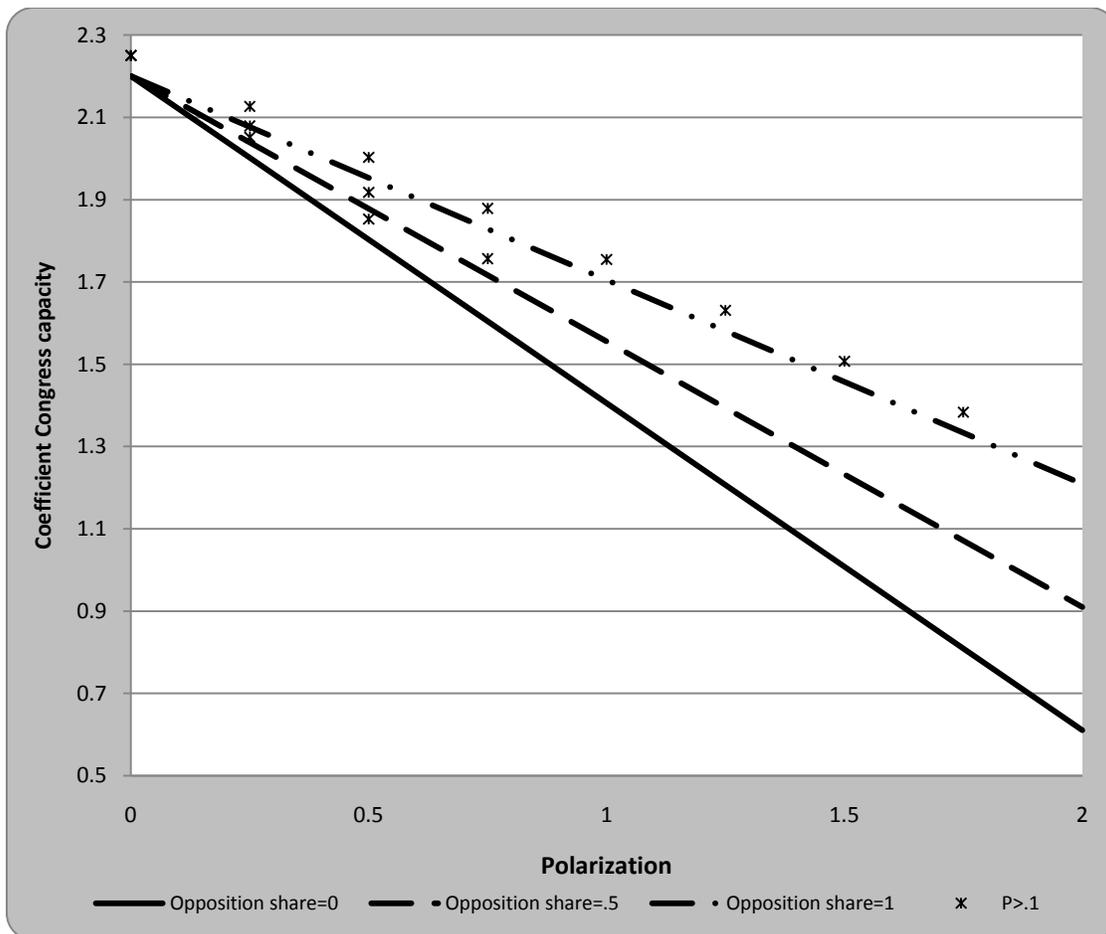


Figure 5.4. Central bank reform: Coefficient associated to *Congress capacity*, conditional on *Polarization*
 Presidential democratic developing countries, 1975-2006
 Linear combination of coefficients estimated using *lincom* (Stata 10) from Model 12d.

5.2.6 Hypothesis 8: Preference distance

Based on a mechanical view of the relationships between the executive and legislative branches, hypothesis 8 stated: “*Central bank reform is less likely the more distant the president’s and the congress’s preferences are.*” It seemed reasonable to expect that, other things being equal, reforms promoted by the executive should be more costly to pass (a) under divided government than under unified government, and (b) the more ideologically distant the two branches are. To test this hypothesis, the models include two variables: *Opposition share* and *Polarization*. Contrary to my expectations, the coefficients associated with these variables are positive in all specifications. Although *Opposition share* is statistically significant in most models,¹³¹ *Polarization* does not achieve standard levels of statistical significance in some models.

Models presented in Table 5.10 suggest that *Opposition share* has a statistically significant positive impact on the likelihood of central bank reform conditional on the capacity of the congress, but this impact is conditional on the capacity of the congress. Figure 5.5 shows that the positive association between *Opposition share* and the likelihood of central bank reform happens in cases of no polarization (that is, when the president and the congress main parties are politically aligned), and at low and medium levels of congress capacity (*Congress capacity* ≤ 2). There is no significant relationship between *Opposition share* and the likelihood of central bank reform happens when *Polarization* equals 1 (that is, when either the president or the congress are classified as “centrist”). The coefficient associated with *Opposition share* is negative (and significant at the .1 level) in cases of high polarization and high congress efficiency.

¹³¹ The exception is Models 9a and 9b, that is, when the baseline model is run on a sub-sample of countries needing capital.

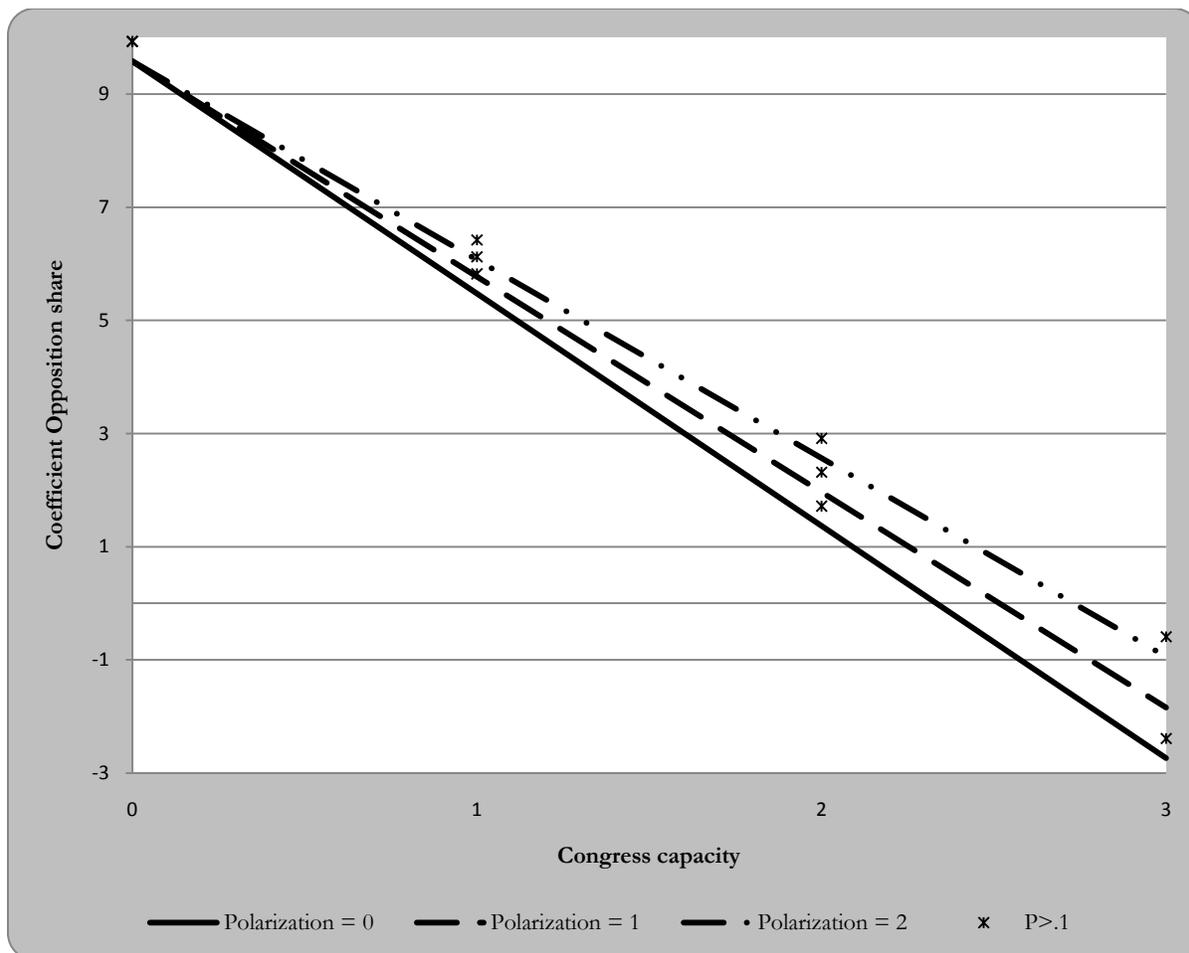


Figure 5.5. Central bank reform: Coefficient associated to *Opposition share*, conditional on *Congress capacity*
 Presidential democratic developing countries, 1975-2006
 Linear combination of coefficients estimated using *lincom* (Stata 10) from Model 12d.

Polarization achieves statistical significance at most levels of *Congress capacity* and of *Opposition share*. Figure 5.6 shows that *Polarization* is positively associated with central bank reform at all levels of *Opposition share* and at most levels of *Congress capacity*: There are two particular cases in which this is not the case: First, in cases of no polarization with a highly efficient congress (*Congress capacity* = 3), increases in the ideological distance between the executive and the legislative branches decrease the likelihood of central bank reform. However, in cases of moderate polarization, increases in the

ideological distance between the executive and the legislative branches do not statistically significantly affect on the likelihood of central bank reform.

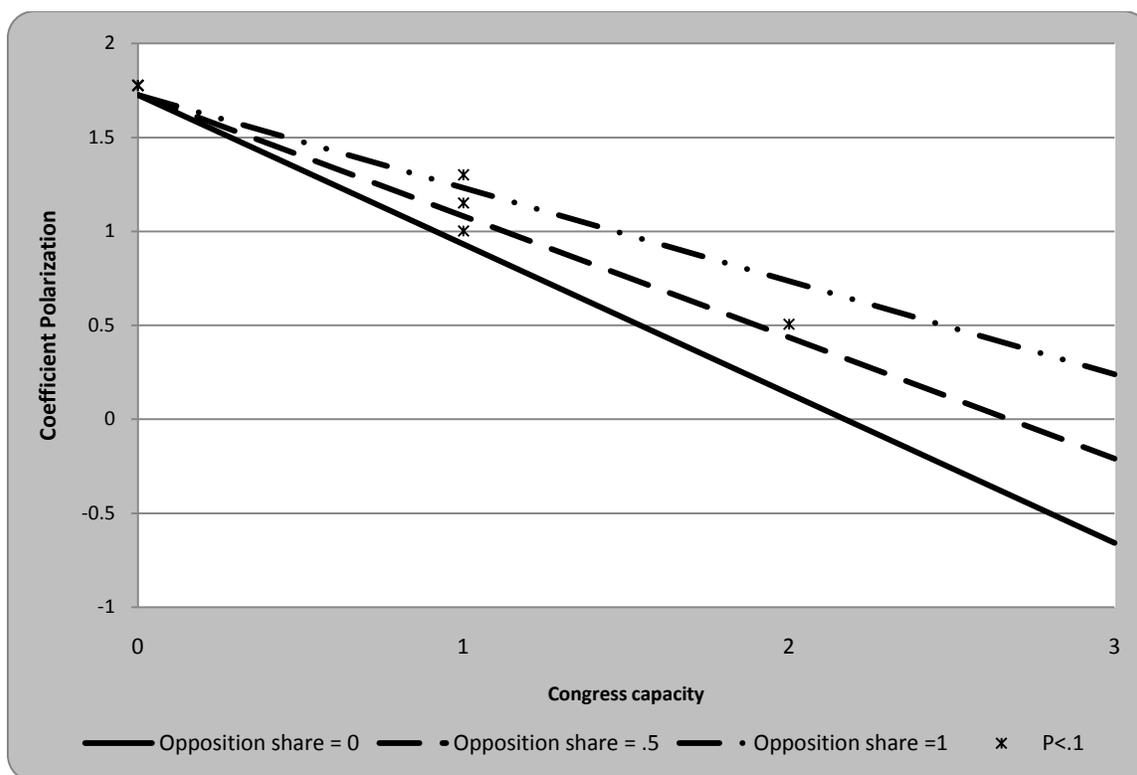


Figure 5.6. Central bank reform: Coefficient associated to *Polarization*, conditional on *Congress capacity*
 Presidential democratic developing countries, 1975-2006
 Linear combination of coefficients estimated using *lincom* (Stata 10) from Model 12d.

5.2.7 Hypothesis 9: Preference distance and congress capacity

Hypotheses 9 states that “*preference distance reduces the likelihood of central bank reform more in effective than in non-effective legislatures.*” This hypothesis relies on the idea that preference distance might impose additional burden on negotiations over monetary policy the more efficient or professionalized the

legislature is. Stated differently, professional legislatures that oppose the executive may find inter-institutional bargaining even more difficult than professional legislatures where the president's party has the majority in congress, or when the parties in congress are ideologically more distant from the president's ideology. This expectation is consistent with Volden's conditional answer on the effect of divided government on bureaucratic discretion (Volden 2002).

Because I used two indicators of preference distance (*Polarization* and *Opposition share*), the empirical test for this hypothesis implies analyzing the impact of *Congress capacity* on both preference distance variables' effect, holding the other preference variable at different levels.

Although the direct impact of the three variables of interest (*Polarization*, *Opposition share* and *Congress capacity*) on the likelihood of a central bank reform increasing CBI is positive, the combination of these factors mitigates the positive effect of these variables. At higher levels of *Congress capacity*, the positive impact of *Opposition share* on the likelihood of central bank reform is reduced. Furthermore, with very efficient legislatures (*Congress capacity*=3), the effect of *Opposition share* becomes negative both at high and low levels of *Polarization* (see Figure 5.5).

A similar thing happens with the impact of *Polarization* on the likelihood of central bank reform increasing CBI: with more effective legislatures, the impact of *Polarization* becomes smaller. Note however that the negative coefficients for this variable do not achieve acceptable levels of statistical significance (see Figure 5.6).

In sum, and as expected in hypothesis 9, more effective legislatures condition the impact of preference distance measured as *Opposition share* and *Polarization*.

5.2.8 Evaluating the predictions of the models

Figure 5.7 plots the probability of central bank reform increasing CBI and the actual reforms, by country. Note that the model is not able to estimate a probability of reform for some years. This is due to lack of data or because some years the presidential developing countries under analysis were not considered democratic. In some cases, central bank reforms increasing CBI coincide with the highest probability estimated by the model. This is particularly clear in cases such as Argentina 1992, Ghana 2000, Nicaragua 1998, and Philippines 1993. In most cases, there seems to be a year delay between the highest probability estimated by the model and the actual reform. That is clearly the case of Bolivia, Colombia, South Africa and Uruguay.

A superficial look at Figure 5.7 indicates that in Brazil, the estimated probability and the actual reforms do not correspond in the same way as in other cases. Chapter 6 analyzes in detail the politics of central bank reform both in Brazil and Argentina.

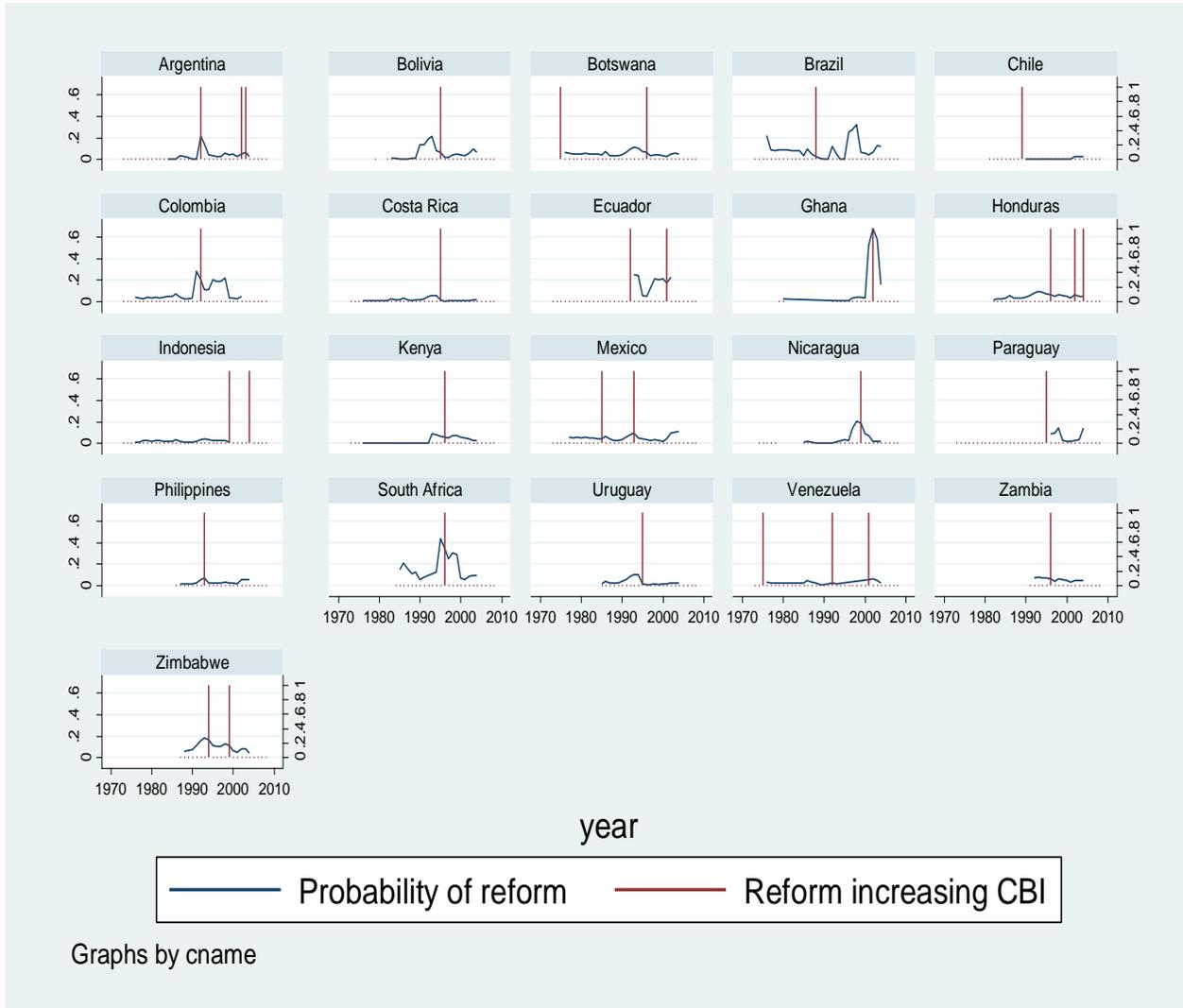


Figure 5.7. Probability of reform increasing CBI and actual reforms

5.3 INTERPRETATION OF RESULTS

The results presented in this chapter contradict many of the expectations derived from the domestic level of my theory. First, although the extent of presidential powers is positively associated with the

likelihood of central bank reform in the general sample (as expected in hypothesis 6), this positive association is not statistically significant when the sample is restricted to developing countries in need for capital. Second, reforms increasing CBI are more likely to be passed by more professional congresses and when the executive's and the legislature's preferences are not aligned (contrary to hypotheses 7 and 8's expectations). Hypothesis 9 finds support because the interaction between congress capacity and preference distance is negative: at higher levels legislative efficiency and at larger preference distance, the likelihood of central bank reform decreases. How to explain that presidential powers do not seem to be strong drivers of central bank reforms, and that more professional congresses, divided government and polarized governments are more likely to pass reforms increasing CBI? This section examines possible explanations for these results that go against the hypotheses.

First, it is possible that the models used in this chapter are underspecified. The theory is based on a quasi-mechanical view of inter-branch relationships, based on the literature on political delegation. For example, the models presented in this chapter do not include controls for electoral incentives other than election year. Still, the literature has shown the impact of other factors affecting the passage of executive's initiatives, such as electoral systems emphasizing personal vote in the legislature (e.g., Ames 2001; Carey and Shugart 1995; Hallerberg and Marier 2004) or promoting party fractionalization (Geddes 1991; Leblang 1999), and party systems (e.g., Alesina 1987; Ames 1994; Crisp, Desposato and Kanthak 2009; Nielson 2003). Other scholars stress the importance of social cleavages over the influence of electoral laws (Coppedge 1997; Dix 1989). Unfortunately, the inclusion of some of these controls would restrict the samples significantly for two reasons: lack of data for some cases, and lack of degrees of freedom for performing the statistical analysis.

The idea that stronger presidents should be more able to pass reforms in their interest than more constrained presidents has empirical support in the literature (e.g., Alemán and Navia 2009;

Cox and Morgenstern 2001). For example, Nielson found that strong presidents are more likely to pass trade reforms, overcoming protectionist biases (Nielson 2003).¹³² The positive impact of the strength of presidential powers on the likelihood of central bank reform finds empirical support in the full sample, but does not achieve statistical significance in the subsample of countries in need for capital (see Figure 5.2). The lack of statistical significance can be attributed to problems in the model specification or to the presence of outliers. Descriptive statistics indicate that the average for the variable *Presidential powers* in years of central bank reform is higher for countries in need for capital than in countries that are not experiencing need for capital (see Table 5.11). Restrictions in the effective sample due to data availability on other variables included in the models may affect the results.

The lack of a negative coefficient for Opposition share is consistent with some literature in American politics that shows that the number of significant bills passed under divided government is not significantly different from the number of bills passed under unified government (Mayhew 2005). Beyond the U.S., the lack of stalemate under divided government is suggested by Alemán and Navia (2009:407), by Cheibub, Przeworski, and Saiegh (2004), and by Negretto (2006). The positive coefficient however, requires further analysis and the consideration of the general picture presented by these results.

¹³² For evidence against legislators subordinating their behavior to presidential initiatives, see Morgenstern and Nacif (2002) and Mustapic (2002).

Table 5.11. Descriptive statistics for *Presidential powers* in years of central bank reform
Mean and standard deviation for the variable in years of central bank reform increasing CBI included in the sample
(democratic developing countries, between 1972 and 2007)

		Number of observations	Mean	Standard deviation
Reform year	Need for capital	29	2.138	1.846
	No need for capital	16	1.750	1.844
No reform year	Need for capital	487	2.413	2.051
	No need for capital	419	2.628	2.182
All years	Need for capital	516	2.397	2.039
	No need for capital	435	2.595	2.175

Second, the general picture may suggest a deeper implication of the signaling argument. The evidence obtained for presidential powers, congress capacity and preference distance may indicate that presidents anticipate the value of the signal they are sending, and do not push forward central bank reforms that may not be credible in the eyes of international actors. It is possible that presidents know that under unified government, low polarization and/or with an inefficient legislature, the signal sent to international actors is not credible, precisely because it is not costly enough. If this is the case, the variables under analysis should have a different effect on the likelihood of passing central bank reforms, but not in passing other kinds of reforms.¹³³ Although there is no literature analyzing the combined effect of legislature's efficiency, divided government and polarization on the approval of reforms initiated by the executive, there is some evidence that unified government and low polarization make reforms easier, particularly in Latin America (Borner

¹³³ The comparison of different kinds of reforms using this data (and changing the dependent variable) exceeds the limits of the present manuscript.

and Kobler 2002). There is also evidence on how the strength of presidential powers significantly impact on the fate of individual bills (Alemán and Navia 2009). This logic is consistent with the assumptions in the theory, and relies on Carl Friedrich's "law of anticipated reactions" (Friedrich 1937): few constraints on the presidential powers, inefficient legislatures or legislatures dominated by the president's party or political ideology may make institutional reforms not credible for international actors. The lack of credibility of the reform may dissuade the president from instituting it.

There is a third possible explanation for these results. It is possible that delegation to the central bank (that is, increases in CBI) occur when the executive and legislative branches are not able or willing to arrive at an agreement. This is an extension of Bernhard's explanation of CBI in parliamentary systems, where different monetary policy incentives for government ministers, party legislators, and coalition partners and information asymmetries may create intra-coalition conflicts (Bernhard 1998, 2002). According to Bernhard, if government ministers fear that party legislators and coalition partners will withdraw their support over a policy dispute, they may favor increases in CBI (Bernhard 1998). Other scholars have highlighted that central bank discretion increases with divided government (Lohmann 1998), with multiple veto players (Hallerberg 2002), and with polarization (Alesina and Gatti 1995).

Qualitative evidence gathered in interviews conducted for this project provides some support to the signaling argument. In Argentina, Brazil and Uruguay the concern seems not to have been the avoidance political conflict over monetary policy, but instead a strong desire of attracting foreign investment and/or pleasing international financial institutions. In the case of Argentina, the reform of the central bank was presented to the IMF and World Bank as a signal of monetary discipline. In Uruguay, the reform was not demanded by international financial institutions. However, and according to high level authorities, the design of the new central bank was presented

to an IMF delegation before Sanguinetti (from the Colorado Party) took office.¹³⁴ In the Brazilian case, after Lula's Letter to the Brazilian People (then presidential candidate Lula's pledge to economic discipline), the commitment to monetary discipline was presented to bankers and investors in the U.S.A.. Even when this evidence has limited possibilities of generalization, it is illustrative of the concerns surrounding central bank reform and CBI in Latin American countries in the 1990s.

5.4 FINAL REMARKS

This chapter presents an empirical test of the second level of the theory. The level of accuracy of predictions (see Figure 5.7) suggests a satisfactory specification of models. However, the results advocate a more cautious approach to the analysis of inter-branch relationships and the need of a more detailed account of other factors that were not included in these models.

First, the explanation presented in this manuscript does not account for electoral rules or party systems, shown to affect distributional decisions in developing presidential countries (e.g., Hallerberg and Marier 2004). Second, the models do not account for changing inter-branch relations (Mustapic 2002:45). This is partially captured by variations in presidential powers and in the effectiveness of the legislature (see Table 5.4), but finer measures should account for the dynamics of these relationships. The results presented here also remind us the need of careful application of delegation models to developing countries (Eaton 2001).

The results presented here speak to the literature on the impact of presidential powers. Mainwaring and Shugart have already warned about the limits of institutionally strong presidents

¹³⁴ Interviews revealed that the central bank reform went beyond the expectations of the IMF delegation, whose members were pleasantly surprised by the Sanguinetti's team proposed reform.

when they hold legislative minorities, or fractionalized and undisciplined pluralities or majorities (Mainwaring and Shugart 1997:395). The different impact of presidential powers depending on the presence of need for capital suggest the need of considering other contextual factors that may affect sectoral policies.

A more complete picture would include information about the initiators of reforms. This would shed light on the alternative explanations for the positive association between *Congress capacity*, *Opposition share* and *Polarization*, and the likelihood of central bank reform. Unfortunately, this is not an easy task when dealing with large-N studies such as the one presented in this chapter. The analysis of cases in the following chapter presents evidence regarding the initiative for central bank reform in Argentina and Brazil: in both cases, the executive branch proposed the central bank reforms. This evidence, however, cannot be generalized to all presidential developing countries under analysis.

6.0 CASE STUDIES

6.1 INTRODUCTION

In this chapter, I analyze the evolution of central banking in two cases: First, Argentina, because it is one of the cases that the theory presented here predicts relatively well. Second, Brazil, a case in which central bank reforms seem not to be well predicted by the theory (at least, when examined superficially). This chapter does not intend to present a complete account of the economic history of these countries. I intend to describe the main events that were related to the institutional evolution of these countries' central banks, or that explain the lack of central bank reform when the preconditions would suggest an increased probability of central bank reform.

Two additional caveats must be taken into account. First, my theory is designed bearing in mind the post-Bretton Woods world, an environment characterized, among other things, by high levels of capital mobility and flexible exchange rates. In this chapter, however, I refer to events that took place before the 1970s in order to present a more complete account of central banking in these countries. Second, my theory applies to democracies. However, some of the most relevant developments in the evolution of Argentina's and Brazil's central banks took place under

authoritarian rule – i.e., the creation of the Brazilian central bank,¹³⁵ and the 1950s reforms in Argentina. In those cases, I highlight the presence or absence of international incentives.

The evidence presented here was gathered through the analysis of primary and secondary sources, and semi-structured interviews. More than forty interviews (around 60 hours) were conducted between June and August 2009 in Argentina, Brazil and Uruguay.¹³⁶ In Argentina, I interviewed politicians, central bank functionaries, and analysts. Among the politicians and public officers, I interviewed former Minister of Economy Juan Vital Sourrouille (in office between February 1985 and March 1989), former functionaries of the Ministry of Economy (serving between 1985 and 2000), a senator from the province of Salta (also former governor of that province) who was the author of one of the reform projects and one of the principal sponsors of CBI in the Congress, a former national deputy and vice-president of the Redaction Commission during the 1994 Constitutional Convention, a national deputy, and staff in the Congress's commissions. Among the central bank functionaries, I interviewed former directors of the Central Bank (serving between 1991 and 2000), and former functionaries of the Central Bank (serving between 1964 and 1990). I have also talked to former functionaries of international organizations (IMF, World Bank, and ECLAC), academics, economists, and journalists.

In Brazil, I interviewed the Secretary of Economic Policy, Nelson Barbosa Filho; a deputy's adviser; current and former functionaries of the Ministry of Finance and of economic research agencies. I also interviewed current and former bureaucrats at the Central Bank of Brazil: former directors of the Central Bank (serving between 1990 and 2000), a Central Bank president's high level adviser, current and former functionaries of the Central Bank (serving between 1970 and present

¹³⁵ Brazil was ruled by Castelo Branco, whereas Argentina was under the presidency of Agustin P. Justo. Although Justo was elected, the elections in that decade were characterized by open fraud.

¹³⁶ My fieldwork was partially funded by the Department of Political Science of the University of Pittsburgh and by the Richard Cottam Memorial Prize. I conducted interviews in Uruguay as I was working for Professor Julia Gray on a different project. She helped support my stay there.

date). Finally, I was able to interview academics in Brasilia, Sao Paulo and Rio de Janeiro, and journalists from major national newspapers. In Uruguay, I interviewed the President of the Central Bank, director and two high level economists who were part of the draft of the new Charter for the Central Bank and involved in some interactions with the IMF regarding said reform. Some of the sources requested that I not identify or directly quote them.¹³⁷

6.2 ARGENTINA: INTERNATIONAL DETERMINANTS OF CBI AT WORK

“No people in the world like monetary experiments more than the people of Argentina”
Banker's Magazine, London, 1899,
(Véganzonès and Winograd 1997:197)

6.2.1 Central banking in Argentina

The Argentine case reflects rapid institutional reactions to international incentives in relatively weak institutional contexts. Most of the reforms affecting CBI can be explained by the theory, and are usually the corollary of the economic and political instability experienced by the country.

6.2.1.1 The Central Bank of the Argentine Republic (BCRA)

Between 1899 and 1935, the main Argentine monetary authority was a currency board (*Caja de Conversión*).¹³⁸ Although President Hipólito Yrigoyen sent to the Congress a project to create a central bank in 1917, and insisted upon similar projects in 1919 and 1921, Yrigoyen's initiative was

¹³⁷ For a complete list, see Annex A.

¹³⁸ Until the creation of the currency board in 1890 (Law 2.742), province banks issued currency. Since 1890, the federal government held the monopoly of currency issuance. The currency board also held the country's gold reserves. The following year, Law 2.841 created the National Bank (*Banco de la Nación*).

never discussed in the Senate, which was controlled by the opposition.¹³⁹ The first serious discussions around the creation of a central bank are linked to the consequences of the 1929 crisis. Some authors suggest the fall in the growth rate had a major impact on the economic leaders at the time.¹⁴⁰ Arnaudo explains that the coexistence of falling growth rates with drops in foreign capital inflows imposed “a sense of urgency” and a series of demands on the political elites that explain the interventionist tone in deeply liberal people (Arnaudo 1987:16). In particular, the elites were aware of the more destabilizing effects that gold inflows and outflows had during the Gold Standard, because stabilization measures were not possible (Arnaudo 1987:16).

Economic ideas evolved in the mid-1930s. There was some consensus around the administrative advantages of a central bank, and a few projects were drafted. The most influential one – considered by many the basis for the Argentine central bank – was grounded on the Bank of England experience, and on the recommendations of the 1933 mission headed by British specialist Otto Niemeyer. President Justo agreed with the Niemeyer mission’s recommendations, and intended to send the project to the Congress in 1933, but that would not happen until 1935 (Ortiz Batalla 1998:126).¹⁴¹

¹³⁹ The 1917 project was amended in response to the opposition’s objections, and sent to the Congress again in 1919. This version was not discussed either. In 1921, President Yrigoyen sent a project stating that, in case of deadlocks between the executive and legislative powers, the Supreme Court should adopt a decision. This last project, obviously, did not pass either.

¹⁴⁰ Arnaudo speculates that the growth rates fall was felt by the authorities even in absence of many instruments and indicators to measure it (Arnaudo 1987:16).

¹⁴¹ In 1932, president Justo asked the Bank of England to send a mission to give advice on the design of a central bank. According to Ortiz Batalla, that is the project that president Justo intended to send to the Congress in 1933 (Ortiz Batalla 1998:126). The official BCRA’s webpage also attributes the initiative to create a central bank system to Otto Niemeyer’s expert opinion issued in 1933. Niemeyer’s idea was further developed by Raul Prebisch (Banco Central de la República Argentina 2010). However, a substantial group of historians attribute the project to Pinedo (Cortés Conde 2006; Rocke 1985). Furthermore, Pinedo himself expressed that it was necessary to present the project as Niemeyer’s for the Congress to pass the law creating the central bank. Ortiz Batalla (1998:156) reproduces Pinedo’s quote: “we knew that during that time we had to present the executive’s initiative as suggested by the foreign advisor in order to facilitate the initiative’s approval...” (“*Nosotros sabíamos que durante ese periodo, por las peculiaridades del espíritu colectivo, para facilitar la aprobación de la iniciativa del gobierno deberíamos presentarla como sugerida por el asesor extranjero*”).

The law creating the Argentine Central Bank (BCRA, *Banco Central de la República Argentina*) was passed on March 1935. There was some debate around the central bank's objectives (Romero 1992:20-21): following the British model, some sought an institution in charge of protecting the value and the convertibility of the currency; following the Federal Reserve model, others preferred a central bank concerned about the country's economic activity and full employment (Arnaudo 1987:20). The BCRA's design follows the American example, with private and public capital, and ample discretion for open market measures. Although both the federal government and commercial banks contributed the BCRA's capital, the state did not have a vote in the board of directors. The structure of the bank "clearly revealed the intention of creating a bank that would be independent of the government" (Véganzonès and Winograd 1997:211).

There are different explanations regarding the creation of the Argentine Central Bank. On the one hand, some authors stress the influence of ideas (or of foreign-inspired men). They emphasize, for example, the role of the Argentine minister of economy at the time, Federico Pinedo. Although Pinedo's project was influenced by Niemeyer's ideas, it included original elements in the design of the central bank (Ortiz Batalla 1998:146). Jauretche (1955) highlights the influence of Raul Prebisch in the law creating the BCRA.¹⁴² On the other hand, other interpretations emphasize the role of economic determinants. For example, Rocke argues that the central bank was conceived "primarily as an alternative to the gold standard, one that would uphold the peso at a fixed parity and enhance the country's attractiveness to new foreign investors, while avoiding the pains of automatic deflation as gold reserves fell" (Rocke 1985:233). Arnaudo explains the creation of the BCRA by an economic environment that was causing currency's volatility, instead of a set of

¹⁴² Note that Jauretche stressed the "antinationalist" nature of the central bank. There were two main criticisms against the BCRA: the fact that an independent central bank would not be an instrument of development for the government, and the possibility that the central bank would represent, in fact, foreign interests.

enlightened ideas trying to transplant foreign ideas (Arnaudo 1987:20). The law instituting the BCRA provides some indications of this concern.¹⁴³

6.2.1.2 The nationalization of the Central Bank

During Juan Domingo Perón's presidency, a series of reforms restricted the bank's independence against the backdrop of economic progress.¹⁴⁴ Decree 8.503 (1946) excluded private capitals from the Bank's assets, and declared the Bank's capital "national patrimony." The BCRA was in charge not only of preserving monetary stability, but also of expanding the economy and maintaining employment (Cortés Conde 2006:233). In March 1947, Law 12.962 nationalized the central bank and the Argentine banking system. According to said law, the BCRA would receive all bank deposits, in the name of the federal government who guaranteed such deposits.¹⁴⁵ Part of Perón's plans involved the use of monetary policy to stimulate economic activity in tandem with the import-substituting industrialization policies. The BCRA, in addition to its monetary and fiscal goals, also had the goal of stimulating the economy.

The government's dominance over the BCRA was completed in 1949: The 1949 Constitutional reform subordinated the BCRA to the Ministry of Finance. The same year, the government removed the 25 percent gold backing for new currency, and allowed the BCRA to hold

¹⁴³ The law sets as a goal of the BCRA to accumulate enough reserves to smooth the consequences of exports' and foreign investment's volatility on the currency, credit and commercial activities ("*concentrar reservas suficientes para moderar las consecuencias de la fluctuación en las exportaciones y las inversiones de capital extranjero sobre la moneda, el crédito y las actividades comerciales, a fin de mantener el valor de la moneda*") (Art. 3, inc. a) Ley de Creación del Banco Central de la República Argentina, Nro. 12.155 1935).

¹⁴⁴ According to Rocke, in the 1945-1948 period the GNP and manufacturing grew by around 29% (Rocke 1985:276).

¹⁴⁵ Although commercial banks were still privately owned, they operated as "agents" of the State: private banks received deposits in the name of the BCRA. The BCRA compensated the banks and granted them rediscounts, allowing them to give credits and to collect interests. This was the root of a perverse mechanism: as Cortés Conde summarizes, "the Central Bank recycled private savings to favored banks – mainly official ones – with the peculiarity that it lent this money at nominal rates below inflation, which meant an assignment of income from creditors to debtors. Rediscounts surpassed deposits systematically, turning themselves into a significant money creation, and feeding the inflation of those years. Rediscounts, which surpassed deposits by 17 percent in 1947, exceeded them by 70 percent in 1956" (Cortés Conde 2006:233). See also Arnaudo (1987) and Véganzonès and Winograd (1997:214).

more government bonds. This was a step that, according to Rocke, “facilitated the inflationary financing of public deficits” (Rocke 1985:301).

The BCRA performed as a tool for development, and negative real interest rates were used as instrument of economic policy until 1977. This affected (the lack of) capital market development, banking efficiency, and low savings, contributing to the country’s low growth rates at the beginning of the 1950s (Végazonès and Winograd 1997:214-216).

6.2.1.3 Decades of instability and the Central Bank

In 1955, the military government abolished the 1949 Constitutional reform, Law 12.962, and put the BCRA under the Bank for International Settlements’ (BIS) rules. Decree-law 13.130 (1957) confirmed the central bank’s autarky and its independence from the executive power, and reestablished the Senate confirmation for appointing the BCRA’s president and vice-president. The representation of trade unions in the central bank was also abolished (Végazonès and Winograd 1997:233). The country joined the IMF in 1958. Végazonès and Winograd interpret all these measures as a sign of the government’s “desire for greater integration with the international capital market” (1997:217).

Although formally autonomous, the BCRA was influenced by the political instability that characterized the 1960-1982 period (see Table 6.1).

Table 6.1. Argentine authorities

President	Finance minister	Head of the Central Bank
Agustín Pedro Justo (02/20/1932-02/20/1938) (PDN)	Alberto Hueyo 02/20/1932 – 07/17/1933 Federico Pinedo 08/24/1933 – 12/30/1935 Roberto M. Ortiz 12/30/1935 – 06/22/1937 Carlos Alberto Acevedo 06/22/1937 – 02/20/1938	Ernesto Bosch
Roberto Marcelino Ortiz (02/20/1938-06/27/1940) (Quitted) (UCR-A)	Pedro Groppo 02/20/1938 – 09/02/1940 Federico Pinedo 09/02/1940 – 01/16/1941	
Ramón Castillo (06/27/1940-06/04/1943)	Carlos Alberto Acevedo 06/27/1942 – 06/07/1943	
Arturo Rawson (06/04/1943-06/07/1943) Military	Jorge A. Santamarina 06/04/1943 – 10/14/1943	
Pedro Pablo Ramírez (06/07/1943-03/09/1944) Military	César Ameghino 10/15/1943 – 05/07/1945	
Edelmiro Julián Farrell (03/09/1944-06/04/1946) Military	Ceferino Alonsa Yrigoyen 05/07/1945 – 08/23/1945	
	Armando Gerardo Antille 08/23/1945 – 10/13/1945	
	Amaro Avalos 10/20/1945 – 06/04/1946	Emilio F. Cárdenas
Juan Domingo Perón (06/04/1946-06/04/1952)	Ramón Antonio Cereijo 06/04/1946 – 06/04/1952	Miguel Miranda Domingo O. Maroglio
Juan Domingo Perón (06/04/1952-09/16/1955)		Alfredo Gómez Morales
José Domingo Molina Gómez (09/21/1955-09/23/1955) Military - Interim	Eugenio Folcini 09/22/1955 – 11/13/1955	Miguel Revestido
		Eugenio Folcini
Eduardo Lonardi (09/23/1955-11/13/1955) Military	Julio E. Alizon García 10/10/1955 – 06/08/1956	Julio E. Alizon García
Pedro Eugenio Aramburu (11/13/1955-05/01/1958) Military	Eugenio A. Blanco 06/08/1956 – 01/25/1957	Eugenio Blanco
	Roberto Verrier 01/26/1957 – 03/26/1957	Eduardo Laurencena
	Adalberto Krieger Vasena 03/26/1957 – 05/01/1958	

Table 6.1 (continued)

President	Finance minister	Head of the Central Bank
Arturo Frondizi (05/01/1958-03/29/1962) (UCRI)	Emilio Donato del Carril 06/17/1958 – 06/24/1959	José Mazar Barnett
	Álvaro Alsogaray 06/25/1959 – 04/26/1961	Eusebio Campos
	Roberto Alemann 04/26/1961 – 01/12/1962	Eustaquio A. Méndez Delfino
Carlos A. Coll Benegas 01/15/1962 – 03/26/1962		
Jorge Wehbe 03/26/1962 – 04/06/1962		
Federico Pinedo 04/06/1962 – 04/25/1962		
Álvaro Alsogaray 06/30/1962 – 12/10/1962	Ricardo Pedro Pasman	
Eustaquio Méndez Delfino 12/10/1962 – 05/13/1963	Luis M. Otero Monsegur	
José Alfredo Martínez de Hoz 05/21/1963 – 10/12/1963		
Arturo Umberto Illia (10/12/1963-06/28/1966) (UCRP)	Eugenio Blanco 10/12/1963 – 08/05/1964	1963 Félix Gilberto de Elizalde
	Juan Carlos Pugliese 08/19/1964 – 06/28/1966	
Juan Carlos Onganía (06/29/1966-06/08/1970) Military.	Jorge Salimei 10/04/1966 – 01/03/1967	Antonio Micele Felipe S. Tami Benedicto A. Bianchi
	Adalbert Krieger Vasena 01/03/1967 – 06/11/1969	Pedro E. Real
	José Dagnino Pastore 06/11/1969 – 06/17/1970	Egidio Iannella
Roberto Marcelo Levingston (06/18/1970-03/22/1971) Military	Carlos Moyano Llerena 06/18/1970 – 10/15/1970	Daniel Fernández
	Aldo Ferrer 10/26/1970 – 05/28/1971	
Alejandro Agustín Lanusse (03/22/1971-03/25/1973) Military	Juan A. Quilici 06/01/1971 – 10/11/1971	Ricardo Gruneisen
	Cayetano Antonio Licciardo 10/11/1971 – 10/13/1972	Carlos Brignone
	Jorge Wehbe 10/13/1972 – 05/25/1973	Jorge Bermúdez Empananza
Héctor José Cámpora (05/25/1973-07/13/1973) (PJ)	José Ber Gelbard 05/25/1973 – 10/21/1974	Alfredo Gómez Morales
Raúl Alberto Lastiri (07/13/1973-10/12/1973) (PJ) Interim		
Juan Domingo Perón (10/12/1973-07/01/1974) (PJ)		

Table 6.1 (continued)

President	Finance minister	Head of the Central Bank
María Estela Martínez de Perón (07/01/1974-03/24/1976) (PJ)	Alfredo Gomez Morales 10/21/1974 – 06/02/1975	Hernán Aldabe
	Celestino Rodrigo 06/02/1975 – 07/17/1975	Ricardo A. Cairoli
	Ernesto Corvalán Nanclares 07/17/1975 – 07/22/1975	
	Pedro Jose Bonani 07/22/1975 – 08/11/1975	Emilio Mondelli
	Ernesto Corvalán Nanclares 08/11/1975 – 08/14/1975	
	Antonio Cañero 08/14/1975 – 02/03/1976	
	Emilio Mondelli 02/03/1976 – 03/24/1976	Eduardo Zalduendo
Military Junta (03/24/1976-03/29/1976) Military	Juan Las Heras 03/24/1976-03/29/1976	
Jorge Rafael Videla (03/29/1976-03/29/1981) Military	José Alfredo Martínez de Hoz 03/29/1976-03/31/1981	Alfredo Cassino Adolfo Diz
Roberto Eduardo Viola (03/29/1981-12/11/1981) Military	Lorenzo Sigaut 04/01/1981 – 01/20/1981	Julio J. Gómez
Carlos Alberto Lacoste (12/11/1981-12/22/1981) Military - Interim		
Leopoldo Galtieri (12/22/1981-06/18/1982) Military	Roberto Alemann 12/22/1981 – 06/30/1982	Egidio Iannella
Alfredo Oscar Saint-Jean (06/18/1982-07/01/1982) Military - Interim		
Reynaldo Bignone (07/01/1982-12/10/1983) Military	José María Dagnino Pastore 07/02/1982 – 08/24/1982	Domingo Felipe Cavallo
	Jorge Wehbe 08/24/1982 – 12/09/1983	Julio C. González del Solar
Raúl Alfonsín (12/10/1983-07/08/1989) (UCR)	Bernardo Grinspun 12/10/1983 – 02/18/1985	Enrique García Vázquez
	Juan Vital Sourrouille 02/19/1985 – 03/31/1989	Juan J. A. Concepción José Luis Machinea
	Juan Carlos Pugliese 03/31/1989 – 05/14/1989	Enrique García Vázquez
	Jesús Rodríguez 05/14/1989 – 07/08/1989	

Table 6.1 (continued)

President	Finance minister	Head of the Central Bank
Carlos Menem (07/08/1989-07/08/1995) (PJ)	Miguel Roig 07/08/1989 – 07/14/1989	Javier González Fraga
	Néstor Mario Rapanelli 07/18/1989 – 12/18/1989	Egidio Iannella
	Antonio Erman González 12/19/1989 – 02/04/1991	Rodolfo Rossi Enrique Folcini Antonio Erman González Javier González Fraga
	Domingo Cavallo 03/01/1991 – 08/06/1996	Roque Benjamín Fernández
Carlos Menem (07/08/1995-12/10/1999) (PJ)	Roque Fernández 08/06/1996 – 12/10/1999	Pedro Pou
Fernando de la Rúa (12/10/1999-12/21/2001) (Alianza)	José Luis Machinea 12/10/1999 – 03/02/2001	
	Ricardo López Murphy 03/05/2001 – 03/19/2001	
	Domingo Cavallo 03/20/2001- 12/19/2001	Roque Maccarone
Ramón Puerta Eduardo Camaño	Jorge Capitanich 12/21/2001 – 12/23/2001	
Adolfo Rodríguez Saá (12/23/2001-12/30/2001) (PJ)	Rodolfo Frigeri 12/23/2001 – 12/30/2001	
Eduardo Duhalde (01/01/2002-05/25/2003) (PJ)	Jorge Remes Lenicov 01/03/2002 – 04/27/2002	Mario Blejer
	Roberto Lavagna 04/27/2002 – 11/27/2005	Aldo Pignanelli Alfonso Prat Gay
Néstor Kirchner (05/25/2003-12/10/2007) (FV)	Felisa Miceli 11/28/2005 – 07/16/2007	Martín Redrado
	Miguel Gustavo Peirano 07/17/2007 – 12/10/2007	
Cristina Fernández de Kirchner (12/10/2007-2011) (FV)	Martín Lousteau 12/10/2007 – 04/24/2008	
	Carlos Rafael Fernández 04/25/2008 – 07/07/2009	
	Amado Boudou 07/07/2009 – ...	Miguel Ángel Pesce (<i>interim</i>)
		Mercedes Marcó del Pont

Source: Banco Central de la Republica Argentina. <http://www.bcra.gov.ar/institucional/in080301.asp>

In 1973, again under the Perón administration, there was another episode of nationalization of deposits. The government set a 100 percent reserve requirement for deposit. The 1976 military government reversed this move, and implemented an unprecedented liberalization of the financial and exchange markets. The BCRA expanded the monetary base to purchase foreign currency first, and in the 1980s, by compensating bank deposits in the central bank (Cortés Conde 2006:243). During the military government, the foreign debt grew in tandem with the worsening of the economic situation, increasing almost 300 percent in real terms (Véganzonès and Winograd 1997:220).

In the 1980s, Argentina experienced a critical inflationary process that started with the 1980 financial crisis and ended in the 1989-1990 hyperinflation. According to some observers, the central bank was “a major source of instability” during this period (World Bank 1993:179, see esp. 179-181).¹⁴⁶

During the Alfonsín administration, the central bank board represented the preferences of the president (between 1983 and 1986), and of the minister economy once Mr. Machinea was appointed as the BCRA’s head. This was probably one of the periods with the lowest levels of de facto CBI, with little concern among the authorities, the opposition or the international financial institutions for CBI.

To my knowledge, there was one project attempting to increase CBI during the democratic government of Raul Alfonsín: Juan Carlos Romero, Peronist Senator from the province of Salta, presented a project that was not discussed on the floor. According to Romero, his project was not

¹⁴⁶ The World Bank reports that the BCRA’s net worth “was always negative during the 1985-1991 period, and the cumulative quasi-fiscal losses [...] were about US\$15 billion by end-1989.” This report attributes the losses to the absorption of the foreign debt and of the debts of banks liquidated after the collapse of the domestic financial system (1980-1982), and to “disguised fiscal expenditures” through housing and development banks (between 1986-1987) (World Bank 1993:179).

seriously considered because “the government believed reserves to be resources to finance the state” (Romero 2009).

6.2.1.4 The 1992 reform

The hyperinflation and the political crisis associated to it ended in an anticipated change of authorities in 1989, five months before Alfonsín’s term expired. The Menem administration’s main instrument to fight inflation was the 1991 Convertibility Law, implementing an economic model that would last until the 2002 Economic Emergency Law. Under the Convertibility Law, the exchange rate was fixed to the dollar and the full convertibility of the national currency into dollars was guaranteed. This law constrained the issuance of money, because the monetary base should not be larger than the reserves. As a consequence of the monetary discipline imposed by the Convertibility Law, inflation dropped substantially and the country’s macroeconomic performance improved notably (della Paolera, Irigoin and Bózzoli 2003:70).

The reform increased the independence of the BCRA and imposed a single goal for the institution: the central bank’s primary and fundamental mission is “to preserve the value of the Argentine currency” (Carta Orgánica del Banco Central de la República Argentina, Nro. 24.144 1992). Starting in 1992, the BCRA would be governed by a board composed by a Governor, a Deputy Governor and eight directors. All the members of the Board are appointed by the executive with the agreement of the Senate for six years, and their mandates can be renewed (see Braessas and Naughton 1997). The new law prohibited the BCRA from financing provincial or municipal governments, public firms, or the private nonfinancial sector.¹⁴⁷

¹⁴⁷ After the loss of liquidity caused by the Tequila crisis (1995) some of the banking regulations were revised. The Financial Institutions Law gave further powers to the BCRA. It allowed the BCRA to engage in rediscount operations with financial institutions “under extraordinary circumstances” and to restructure troubled banks (see Pou 2000:14).

Although the reform implied a substantial increase in the BCRA's independence, the existence of the Convertibility Law limited the functions to the Bank to *almost* a currency board.¹⁴⁸ The Congress eliminated many dispositions from the original project to make the BCRA compatible with a fixed exchange rate system. The new Charter of the BCRA prevented the central bank to guarantee commercial bank deposits or take new financial assets to make the BCRA compatible with the Convertibility Law. This last disposition affected the provinces' access to financing (Clarke and Cull 2000:7; Dillinger and Webb 1999:16).

There are different claims regarding the authorship of this reform and its relationship with the Convertibility Plan. Senator Romero claims it was based on his late 1980s project, drawing on the experience of other countries (Romero 2009). Others mention that the idea of the reform was already analyzed during Javier González Fraga's BCRA presidency, in a broader context – that is, independently from the adopted exchange rate system (González Fraga 2001; Guidotti 2009). Finally, there is a substantial disagreement regarding whether the reform was made to fit within Domingo Cavallo's economic plan. Whereas some argue that the new BCRA law helped Cavallo's command of the economy, others – including some of his closest advisors and colleagues – point out how uncomfortable an independent central bank made the former minister of economy.¹⁴⁹

During the 1994 Constitutional Convention, there was a proposal to create a federal bank, adapting the BCRA to the federal structure of the republic. Basically, the proposal involved allowing some form of intervention by the provinces in the governing structures of the central bank

¹⁴⁸ Many considered the BCRA under the Convertibility Law to be not more than a currency board (e.g., Baliño and Enoch 1997). Note however that the BCRA was not a mere currency board: because reserves could (and did) exceed the monetary base, the BCRA was able to decide emissions. Furthermore, the BCRA was able to determine the reserve requirements.

¹⁴⁹ Observers point to the fact that in 2001, as de la Rúa administration's Minister of Economy, Domingo Cavallo did not hesitate in instigating the separation of the president of the BCRA, Pedro Pou, and of part of the central bank's board (La Nación 2001c). Although they were accused of intervening in money laundry operations (BBC News 2001), the disagreements between the minister and the president of the central bank are highlighted as the main reason of the prosecution. Furthermore, della Paolera *et al.* stress the fact that the independence of the BCRA was de facto terminated by one of its architects, Cavallo (2003:72, fn. 31).

(Hernández 2002:228; 2009b). The proposal, presented and promoted by UCR former deputy and vice-presidential candidate, Antonio María Hernández, was discussed in the Constitutional Assembly (Hernández 2009a), but was not adopted.

There were two attempts to reform the BCRA in the late 1990s. In December 1997, there was an attempt to increase the number of vice presidents to two, and to give immunity to the directors in issues related to the reform of the financial system. This project, presented by Peronist Senator Branca, and sponsored by banking elites the president of the BCRA, was not discussed on the floor (Blanco 1998).

In March 1999, opposition legislators announced a project intending to undermine the powers of the president of the BCRA. This project was not officially presented in the Congress (La Nación 1999).

6.2.1.5 The 2001 crisis and beyond

The Convertibility Law helped to control inflation in the 1990s. A fixed exchange rate, trade and financial openness, and a broad privatization program spurred capital inflows. However, the ten-year fixed exchange rate, anchored on the dollar, did not allow for adjustments to the appreciation of the dollar or increases in international interest rates. The fall in inflation was followed by deflation and a subsequent GDP decrease in 1999. The increasing public deficit and foreign debt generated distrust from investors and people with bank deposits. Capital fled the country the midst of a crisis of confidence in the value of the currency and speculative attacks.¹⁵⁰

¹⁵⁰ There are numerous detailed accounts and interpretations of the 2001 crisis (Damill, Frenkel and Juvenal 2003; Galiani, Heymann and Tommasi 2003; Perry and Servén 2002). The analysis of the crisis though, exceeds the purposes of this section.

In 2001, a Decree of Necessity and Urgency (DNU) modified the Charter of the BCRA. The DNU, sponsored by some Peronist senators and approved by the IMF,¹⁵¹ changed the reserve requirements for deposits, and authorized the central bank to pay compensation for bank deposits in the BCRA.

In 2002, as a consequence of the economic crisis, a series of reforms affected the Argentine Central Bank. The National Emergency Law reinstated the BCRA as lender of last resort and allowed it to issue currency backed with reserves. The law also expanded the capabilities of the BCRA's Board, allowing it to give *rediscounts* to banks with liquidity problems.

Further reforms were passed in 2003. On August 27, 2003, through Law 25.780, Congress reformed the Financial Institutions Act as well as the BCRA Law. This reform increased and decreased CBI in different aspects. On the one hand, the independence of the central bank was restricted because the central bank was authorized to give "advances" to the Treasury for up to 12% of the monetary base. On the other hand, and through a law supported by the IMF (Kanenguiser 2003; Serra 2003b), the board received limited immunity to restructure the financial sector (La Nación 2003; Serra 2003a; Ybarra 2003).

Finally, in 2007 Peronist Representative Mercedes Marcó del Pont presented a project to restrict CBI (Serra 2007). The proposed reform demanded the central bank articulate its policies regarding employment and growth. This project was considered "against monetary stability, to make the central bank the lender of the government again; part of the statization of the economy and of the current economic dirigisme" by congressmen of the Peronist party (Romero 2009). Direct observers qualified this project as "her personal initiative," and not part of the government's or party's political program. Her project received support from the government until the reaction of

¹⁵¹ On the support by the opposition, see *La Nación* (2001b). On the IMF's blessing of the reform, see the report in *La Nación* (2001a).

the then BCRA president, Martin Redrado, who convinced leaders of the executive power to withdraw their support to the project.¹⁵²

6.2.2 Explaining the evolution of Argentine central banking

After describing the evolution of Argentine central banking, this section intends to analyze said evolution in the light of the theory.

There is some debate around the causes of the creation of the Argentine central bank: whereas some authors point to the influence of ideas and personalities, the timing of the creation of the BCRA coincides with falling growth rates – “a phenomenon rarely taken into account” (Arnaudo 1987:16) – and foreign investment. This was interpreted as a financial crisis by Argentine authorities (Arnaudo 1987:17), who looked for advice in the Bank of England, but created a central bank copying some characteristics of the U.S. Federal Reserve. Although full employment and the level of economic activity were mentioned among the concerns for the institution, the original design of the bank reflected the intention of creating an independent central bank (Véganzonès and Winograd 1997:211). Interestingly, the law creating the BCRA was passed in a context of political polarization: although it was proposed by a conservative executive, it was supported by prominent socialist deputies.

The first institutional restriction to the CBI happened under Perón’s first presidency, in a context of increasing rates of growth in the post-World War II era (Rocke 1985:276) and a relative lack of need for international financing. This movement was reversed by the 1955 military

¹⁵² Interestingly, in 2010, after a public fight between president Kirchner and Martin Redrado that derived in a scandal (the president fired Redrado, who did not leave office, backed by judicial decisions), it was Mercedes Marcó del Pont who replaced Redrado in the presidency of the BCRA.

government as part of a series of measures attempting to enhance confidence and attract foreign capital.

The 1973 restriction of CBI can be explained as Perón's attempt of resuming his nationalistic project, interrupted in 1955. Notice however, the relative improvement of some economic indicators, regarded in this project as international incentives for increases in CBI. A rise in the growth rates, stable FDI inflows, and relatively low levels of foreign debt are consistent with lack of incentives for increasing CBI in developing countries (see Figure 6.1).¹⁵³

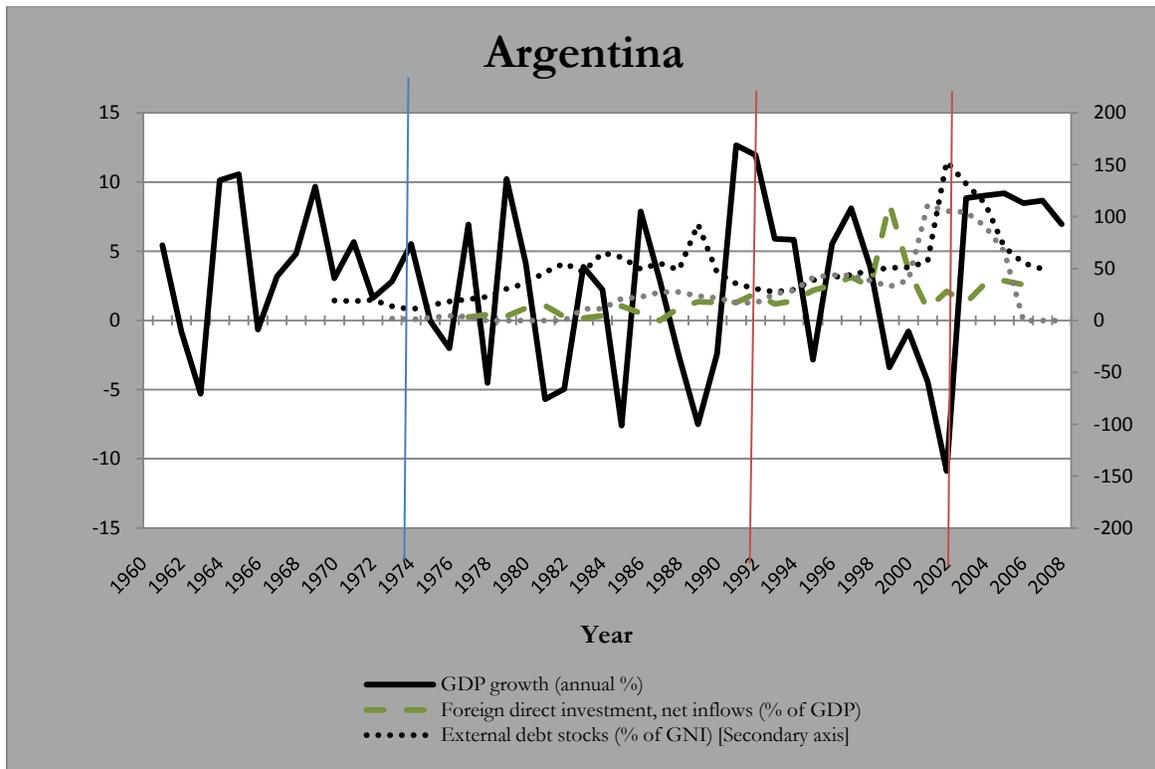


Figure 6.1. International determinants of CBI in Argentina, 1960–2008
Notes: Years of reforms decreasing CBI indicated with blue spikes.
 Years of reforms increasing CBI indicated with red spikes.

¹⁵³ I am aware of the descriptive nature of these data, and of the limited utility as evidence for a conditional theory. Unfortunately, data availability does not allow models from the previous chapter to estimate the probability of central bank reform for the Perón-Perón administration.

The liberalization of financial and exchange markets carried out by the military government was not reflected in a parallel institutional development. This is certainly not surprising during a regime that was not constrained by laws and institutions. Notice also that my theory does not have expectations for the behavior of autocracies.

A simple look at the economic indicators might suggest the expectation of a central bank reform increasing CBI in the 1980s: volatile growth rates, low FDI inflows, and increasing levels of debt (see Figure 6.1). However, a closer look at the probabilities calculated using the full model (as of Model 12d, see Figure 6.2) reveals that the full set of factors, including domestic dynamics, curved the incentives for reform. The highest probability for central bank reforms increasing CBI in this period is .032 in 1987.

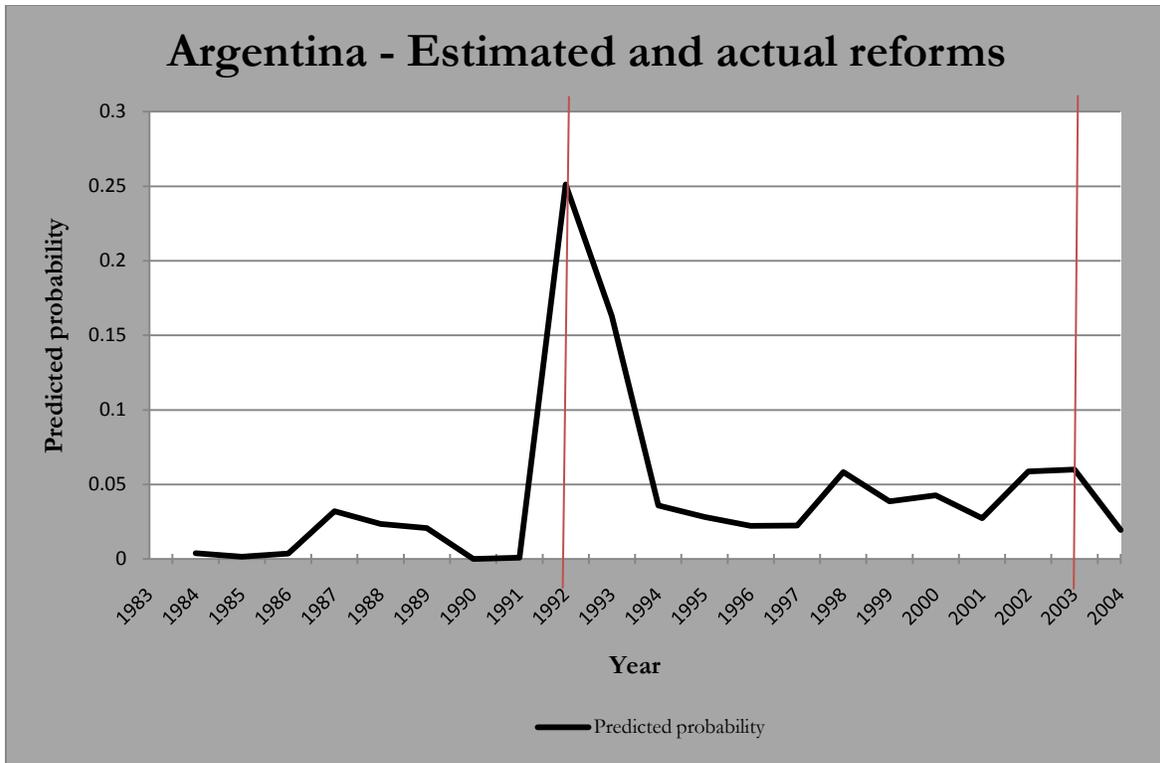


Figure 6.2. Probability of central bank reform increasing CBI and actual central bank reforms. Probability estimated after Model 12d. Central bank reforms increasing CBI indicated with vertical spikes.

Notice that the idea of an independent central bank was not in the mindset of Alfonsín's economic team. The BCRA was conceived as an instrument of the government, a necessary tool to conduct the monetary side of economic decisions. The president of the BCRA was considered a necessary collaborator in the implementation of the overall economic plan (Sourrouille 2009). Furthermore, international financial institutions endorsed these kinds of policies and did not demand CBI (*idem*).

Figure 6.2 plots the probability estimated after running Model 12d in the previous chapter, and the actual reforms of the BCRA's independence. It is apparent that my model accurately predicts both the 1992 major reform and the subsequent 2003 modification of the board's liability. Note that the model does not make predictions for the period before 1984 (third Perón administration and 1976-1982 military government) because of the conditional character of the theory, the inclusion of lags, and data availability. Although the reforms seem well predicted, there are some periods in which the likelihood of reform increased, and there were no observed reforms. The next paragraphs will also analyze these episodes.

The 1992 reform was preceded by a recovery from the 1989-1990 hyperinflation, an upturn associated to the effects of the Convertibility plan. Although growth rates were improving and capital inflows increased,¹⁵⁴ the pressures from international actors for CBI became explicit. For example, a World Bank document (published after the reform took place) stated:

“The new draft Charter should be implemented as soon as possible for at least three reasons. First, it will enhance the independence of the central bank through its legal constitution and financial autarky. Second, it will clarify the relations between the central bank and the rest of the financial system (e.g.,

¹⁵⁴ Note that an important part of this period's capital inflows is associated to the privatization programs implemented by the Menem administration.

Superintendency of Banks and credit to commercial banks). Finally, the Charter will provide a second legal pillar supporting monetary control in addition to the Law of Convertibility, *which will provide assurances to investors that fear change in the exchange rate regime*” (World Bank 1993:187, emphasis added).

It is interesting to note the stress on the guaranties that an independent central bank would offer to foreign investors. After some doubts, the international elites gladly received the Convertibility Law.¹⁵⁵ However, the international elites’ main concern was an eventual departure from the fixed exchange rate¹⁵⁶

During the crisis that ended in the collapse of the de la Rúa administration, the independence of the central bank became an issue of open debate. It is clear that, at the time, CBI was not considered a tool to stop capital outflows, but as a means of providing some form of institutional stability. However, notice the erratic behavior of international financial institutions – particularly, the IMF – regarding CBI: Although the IMF openly supported legal guarantees to the BCRA’s independence, it also endorsed measures that clearly reduced CBI, reducing the incentives for CBI. The IMF backed the 2003 reform that in some aspects implied a reduction of CBI, but that included one modification strengthening CBI: the Board’s immunity for financial reorganization, the only aspect expressly demanded by the IMF.

¹⁵⁵ As Blustein highlights, in 1991 “Argentina was anything but a darling of the international financial elites.” (Blustein 2006:16).

¹⁵⁶ The World Bank document cited above recognizes the possible redundancy of dispositions increasing CBI (and even of the “raison d’être of a Central Bank”). However, it stresses that the Convertibility Law “sharply reduces – but does not eliminate – the scope for an active monetary policy [...]any eventual departure from the fixed exchange rate regime may lead to an active monetary policy, thus reinforcing the role of the central bank” (World Bank 1993:191).

6.3 BRAZIL: HOW MUCH OF AN OUTLIER?

Brazil seems to be an outlier for many reasons. Many Latin American countries that created very independent central banks in the 1920s and 1930s (Ortiz Batalla 1998:45).¹⁵⁷ In contrast, Brazil did not have a proper central bank until the mid 1960s, and this central bank was not really independent. Furthermore, Brazil did not reform its central bank's organic law in the 1990s, going against the worldwide wave of CBI. However, a closer examination of the Brazilian case shows that, although it presents peculiarities, Brazil is not so much of an outlier.

Note that most of developments in Brazilian CBI happened under authoritarian rule (see Table 6.2). Therefore, my explanation does not fully account for these episodes. However, changes that occurred in democratic Brazil are not too different from what my theory would suggest.

¹⁵⁷ The Latin American countries with central banks in the first half of the 20th century are: Uruguay (1896), Peru (1922), Colombia (1923), Chile, Mexico and Guatemala (1925), Ecuador (1927), Bolivia (1929), El Salvador (1934), Argentina (1935), Venezuela (1937), Nicaragua (1941), Paraguay (1944), Dominican Republic (1947), Cuba (1949), and Honduras (1950) (Ortiz Batalla 1998:17).

Table 6.2. Brazilian authorities

President	Finance minister	Head of the Central Bank
João Goulart (09/07/1961-04/01/1964) Brazilian Labour Party	Walter Moreira Salles 08/09/1961 - 26/06/1962	
	<i>Tancredo de Almeida Neves (Interim)</i> 23/03/1962 - 09/05/1962	
	Walter Moreira Salles 12/07/1962 - 14/09/1962	
	<i>Henrique Domingos Ribeiro Barbosa(Interim)</i> 22/06/1962 - 03/08/1962	
	Francisco de Paula Brochado da Rocha 13/07/1962 - 29/07/1962	
	<i>Miguel Calmon Du Pin e Almeida Sobrinho (Interim)</i> 03/08/1962 - 17/09/1962)	
	Miguel Calmon Du Pin e Almeida Sobrinho 18/09/1962 - 22/01/1963	
	Francisco Clementino de San Tiago Dantas 23/01/1963 - 20/06/1963	
	<i>Antônio Balbino de Carvalho (Interim)</i> 11/03/1963 - 26/03/1963	
	Carlos Alberto Alves de Carvalho Pinto 21/06/1963 - 19/12/1963	
	<i>Hélio Pereira Bicudo (Interim)</i> 27/09/1963 - 04/10/1963	
	Ney Neves Galvão 20/12/1963 - 03/04/1964	
<i>Waldyr Ramos Borges (Interim)</i> 16/03/1964 - 20/03/1964		
Ranieri Mazzilli (04/02/1964 – 04/15/1964) Social Democratic Party	<i>Octavio Gouvêa de Bulhões (Interim)</i> 04/04/1964 - 15/04/1964	
Humberto de Alencar Castelo Branco (04/15/1964-03/15/1967) National Renewal Alliance Party (military)	Octavio Gouvêa de Bulhões 15/04/1964 - 16/03/1967	
	<i>Roberto de Oliveira Campos (Interim)</i> 04/09/1964 - 15/09/1964	
	<i>Eduardo Lopes Rodrigues (Interim)</i> 23/09/1965 - 04/12/1966	
Arthur da Costa e Silva (03/15/1967-08/31/1969) National Renewal Alliance Party (military)	Antônio Delfim Netto 17/03/1967 - 15/03/1974	Ruy Aguiar da Silva Leme- 03/31/1967 to 02/12/1968
		<i>Ary Burguer (Interim)-</i> 02/08/1968 to 02/20/1968
	<i>Fernando Ribeiro do Val (Interim)</i> 24/04/1967 - 06/04/1969	Ernane Galvêas- 02/21/1968 to 03/15/1974
	<i>Fernando Ribeiro do Val (Interim)</i> 24/04/1967 - 06/04/1969	

Table 6.2 (continued)

President	Finance minister	Head of the Central Bank
Augusto Rademaker, Aurélio de Lira, and Márcio Melo (08/31/1969 – 10/30/1969) National Renewal Alliance Party (junta)	<i>José Flávio Pécora (Interim)</i> 07/04/1969 - 15/03/1974	Ernane Galvêas- 02/21/1968 to 03/15/1974
Emilio Medici (10/30/1969-03/15/1974) National Renewal Alliance Party (military)		
Ernesto Geisel (03/15/1974 -03/15/1979) National Renewal Alliance Party (military)	Mário Henrique Simonsen 16/03/1974 - 15/03/1979	Paulo Hortêncio Pereira Lira- 03/15/1974 to 03/14/1979
	<i>José Carlos Soares Freire (Interim)</i> 16/03/1974 - 15/03/1979	
João Figueiredo (03/15/1979-03/15/1985) Democratic Social Party (military)	Karlos Heinz Rischbieter 16/03/1979 - 17/01/1980	Carlos Brandão- 03/15/1979 to 08/17/1979
	<i>Márcio João Andrade Fortes (Interim)</i> 16/03/1979 - 17/01/1980	Ernane Galvêas- 08/17/1979 to 01/18/1980
	Ernane Galvêas 18/01/1980 - 14/03/1985 <i>Eduardo Pereira de Carvalho (Interim)</i> 18/01/1980 - 25/03/1981 <i>Carlos Viacava (Interim)</i> 25/03/1981 - 01/03/1983	Carlos Geraldo Langoni- 01/18/1980 to 09/05/1983
		Affonso Celso Pastore- 09/05/1983 to 03/14/1985
José Sarney (03/15/1985-03/15/1990) Brazilian Democratic Movement Party	Francisco Oswaldo Neves Dornelles 15/03/1985 - 26/08/1985	Antonio Carlos Braga Lemgruber- 03/15/1985 to 08/28/1985
	Dilson Domingos Funaro 26/08/1985 - 29/04/1987	Fernão Carlos Botelho Bracher- 08/28/1985 to 02/11/1987
		Francisco Roberto André Gros- 02/11/1987 to 04/30/1987
		<i>Lycio de Faria (Interim)-</i> 04/30/1987 to 05/04/1987
	Luiz Carlos Bresser Gonçalves Pereira 29/04/1987 - 21/12/1987 <i>Mailson Ferreira. da Nóbrega (Interim)</i> 13/05/1987 - 06/01/1988	Fernando Milliet de Oliveira 05/05/1987 to 03/09/1988
	<i>Mailson Ferreira. da Nóbrega (Interim)</i> 13/05/1987 - 06/01/1988	
	Mailson Ferreira. da Nóbrega 06/01/1988 - 15/03/1990	Elmo de Araújo Camões – 03/09/1988 to 06/22/1989
		Wadico Waldir Bucchi (Interim)- 06/23/1989 to 10/25/1989
Wadico Waldir Bucchi- 10/25/1989 to 03/14/1990		

Table 6.2 (continued)

President	Finance minister	Head of the Central Bank
Fernando Collor de Melo (03/15/1990-12/29/1992) Party of the National Reconstruction	Zélia Maria Cardoso de Mello 15/03/1990 - 10/05/1991	Ibrahim Eris- 03/15/1990 to 05/17/1991
	Marcílio Marques Moreira 10/05/1991 - 02/10/1992	Francisco Roberto André Gros – 05/17/1991 to 11/16/1992
	Gustavo Krause Gonçalves Sobrinho 02/10/1992 - 16/12/1992	Gustavo Jorge Laboissière Loyola- 11/13/1992 to 03/29/1993
Itamar Franco (12/29/1992 (acting from 10/02)-01/01/1995) Brazilian Democratic Movement Party	Paulo Roberto Haddad 16/12/1992 - 01/03/1993	Paulo Cesar Ximenes Alves Ferreira- 03/26/1993 to 09/09/1993
	Eliseu Resende 01/03/1993 - 19/05/1993	Pedro Sampaio Malan- 09/09/1993 to 12/31/1994
	Fernando Henrique Cardoso 19/05/1993 - 30/03/1994	
	Rubens Ricupero 30/03/1994 - 06/09/1994	
	Ciro Ferreira Gomes 06/09/1994 - 31/12/1994	
Fernando Henrique Cardoso (12/29/1995 -12/29/2003) Brazilian Social Democracy Party	Pedro Sampaio Malan 01/01/1995 - 31/12/2002	<i>Gustavo Henrique de Barroso Franco (Interim)-</i> <i>12/31/1994 to 01/11/1995</i>
		Persio Arida- 01/11/1995 to 06/13/1995
		Gustavo Jorge Laboissière Loyola- 06/13/1995 to 08/20/1997
		Gustavo Henrique de Barroso Franco- 08/20/1997 to 03/04/1999
		Arminio Fraga Neto- 03/04/1999 to 01/01/2003
Luiz Inácio da Silva (01/01/2003 – 01/01/2011) Workers' Party	Antonio Palocci Filho 01/01/2003 - 27/03/2006	Henrique de Campos Meirelles 01/01/2003 - ...
	Guido Mantega 27/03/2006 a	

Source: Ministério de Fazenda, Governo do Brasil, <http://www.fazenda.gov.br/>. Banco Central do Brasil (2008). Banco Central do Brasil, <http://www.bcb.gov.br/?GOVHISTORY>. Accessed on April 11, 2010.

6.3.1 Central banking in Brazil

Before the creation of the Central Bank of Brazil (BCB) in 1964, three institutions had some form of monetary authority: the Bank of Brazil, the Currency and Credit Superintendence (SUMOC) and the National Treasury.¹⁵⁸

6.3.1.1 The Bank of Brazil

The Bank of Brazil was created in 1808 to finance the government and to be the seed of a monetary authority (Abreu and Lago 2001:366; Saddi 1997:171). Some historians point to the influence of Adam Smith's ideas on Conde de Linares, a minister of King João VI of Portugal, as the motivation behind the Bank.¹⁵⁹ However, the need to finance the government's expenditures and the trade deficit produced by the openness of the domestic market to international trade seem to be more important reasons for the establishment of the bank (Peláez and Suzigan 1981-40). Even after the independence of Brazil, the Bank of Brazil did not have real monetary authority: for more than a century, the Bank of Brazil was mainly in charge of printing currency,¹⁶⁰ but responded to the whims of the National Treasury (Franco 1979:14). As a consequence of the 1929 crisis, all foreign exchange operations were put in the Bank of Brazil's hands (Armijo 1993:262).

The 1930s witnessed the first attempts to create a central bank. José Maria Whitacker, Vargas' Minister of Public Finance (1930-1931), intended to create a central bank. He invited Sir Otto Niemeyer of the Bank of England, head of the noteworthy Niemeyer mission to Australia, to

¹⁵⁸ Given the lack of reliable economic indicators, the analysis of the pre-1964 period relies on secondary sources.

¹⁵⁹ Although influenced by of Adam Smith's ideas, Conde de Linares believed that central banks should enjoy monopoly powers (Inglêz de Souza 1924:32; Viana 1926:81).

¹⁶⁰ Note that for brief periods, the monopoly of monetary emission was shared with the private sector during certain periods in the XIX century (See Peláez and Suzigan 1981:85 and ff.). The Bank of Brazil recovered the monopoly on monetary emission in 1892, after its merger with the Bank of the Republic of the United States of Brazil (*Banco de República dos Estados Unidos do Brasil*) (Saddi 1997:173-174).

assess this possibility (Hilton 1975:768; Saddi 1997:176).¹⁶¹ Niemeyer recommended the “prompt reconstruction of the Bank of Brazil as an orthodox central bank on independent lines” (“Sir Otto Niemeyer's Brazil Mission” 1931). Whitacker left the Ministry of Finance by the end of the year. Although he was later appointed to the Bank of Brazil, the proposal of a central bank was left aside: the 1931 proposal of reform, although temporally close to Whitacker’s tenure, was limited to stabilizing the value of the currency. In 1937 there was a second failed effort to create a weak central bank, but the creation of a central bank would not be discussed again until 1945 (Saddi 1997:176).

6.3.1.2 The Currency and Credit Superintendence (SUMOC) and the National Treasury

The Currency and Credit Superintendence (SUMOC, *Superintendência da Moeda e do Crédito*) was created in 1945, along with two other agencies: the Rediscount Bureau (CARED, *Carteira de Redesconto*), and the Bank Mobilization Agency (CAMOB, *Caixa de Mobilização Bancária*).¹⁶² This institution had a two-fold purpose: to exercise monetary control and to prepare the basis to organize

¹⁶¹ There is some discrepancy regarding Niemeyers’ trip to Brazil. On the one hand, some authors believe Niemeyer was invited by Minister Whitacker (Baer 2001:41; Hilton 1975:768; Saddi 1997:176), or even “serving the Brazilian government in an advisory capacity” (Eichengreen and Portes 1989:227). On the other hand, Maxfield interprets his visit as “as part of British financiers’ evaluation of Brazilian creditworthiness” (Maxfield 1994:578; 1997:123), and Shaw refers to this mission as part of the bankers’ pressures on the debtors (Shaw 2005:183).

A 1931 Australian newspaper article however shed light on the nature of the visit. According to the *Sydney Morning Herald*, “Four questions are involved in the *official invitation* to Sir Otto Niemeyer in his recently-undertaken mission of investigation and advice to Brazil. They are: (1) The prompt reconstruction of the Bank of Brazil as an orthodox central bank on independent lines; (2) monetary reform and stabilization of the exchange; (3) maintenance of budget balance and the publication of periodical budget figures; and, (4) limitation of direct or indirect foreign borrowing by the Brazilian Federal Government, the States, or the Bank of Brazil, in accordance with a scheme to be agreed. These points show that Sir Otto’s present task in some respects bears a similarity to that which he undertook in Australia, the chief differences being that his advice on the establishment of a central bank, monetary reform, and exchange stabilization is specifically sought. *The announcement of the acceptance of the Brazilian Government’s invitation* was reflected immediately in firmer quotations for Brazilian stocks in London” (“Sir Otto Niemeyer's Brazil Mission” 1931, emphasis added). Note that the Niemeyer mission evaluated other aspects of the Brazilian economy (Gordon-Ashworth 1980:88).

¹⁶² CARED and CAMOB granted liquidity for commercial banks by discounting short- and medium-term bonds (Cortés Conde 2006:235).

the central bank. Its Executive Director was selected by the president, and its Council was chosen by the minister of finance, a secretary-range functionary,¹⁶³ and the Bank of Brazil's president.

The SUMOC had non-exclusive monetary functions. It was primarily in charge of providing liquidity to the system, orienting the exchange rate policy, and setting the interest and discount rates. It was also in charge of supervising banks, and of receiving and setting requirements for commercial banks deposits. Finally, it represented Brazil at international financial institutions. However, SUMOC was not responsible for monetary stability and ended up being an instrument for financing the public budget. The Bank of Brazil was actually performing as the government bank, controlling both foreign trade and foreign exchange operations.

Taylor describes the SUMOC as “a ‘toothless tiger’, with nominal responsibility for monetary policy but subject to intense political pressure and with no control over the Banco do Brasil” (Taylor 2009:496). According to Maxfield, the SUMOC was a “‘halfway’ central bank” because the Bank of Brazil, and the Sao Paulo interests that were represented in it, resisted the creation of a central bank (Maxfield 1997:125). The Bank of Brazil lobbied to become the monetary authority itself. Saggi mentions that a hundred unsuccessful proposals were discussed, and some were sent to the Congress between 1946 and 1964, but not pursued (Saggi 1997:178, 261 fn 31). It is interesting to note that, with one exception,¹⁶⁴ said proposals did not come from the executive but from legislators.

The last piece in Brazil's monetary architecture was the National Treasury. The National Treasury was limited to executing the rules submitted by SUMOC, to receiving commercial banks' reserve requirements and voluntary deposits, and to issuing currency.

¹⁶³ The director of the Rediscount, Exchange, and Mobilization Account, and Bank Supervision agency (in Portuguese, *Carteira de Redescoto, Câmbio e Caixa de Mobilização e Fiscalização Bancária*).

¹⁶⁴ The exception is Minister Corrêa e Castro's 1946 project (Saggi 1997:261 fn 31).

During this period, there was a significant increase in the monetary base with an overvalued currency. Cortés Conde reports that between 1945 and 1960 the Brazilian currency devaluated by 9,700% and prices rose 7,000% – compared to 80% in the U.S. (Cortés Conde 2006:233). In the early 1960s Brazil was experiencing a severe balance of payments crisis¹⁶⁵ that led to a declaration of default in 1964 (Cortés Conde 2006:236).

6.3.1.3 The Brazilian Central Bank (BCB)

The Central Bank of Brazil (BCB, *Banco Central do Brasil*), was created on December 31, 1964 by Castelo Branco's military government. The same law created both the BCB and the Brazilian National Monetary Council (CMN, *Conselho Monetário Nacional*), the highest deliberative organ of the National Financial System.

The BCB was in charge of executing monetary and credit policies, but under the President's guidelines. Its board had a six-year tenure (longer than the presidential mandate), suggesting substantial autonomy. However, the BCB's Board comprised by the Minister of Finance, the Minister of Planning and Budget, and the BCB governor, and was directed by the National Monetary Council. In fact, the BCB was in charge of applying the National Monetary Council's guidelines for monetary policy and financial stability. In other words, the BCB lacked any real autonomy.

With the creation of the BCB, there were four monetary authorities in the country: (1) the National Monetary Council; (2) the BCB, (3) the Bank of Brazil, and (4) the National Treasury. The National Monetary Council produced the guidelines for monetary policy and financial stability, including foreign exchange and credit policies, and was responsible for regulation and supervision of

¹⁶⁵ Cortés Conde attributes this crisis to a “growth [strategy] based on financing through inflationary taxes” (2006:236).

financial institutions. The BCB was in charge of implementing those guidelines, and of monetary regulation and emission, and the Bank of Brazil was the government's financing and credit agent.

Although the BCB was designed to have some degree of autonomy, in 1967 it lost it after serious conflicts with the new military government of Costa e Silva. The main disagreement referred to the origins of inflationary pressures. According to Roberto Campos, one of the designers of the BCB, demand factors were causing inflation. However, according to Delfim Netto, inflation was a consequence of cost pressures (Cortés Conde 2006:243). Only two years after the nomination of the BCB's board, the government submitted to the Congress the names of a new board, causing the collective resignation of the Board (Pereira 2003:4).¹⁶⁶ With the change in authorities, Minister Netto adopted an expansionary monetary policy (see Cortés Conde 2006:243).

Maxfield identifies 1964 and 1967 as the two turning points in Brazilian central banking history (Maxfield 1997:121): 1964 because of the creation of the BCB, and 1967 because of the end of the application of the six-year rule for the BCB governor's tenure. However, the 1988 constitutional reform also affected some aspects of the BCB's independence.

The 1988 Constitution attributes the exclusive role in money issuance to the BCB, and explicitly forbids the BCB from directly or indirectly granting loans to the Treasury.¹⁶⁷ Furthermore, it states that the BCB board appointments need the Congressional approval by a simple majority after the president's nomination. The dismissal of the board remains a responsibility of the president. Although the importance of the constitutional reform is neglected by some authors, there were changes in the operations of the BCB that seem to have affected economic indicators as well

¹⁶⁶ Taylor reproduces a very illustrative anecdote: after Campos explained to Costa e Silva why the government could not substitute the BCB's president at will, the president's answer was: "I am the guardian of the currency" (*O guardião da moeda sou eu*) (Taylor 2009:499).

¹⁶⁷ According to Article 164 of the Brazilian Constitution, the BCB will not finance the National Treasury, nor buy primary issues of federal debt. In particular, the central bank may not grant loans to the National Treasury or to any agency or entity that is not a financial institution.

(Nunes 1999:46). However, operational aspects of the monetary policy (including the structure and functioning of the BCB) were left for a law to be passed in the future.

In June 1996, an administrative order (*Circular 2.698*) created the Monetary Policy Committee (COPOM, *Comitê de Política Monetária*) with the intention of imposing more transparency and regularity on the monetary policy decisionmaking process.¹⁶⁸ The COPOM is composed of members of the BCB Board: the Central Bank Governor and the Deputy-Governors of Monetary Policy, Economic Policy, Special Studies, International Affairs, Financial System Regulation, Financial Supervision, Bank Privatization and Administration. The COPOM is in charge of defining the general monetary policy and the short-term interest rate on a regular basis.¹⁶⁹ This last competence disappeared in March 1999, when Brazil adopted inflation targeting and ceiling interest rates for overnight interbank loans registered with and traded on the SELIC (*Sistema Especial de Liquidação e Custódia*).

In 1999, Decree 3088 established inflation targeting as one of the main central bank objectives. The National Monetary Council defines the inflation target (the target for the SELIC interest rate), and the COPOM is in charge of achieving that target. The COPOM can authorize a band around the target, allowing the BCB to loose or tighten the SELIC rate. If inflation exceeds the target (plus the band), the BCB's Governor must write an open letter to the Minister of Finance explaining the reasons the target was missed, the measures that will be implemented to bring inflation back to the target, and how long it will take for these measures to reduce inflation (Banco Central do Brasil 2009).

The 1988 Constitution confirmed the subordination of the BCB to the authority of the Ministry of Finance. Although the BCB's operational autonomy has increased substantially since the

¹⁶⁸ There was some controversy surrounding the creation of COPOM, because in principle, the BCB was not competent to create committees or councils of any nature (Falção 2003).

¹⁶⁹ Between 2000 and 2006, the COPOM met once a month. Since 2006, it meets eight times a year.

mid 1990s, there were two legal mechanisms to increase *de jure* the independence of the BCB: (1) the Brazilian Congress had to pass a “super-law” (*lei complementar*) addressing many aspects of monetary and fiscal policy,¹⁷⁰ or (2) the Constitution needed to be amended to allow central bank reforms through a supplementary law. In May 2003, Constitutional Amendment 40 reduced some restrictions to issue laws regarding monetary and fiscal policy. Principally, this Constitutional Amendment made central bank reform, and particularly, changes in CBI easier. Although the Constitutional Amendment was passed in 2003,¹⁷¹ in the middle of a long political debate, an actual law reforming the BCB has not passed yet (as of 2010).

6.3.2 Explaining the evolution of Brazilian central banking

What explains the creation and reforms (and more importantly, the lack of reforms) of the BCB? The literature proposes two explanations for the creation of the BCB. On the one hand, Sylvia Maxfield argues that in 1964, the “economic crisis and the need for international creditworthiness helped bring about a military coup and the creation of an official central bank, after two decades of debate over the nature of official financial institutions” (Maxfield 1997:121). On the other hand, Jairo Saddi attributes the creation of the BCB to the budget deficit and “fiscal disorientation” that

¹⁷⁰ After the 1988 Constitutional reform, Article 192 read: “The national financial system, structured *to promote the balanced development* of the country and to serve the collective interests, shall be regulated by a *supplementary law* which shall *also* provide for: (1) authorization for the operation of financial institutions [...], (2) authorization and operation of insurance, reinsurance, social security and capitalization companies, as well as of the supervising agency; (3) conditions for the participation of foreign capital in the institutions to which the preceding items refer to [...]; (4) *organization, operation and duties of the central bank* and other public and private financial institutions; (5) *requirements for the appointment of members of the board of directors of the central bank* and other financial institutions, as well as their impediments after leaving office; (6) creation of a fund or insurance [...]; (7) the restrictive criteria of the transfer of savings from regions with income below the national average to others of greater development; (8) the operation of credit cooperatives and the requirements for them to obtain operational and structural conditions characteristic of financial institutions [...]. (Constituição da República Federativa do Brasil de 1988 1988, emphasis added).

This disposition was undoubtedly interpreted as the need of issuing a single instrument regulating all these complicated matters – including the central bank’s organization and appointment of its board. Hence, my qualification of “Super-law.”

¹⁷¹ Interestingly, the Constitutional amendment was proposed by Senator José Serra (PSDB – SP) in December 1997. Lula defeated Serra in the 2002 presidential elections.

were causing inflation (Saddi 1997:180), a source of concern for incumbents at the time, along with the sizable private sector debt and wage increases (Cortés Conde 2006:236).¹⁷² For a summary of the main indicators used by different authors, see Table 6.3.

Maxfield presents qualitative evidence to support her claims (see Figure 6.3). According to Maxfield, data on imports coverage (month's worth of imports covered by central bank reserves, (Maxfield 1997:72)) and on foreign exchange reserves are indicators of the need of international creditworthiness. Accepting these variables as valid indicators of need of creditworthiness (and assuming that the bivariate analysis does not leave out important factors), one should expect attempts of central bank reform at the beginning and end of the 1950s, around 1967, 1975 and around 1979-1981. Maxfield attributes the lack of reform in all these years to a lack of domestic political consensus, fragmentation and polarization, and weak political parties. For example, Maxfield analyzes Vargas' and Kubitscheck's political support in Congress, and their impossibility to build a coalition behind central bank reform (Maxfield 1997:128). According to her argument, the incentive to reform the central bank in the 1950s was Brazil's need for international capital during 1950, stemming from the fall in exports. "But the logic of trying to remain in power in a polarized, unstable democracy weighed much more heavily on politicians' minds than competing for international capital" (Maxfield 1997:125-7).¹⁷³

¹⁷² According to Saddi, the fiscal situation was so confused that it was hard to know the goal of the emissions: whether they were destined to finance the deficit, to exchange operations, or to finance private sector operations (Saddi 1997:179).

¹⁷³ Note here a substantive difference between her argument and the argument put forward in this dissertation: tenure insecurity should be a reason to promote central bank reform, and not two alternative courses of actions for incumbents.

Table 6.3. Economic indicators – Brazil 1960-2008

Year	Maxfield's argument		Saddi's argument		International determinants of CBI			
	External balance on goods and services (% of GDP)	External debt stocks (% of GNI)	Budget surplus(deficit)/GDP	Inflation, GDP deflator (annual %)	GDP growth (annual %)	FDI, net inflows (% of GDP)	IMF use	Predicted probability of reform
1960	-0.06		-9.94				0.700	
1961	-0.06		-22.02	31.3	10.28		1.100	
1962	-1.32		-28.83	78.83	5.22		0.925	
1963	-0.07		-24.26	69.77	0.87		0.970	
1964	0.71		-29.00	93.83	3.49		0.690	
1965	2.18		-19.24	51.38	3.05		0.893	
1966	0.83		-2.10	39.41	4.15		0.445	
1967	0		-9.53	29.24	4.92		0.120	
1968	-0.61		2.11	26.67	11.43		0.000	
1969	0.07		6.82	20.91	9.74		0.000	
1970	-0.42	13.74	8.77	17.09	8.77	0.93	0.000	
1971	-1.72	15.29	3.52	20.25	11.3	0.91	0.000	
1972	-1.58	19.83	3.52	19.14	12.05	0.79	0.000	
1973	-1.23	18.72	3.83	22.66	13.98	1.49	0.000	
1974	-5.87	21.13	5.25	34.8	9.04	1.15	0.000	
1975	-3.97	22.4	-3.09	33.86	5.21	1.05	0.000	
1976	-2.4	22.17	2.56	47.63	9.79	1.02	0.000	0.22
1977	-0.67	24.27	2.06	46.18	4.61	1.04	0.000	0.09
1978	-1.19	27.83	0.47	41.06	3.23	1	0.000	0.09
1979	-2.05	28.01	3.88	56.48	6.77	1.08	0.000	0.09
1980	-2.25	31.47	3.11	87.31	9.11	0.81	0.000	0.09
1981	-0.38	32.24	4.04	107.21	-4.39	0.96	0.000	0.09
1982	-0.66	35.15	3.18	104.83	0.58	1.03	4.9875	0.08
1983	2.41	51.46	6.16	140.2	-3.41	0.79	25.2572	0.08
1984	5.62	52.68	7.45	212.79	5.27	0.76	42.6987	0.08
1985	5.15	49.09	3.38	231.72	7.95	0.65	42.054	0.03
1986	2.46	42.56	4.20	145.27	7.99	0.13	36.7986	0.10
1987	3.27	42.35	6.95	204.1	3.6	0.4	28.0288	0.05
1988	5.2	37.02	1.13	651.11	-0.1	0.85	24.7682	0.03
1989	3.47	25.5	-0.03	1209.12	3.28	0.27	18.4336	0.01
1990	1.24	26.63	5.78	2735.49	-4.3	0.21	12.7968	0.00
1991	0.76	30.34	3.08	414.24	1.51	0.27	8.6514	0.00
1992	2.48	33.67	4.57	968.18	-0.47	0.53	5.814	0.12
1993	1.41	33.69	1.35	2001.35	4.67	0.29	2.2102	0.05

Table 6.3 (continued)

Year	Maxfield's argument		Saddi's argument		International determinants of CBI			
	External balance on goods and services (% of GDP)	External debt stocks (% of GNI)	Budget surplus(deficit)/GDP	Inflation, GDP deflator (annual %)	GDP growth (annual %)	FDI, net inflows (% of GDP)	IMF use	Predicted probability of reform
1993	1.41	33.69	1.35	2001.35	4.67	0.29	2.2102	0.05
1994	0.35	28.37	2	2251.7	5.33	0.56	1.275	0.00
1995	-1.52	21.17	1.17	93.52	4.42	0.63	0.95227	0.01
1996	-1.8	21.91	1.09	17.09	2.15	1.33	0.47016	0.25
1997	-2.2	23.21	2.48	7.64	3.37	2.26	0.23309	0.27
1998	-2	29.25	0.87	4.23	0.04	3.78	34.2678	0.32
1999	-1.4	42.97	1.68	8.48	0.25	4.87	64.31	0.06
2000	-1.76	38.54	2.94	6.18	4.31	5.08	13.5675	0.05
2001	-1.32	42.87		8.97	1.31	4.06	66.3393	0.04
2002	1.51	47.48		10.55	2.66	3.29	153.196	0.07
2003	2.91	43.94		13.73	1.15	1.84	190.565	0.13
2004	3.88	34.05		8.03	5.72	2.74	161.167	
2005	3.61	22.16		7.21	3.16	1.71	0	
2006	2.9	18.56		6.15	3.97	1.72	0	
2007	1.54	18.67		3.73	5.67	2.59	0	
2008	0.17			5.87	5.08	2.86	0	

This explanation seems inconsistent, however, when applied to other periods. First, it is not clear why the Brazilian government created the SUMOC (in 1945) with the intention of preparing the basis to organize the central bank when import coverage was relatively high (suggesting, in Maxfield's argument, no need of international financing). It also does not explain why the 1988 Constitutional reform included clauses enhancing the BCB's independence. Third, and given that Maxfield's argument seems to rely on economic indicators and presence/absence of polarization, it is not clear why in 1967, when the indicators presented suggested incentives for increasing CBI, and a military government allowed to disregard the fragmentation of the political system (Maxfield

1997:131), there was a central bank reform increasing CBI. Furthermore, there was also an abrogation of the fixed tenure for the BCB's board. Finally, this explanation fails to explain the inclusion of some protections for the BCB's board in the 1988 Constitution.

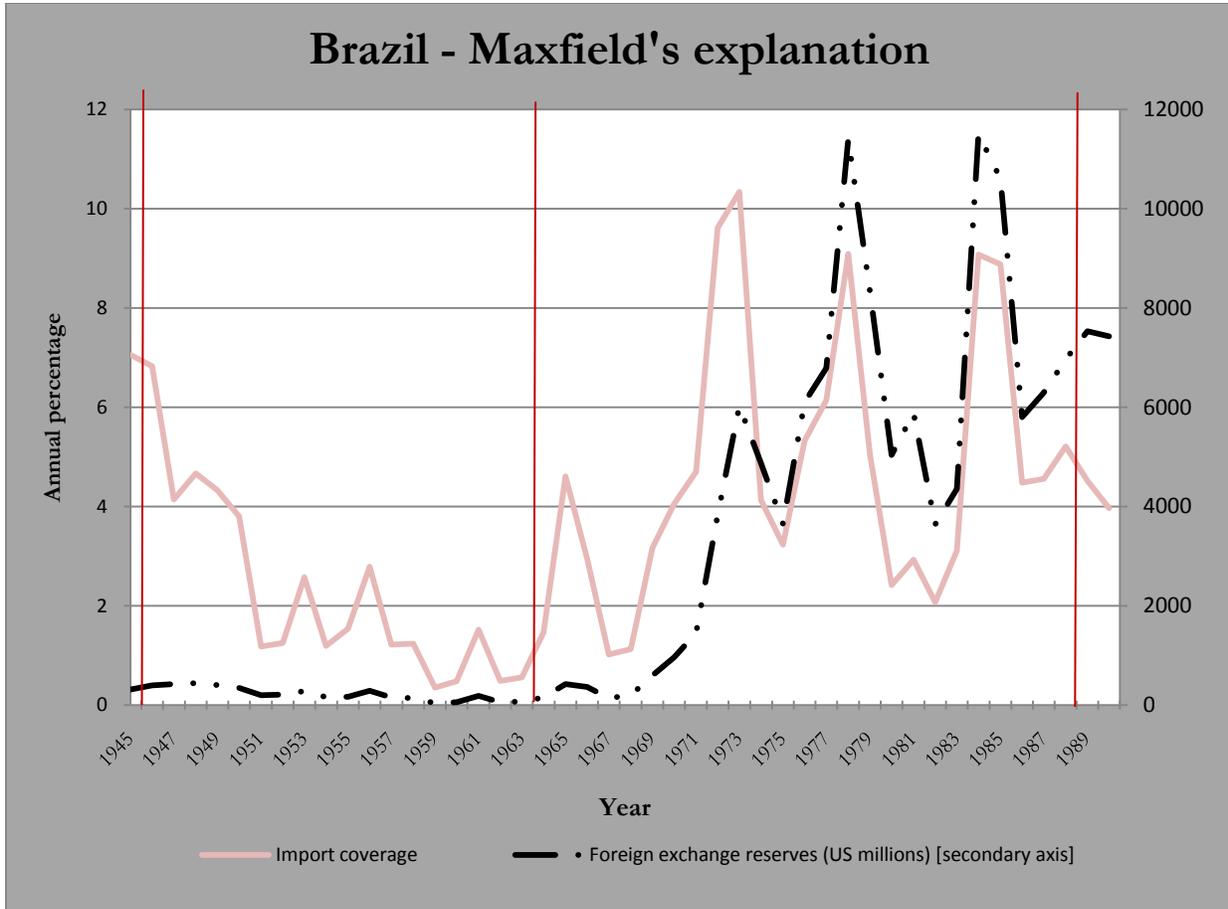


Figure 6.3. Determinants of CBI in Brazil, according to Maxfield 1969–2000
 Source: Maxfield (1997:122-123)

Saddi attributes the BCB's reforms to inflation generated by the public deficit. Although there are several problems regarding the data on Brazilian public deficit,¹⁷⁴ and there is no comparable data on budget deficit for the complete period, Figure 6.4 plots data on inflation and federal deficit as a proportion of the GDP.¹⁷⁵ Note that there is substantial disagreement on the existence and magnitude of the federal budget deficit. On the one hand, Cortés Conde reports that the public expenses grew from 17 to 26% of the GDP between 1970 and 1976, whereas the government's tax revenues increased from 7 to 9.5% of the GDP in the same period (Cortés Conde 2006:239). Coes reports nominal deficits between 1983 and 1990, ranging between 5 to 49% of the GDP, and operational deficits ranging between 1.1 and 3.8% of the GDP between 1981 and 1989 (Coes 1995:68). On the other hand, the Ministry of Finance reports deficits from 1949 until 1967, but after that only in 1975 in 1989 (the Ministry of Finance's data cover until 2000).

¹⁷⁴ Coes explains that “chronic inflation and the absence of budget data on certain public sector expenditures” difficult measuring fiscal deficits in Brazil (Coes 1995:57). In particular, even when deficit is normalized by GDP, the calculations *overstates* the real deficit in the presence of inflation (Coes 1995:60).

¹⁷⁵ The data on deficit and on GDP was obtained from the Brazilian Ministry of Finance, http://www.ibge.gov.br/series_estatisticas/exibedados.php?idnivel=BR&idserie=SCN103, accessed on 04/21/2010.

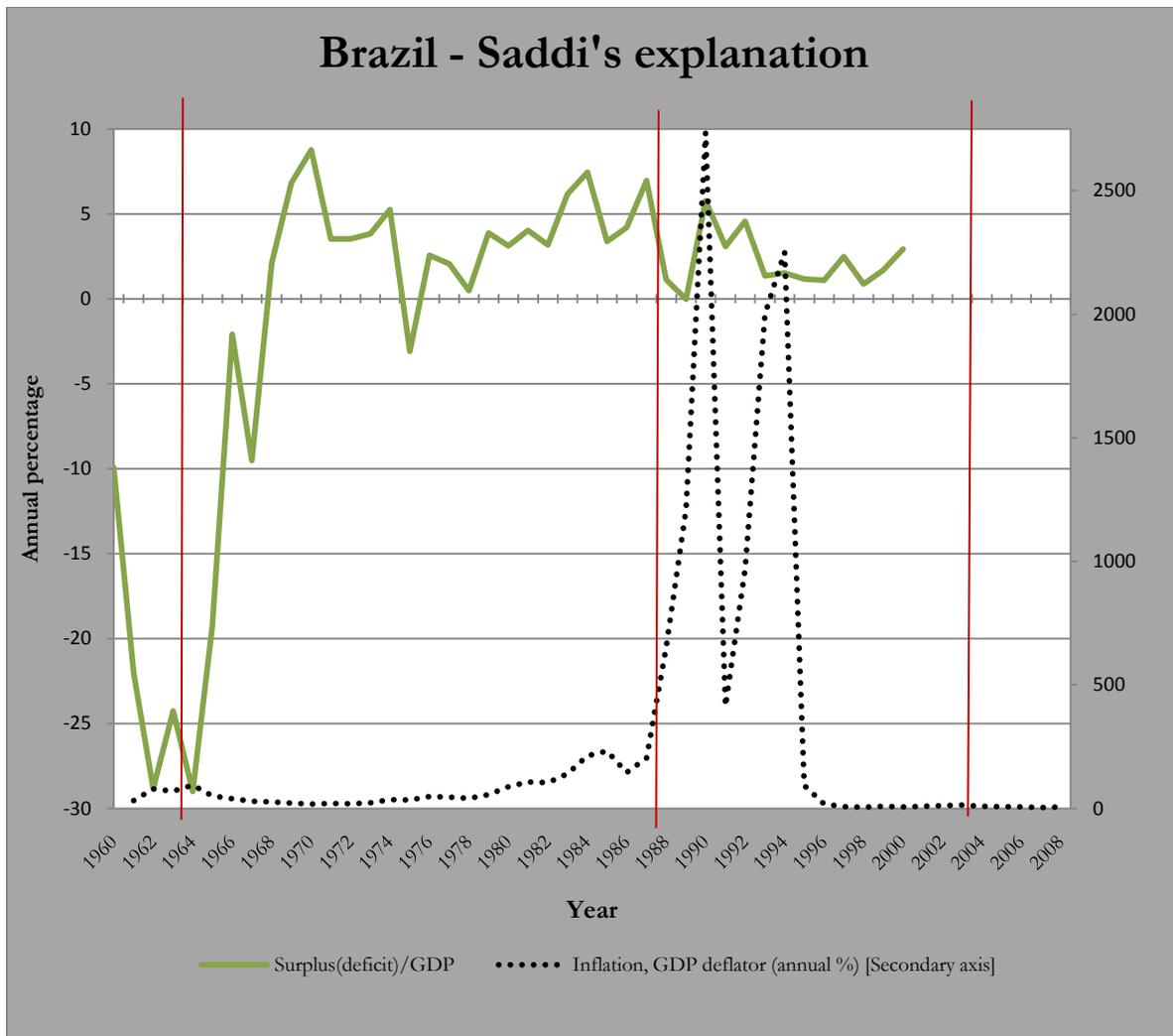


Figure 6.4. Determinants of CBI in Brazil, according to Saggi 1960–2008

Sources: Data on inflation and growth from the World Bank Development Indicators (World Bank 2009). Data on deficit and on GDP in Brazilian currency from *Estatísticas do Século XX*. Rio de Janeiro: IBGE, 2007; *Consolidação das Contas Públicas*, 2000-2006. Brasília, DF:Ministério da Fazenda, Contabilidade Governamental, Gestão Orçamentária, Financeira e Patrimonial, http://www.ibge.gov.br/series_estatisticas/exibedados.php?idnivel=BR&idserie=SCN103, accessed on 04/21/2010

Two observations regarding Saggi’s explanation of the BCB reform: First, although it is reasonable to link public deficits with higher inflation, the correlation between these variables is .15, and the correlation between inflation and the year lag of federal budget deficit/surplus is .13. Only

when excluding years of hyperinflation (1988-1990, 1992-1994, that is, 6 years out of a 40-year sample) this last correlation is .86.

Second, consistent with the results produced by multivariate statistical analyses presented in chapters 4 and 5, inflation does not seem to be consistently positively correlated with central bank reform in Brazil. The average rate of inflation in Brazil for the period 1960-1980 is 44%. Annual inflation was increasing in Brazil since 1960, from 31% to almost 94% in 1964, which seems to correspond to Saggi's argument. There was also an increase in inflation in the late 1980s that precedes the 1988 Constitutional reform. However, inflation alone cannot explain the 2003 reform. Furthermore, there were no serious debates around CBI in the early 1980s, or more strikingly, in the early 1990s, paralleling the episodes of hyperinflation.

Figure 6.5 shows the main indicators of need for capital, as presented in Chapters 3 and 4. Note that there are no comparable data for FDI and for external debt stocks because the World Bank data on these variables start in 1970. Second, I do not argue that the variables of interest should have the same impact before 1973 and after that date. However, these descriptive statistics seem to show a more accurate approximation to the factors associated to central bank reform in Brazil.

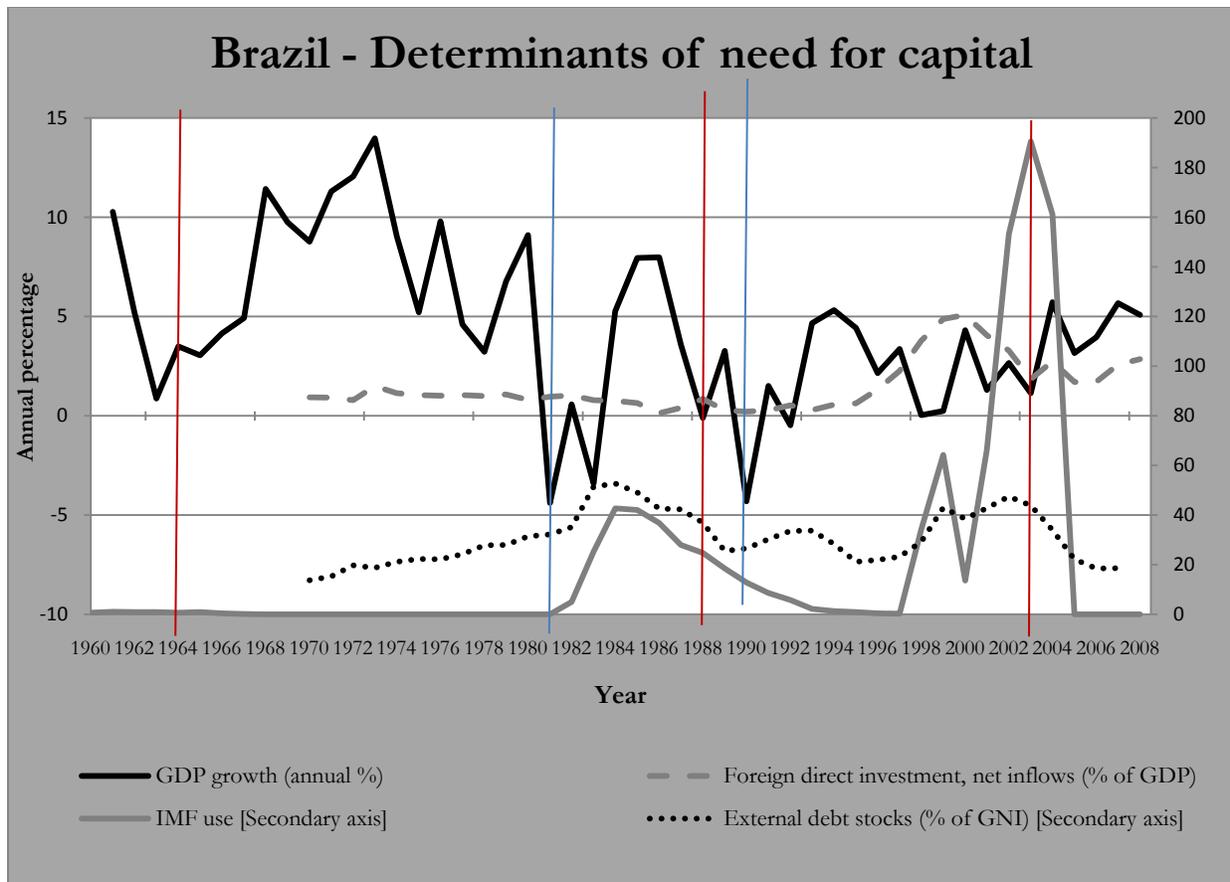


Figure 6.5. International determinants of CBI in Brazil, 1960–2008

In 1963-1964, Brazil experienced growth problems, increasing levels of debt, and there are reports indicating falling FDI inflows. Figure 6.5 shows that Brazilian’s growth rates dropped significantly from 1960 to 1963. The use of IMF credit rose, from 70 million SDR (Special Drawing Rights) in 1960, to 110 million in 1961, 92 million in 1962, and 97 million in 1963. The creation of the central bank was part of a series of incentives that the military regime introduced to attract both domestic and foreign investment (Baer 2001).

Figure 6.6 presents a more accurate picture of the accuracy of the theory to explain central banking in Brazil. Along with GDP growth and FDI net inflows, the figure plots the estimated

probability of central bank reforms increasing CBI in Brazil. There are lags between when the model would predict a reform and actual changes affecting the BCB's independence. What explains these lags?

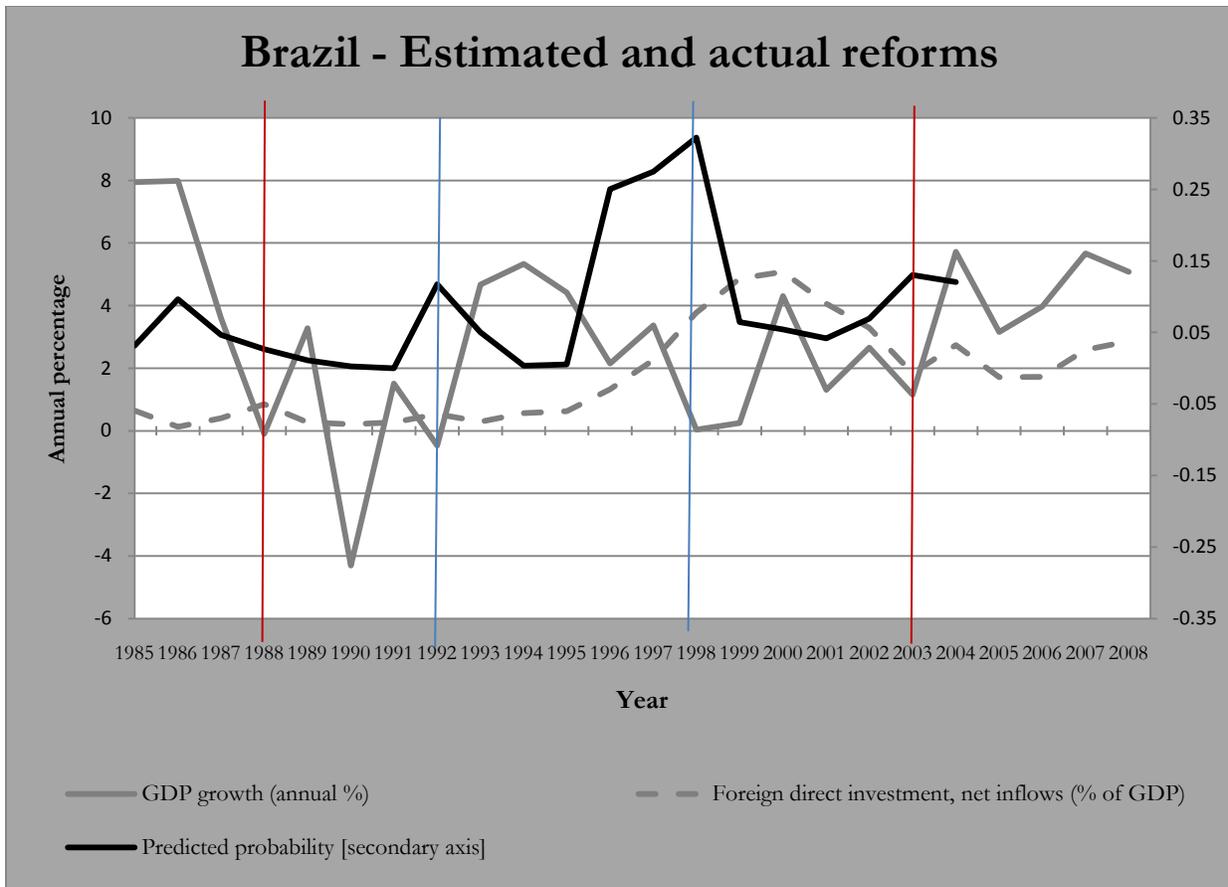


Figure 6.6. Probability of central bank reform increasing CBI and actual central bank reforms
Probability estimated after Model 12d. Central bank reforms increasing CBI indicated with vertical spikes.

The literature often highlights the pace of Brazilian reforms, especially when compared to other developing countries: Brazilian reforms are argued to be gradual, slow and, sometimes, late (e.g., de Albuquerque 2008:95; Taylor 2009; von Mettenheim 2006). Some attribute this pace to

political institutions producing an “excess of veto players” (Ames 2001) and to Brazilian political fragmentation. De Albuquerque stresses the number of political parties represented in Congress (de Albuquerque 2008:105).¹⁷⁶ Others speculate about the role of Brazil’s “informal political negotiating mechanisms” (Armijo, Faucher and Dembinska 2006; Faucher and Armijo 2004), and the need of heavy side payments (in the form of patronage or pork) for legislators in order to pass innovative legislation (Ames 1987; Geddes 1994:133), caused by particular electoral rules (Ames 2001).

Figure 6.6 shows a significant delay between when my theory would predict the executive would initiate a central bank reform and the date in which the BCB’s independence was increased. However, there were initiatives to increase CBI in the predicted years. The delay in reforms – and sometimes, the lack of reform – can be attributed to the domestic political process.

Even when the growth rates were relatively high, the model estimates a higher likelihood of central bank reform in 1986. In that year, the government initiated the Cruzado plan attempting to control inflation, while the debt negotiations were under the Brady Plan. Because Sarney’s government resisted asking for the IMF’s support if it could cause recession, debt agreements were temporary (de Albuquerque 2008:97). There was, however, a significant innovation on the lines of strengthening the BCB. In 1986, the government eliminated the “Transactions Account” (*Conta Movimento*). The *Conta Movimento* was created to correct imbalances between the Bank of Brazil and the BCB to recompose their reserves (Moura 2007:16; Taylor 2009:498). However, because the Bank of Brazil was usually in deficit, the Transaction Account ended up working as a sort of open account to finance public policies and as another source of monetary production (that was not accounted in the Brazilian budget). Disabling this automatic mechanism allowed the BCB to gain control over the monetary base. The BCB’s institutional webpage highlights that “in a process that

¹⁷⁶ She points at the number of political parties represented in Congress as an indication of political fractionalization: two principal political parties between 1974 and 1979, five in the 1980s. In 1999, there were ten political parties represented in the congress, but 21 by the mid-2000 (de Albuquerque 2008:105).

continued through 1988, the functions of monetary authority were progressively transferred from the Bank of Brazil to the Central Bank” (Banco Central do Brasil 2010).

Although some authors discount the importance of the 1988 Constitutional reform as a critical juncture for the evolution of Brazilian monetary institutions (Maxfield 1997; Taylor 2009:503), it did crystallize the growing concern about designing monetary institutions for the country. The vague and certainly provisional text of Article 192 also reflects the lack of consensus regarding the shape these institutions should have.

The model also estimates a higher likelihood of reform initiative at the beginning of the 1990s. The estimated probability for 1992 is almost .12 (see Figure 6.6). Beyond the statistical estimation, it is reasonable to expect more permeability of the Brazilian authorities to foreign incentives. 1990 marks the beginning of financial openness in Brazil. First, free interest rates were introduced; foreign institutional investors were allowed to participate in the stock market in 1991, and they are allowed to participate in future market operations the following year. The foreign debt will be renegotiated in 1993. However, the political climate was clearly not conducive to executive initiatives to promote institutional reforms to attract capital: between mid-1991 and 1992, Fernando Collor de Melo was investigated for corruption charges. These accusations lead to his impeachment and resignation from office. The international incentives would have made it reasonable for a president to be concerned about survival and to initiate reforms to attract investment and credit under normal circumstances. However, Collor de Melo’s survival was clearly challenged on other fronts, and his remaining political capital was not to be invested in attempting to pass a central bank reform.

Note, however, that Gustavo Loyola, BCB’s president under the Collor de Mello administration, was a strong supporter of giving formal independence to the BCB:

“The central bank’s autonomy is a particularly delicate for foreign investors, who value institutional developments. Domestic investors may even disregard the lack of formal CBI and favor a de facto independence [...]. Foreign investors, on the other hand, may have a very negative reading if they evidence government’s difficulties [of formalizing CBI]” (Folha de São Paulo 2003).

Some academics and political actors at the time highlight an increasing concern about CBI (Franco 2009; Lima 2006:64).

Another period of increased likelihood for central bank reform in Brazil is 1996-1998, under the first presidency of Fernando Henrique Cardoso, between the 1997 Asian financial crisis and the 1998 Russian bond default. According to Taylor, Cardoso favored delegating monetary policy authority to the BCB; however, the coincidence of the executive’s and the BCB’s preferences was translated into an increased de facto autonomy for the BCB (Taylor 2009:506). Furthermore, gradualism – either as a personal choice (von Mettenheim 2006), or as a rational response to institutional incentives (Ames 2001:267) – characterized Cardoso’s administration.

Cardoso’s response to the need to control inflation and, I argue, to international incentives, was twofold: First, the BCB published a new set of *Core Principles for Effective Bank Supervision*, based on the Bank for International Settlements’ recommendations to strengthen the banking system. Second, and more importantly, in 1999 Brazil adopted inflation targeting to constrain monetary policy. Inflation targeting not only succeeded in controlling inflation, but it also fostered economic growth. Controlling inflation had a positive effect that may help explain the 2003 reform: in line with Ames’ (2001) argument, Sola, Garman and Marques argue that economic stabilization gained bargaining power in front of the governors, who became more dependent on the federal government (Sola, Garman and Marques 2002:141).

Although the Brazilian economy grew in 2000, the influence of the 2001 Argentine crisis, and concerns regarding Lula da Silva’s electoral prospects, prompted a confidence crisis. Especially

because of investors' concerns regarding Lula's plans for the Brazilian economy – and because investors started fleeing the country – the then-candidate da Silva made a public commitment to economic discipline. In the “Letter to the Brazilian People” (*Carta ao Povo Brasileiro*), he pledged his commitment to monetary stability, and on numerous occasions, he expressed his willingness to discuss and (later in the presidential campaign) to promote the legal increase of CBI. Although many stress this pledge's effect on the domestic audience, economists and privileged observers highlight that international markets were the Letter's real intended audience.

The change in Lula's discourse is remarkable and provides an interesting illustration of how international incentives shape decisions regarding CBI. In 2001, and before becoming the Labor Party's (PT) presidential candidate, he openly criticized the projects attempting to increase CBI under the pretext that investors were worried: “A central bank independent from whom, pale face? These guys have been in office for a hundred years and never spoke about an independent central bank,” said Lula (da Escóssia and Faria 2001). One year later, when Lula's odds of becoming president were clearly high, Lula accepted the possibility of increasing CBI, although relabeled: his Party started to talk about central bank *autonomy*, even if the content was the same (Folha de São Paulo 2002a, 2002b). Before Lula even took office, he announced Henrique Meirelles, former Bank of Boston board member, would be the president of the BCB. Even more surprising, Lula's first presidential address announced that he was sending to the Congress a project to *facilitate* central bank reform – nothing easy, because he had to pass a constitutional amendment in order to do so (Rodrigues 2003). The constitutional amendment was passed, and after months of debate in the Congress, the project disappeared until the end of 2007, when the debate emerged again.

Interviews and newspaper accounts insist on one explanation for this change in Lula's discourse and policies: Lula was aware that it was not possible to govern Brazil without foreign investment. The endorsement of international financial institutions was not secondary, but his main

concern was to provide confidence to investors. This is why he spent considerable political capital negotiating the passage of the Constitutional Amendment. Once the reform passed, the Brazilian economy was already recovering, and there were fewer incentives for Lula to spend his political capital in formalizing the central bank reform. The drop in net FDI during 2006 and 2007 seems to have encouraged the latest set of discussions about increasing CBI. As my theory predicts, in the backdrop of falling FDI, Lula's administration promoted an increase in CBI.

6.4 FINAL REMARKS

This chapter provides a closer look at the process of central bank reform in Argentina and Brazil. An analysis of the reforms affecting CBI, and of instances of lack of reform, provides qualitative evidence of incumbents' motivations for central bank reform, and of the obstacles they face.

The Argentine case shows how need for capital incentives incumbents to delegate monetary authority to the central bank. It also shows that when incumbents are not constrained by need of capital – as during the first and second Peron administration – they are more likely to restrict CBI and use monetary policy as another instrument of domestic policy. The analysis of the Brazilian case also sheds light on one of the most significant outliers. Even when the Brazilian case seems to escape the predictions of the theory, qualitative evidence helps to explain the reasons of the timing of reforms affecting CBI.

7.0 CONCLUSIONS

7.1 OVERVIEW OF THE ARGUMENT AND EMPIRICAL FINDINGS

7.1.1 Summary of the argument

This dissertation intends to answer the following question: *What are the determinants of CBI in developing countries?* I argue that in developing countries CBI is the product of vulnerable governments trying to attract foreign investors and creditors. My explanation of central bank reform and CBI is a story about demand and supply of signals, and about the conditions under which they will meet.

From the demand side, investors and lenders prefer countries where the profitability of their investments or loans is not at risk of sudden decisions, other things held constant. If the owners of capital cannot rely on a country's reputation to ensure that said risk is small, they will use other pieces of information that credibly signal the government's commitment to providing a stable economic environment. The mere use of these signals as part of investors' and lenders' decision making process constitutes an incentive for governments to signal commitment to sound economic policy. This incentive can be strictly considered a demand when foreign actors expressly state what kinds of signals they would require to trust the government. There are indications that capital owners demand CBI from developing countries as a signal of commitment to sound economic

policy (see Section 3.2.4.2). However, I have not found similar indications regarding developed countries.

Focusing on the supply side, I assume that the level of CBI represents an equilibrium solution for conflicting interest regarding the governance of monetary policy. This equilibrium will be altered when incumbents perceive the need for capital. I claim incumbents perceive the need for capital when two conditions appear: (1) when poor economic performance threatens the incumbent's survival, and (2) when the loss of FDI or high levels of indebtedness alert incumbents about the need to attract foreign investors or lenders. If vulnerable incumbents cannot rely on the country's reputation to attract capital, they will engage in reforms that might attract foreign investors or creditors. Particularly, they will delegate monetary policy on their central banks. Notice that I do not argue that an international demand for signals appears at different moments for different countries.¹⁷⁷ However, I argue the incumbents' perception of a need for capital (as defined in Section 3.2.4.3) creates the conditions for international demands to incentive central bank reform.

The existence of demands associated with available international funds does not imply that governments will automatically engage in institutional reforms to attract capital. Even when politicians needing capital have incentives to use reforms as signals, domestic institutional and political constraints make reform more or less likely, affecting the elasticity of the government's response to the incentive system. The second level of my theory analyzes the domestic hurdles for central bank reform. Based on formal models of delegation, I argue that two factors condition governments' responses to international incentives for central bank reform: the capacity of the president and the congress in the inter-institutional bargaining, and the distance between the president's and congress's preferences. Therefore, I expect central bank reforms to be more likely in

¹⁷⁷ I have found evidence that CBI was considered a signal of good economic policy among British bankers and some political elites since the beginning of the 1930s (see section 6.3.1.1.). I argue that the perception of CBI as a signal of "good economic policies" is relatively constant among international actors since the end of the 1980s.

developing countries in need of capital with (1) stronger president, (2) less capable congresses, both indications of the institutional actor's capacity, and aligned preferences between the executive and the legislative branches. Most of these expectations did not find empirical support.

7.1.2 Observable implications

This dissertation tests nine implications of the theory. Regarding the first level of the theory (international determinants of CBI), one should observe that:

- Developing countries with growth problems increase CBI to attract foreign investment (Hypothesis 1, *Growth problems*).
- Developing countries with growth problems that are losing FDI increase CBI to attract foreign investment (Hypothesis 2, *Need for FDI*).
- Developing countries with growth problems that highly indebted increase CBI to obtain loans (Hypothesis 3, *Need for credit*).

Because the usefulness of CBI as a signal depends on the credibility of the central bank reform, one should also observe that:

- Developing countries with higher levels of CBI are less likely to increase their CBI (Hypothesis 4, *Sunk costs*).
- Democracies are more likely to use CBI as a signal than are autocracies (Hypothesis 5, *Audience costs*).

The second level of the theory (domestic determinants of CBI) has predictions for a subset of developing countries: developing countries with presidential systems. In this cases, the theory expects central bank reforms to be more likely the stronger the president is (relatively to the

Congress), and the less distant the preferences of the two branches are. Therefore, the observable implications are:

- Central bank reform is more likely the stronger the presidential powers are (Hypothesis 6, *Presidential powers*).
- Central bank reform is more likely the less effective the legislature is (Hypothesis 7, *Congress's capacity*).
- Central bank reform is less likely under divided government (Hypothesis 8, *Preference distance*).
- Divided government reduces the likelihood of central bank reform more in effective than in non-effective legislatures (Hypothesis 9, *Preferences distance and Congress's capacity*).

The next subsection summarizes the empirical evidence obtained after testing these hypotheses.

7.1.3 Overview of empirical evidence

Chapter 4 presents evidence supporting the assumption of developing countries' distinctive behavior. The effects of growth problems, FDI change, debt, and previous level of CBI on changes in CBI are the opposite for developed and developing countries.

A series of models provide empirical support for hypotheses 1, 2 and 3: Developing countries seem to increase their CBI when they are facing need for capital. Growth rates are negatively associated with changes in CBI. This impact is stronger when growth problems are proxied by deviations from the growth trajectory. However, this effect is conditional on the levels of FDI and debt. As suggested by the theory, *the mere existence of growth problems is not a sufficient*

predictor of changes in CBI. In developing countries, growth problems when coupled with FDI losses or high levels of debt are associated with increases in CBI.

Regarding the impact of the signal credibility on changes in CBI, the models provide empirical support to the sunk costs idea (hypothesis 4): Countries with higher levels of CBI are less likely to increase their CBI. This relation is non-linear, as shown in Model 4c (Table 4.11). The impact of regime type on changes of CBI is less straightforward than hypothesis 5 suggests. Regarding the audience cost hypothesis, democracy seems to have an indirect impact on the relationship between need for capital and CBI change: Facing similar growth problems, more democratic countries will increase CBI more than less democratic countries.

The baseline model satisfactorily predicts changes in CBI in most of the cases. In this chapter, however, politics are static. In part because of the need to determine the existence of a particular behavior in developing countries, and in part because of the characteristics of a sample that combines democracies and non-democracies, presidential and parliamentary systems, I did not test how domestic political dynamics affect the decision to reform central bank. Chapter 5 explores the political dynamics behind the decision to reform central banks.

The results presented in Chapter 5 contradict many of the expectations derived from the domestic level of my theory. First, although the extent of presidential powers is positively associated with the likelihood of central bank reform in the general sample (as expected in hypothesis 6), this positive association is not statistically significant when the sample is restricted to developing countries in need for capital. Second, reforms increasing CBI are more likely to be passed by more professional congresses and when the executive's and the legislature's preferences are not aligned (contrary to hypotheses 7 and 8's expectations). Hypothesis 9 finds support because the interaction between congress capacity and preference distance is negative: at higher levels legislative efficiency and at larger preference distance, the likelihood of central bank reform decreases.

Section 5.3 analyzes possible causes for these puzzling results, and suggests a deeper implication of the signaling argument. The evidence obtained for presidential powers, congress capacity and preference distance may indicate that presidents anticipate the value of the signal they are sending, and do not push forward central bank reforms that may not be credible in the eyes of international actors. It is possible that presidents know that under unified government, low polarization and/or with an inefficient legislature, the signal sent to international actors is not credible, precisely because it is not costly enough. If this is the case, the variables under analysis should have a different effect on the likelihood of passing central bank reforms, but not in passing other kinds of reforms. This interpretation finds some support in qualitative evidence gathered in interviews with political actors and analysts in Argentina, Brazil, and Uruguay. However, one should be cautious before generalizing this interpretation to other cases. Further research can compare the effect of these variables in different kinds of reforms, particularly in reforms that target domestic and international audiences.

In spite of the lack of support for some of the hypotheses derived from the second level of the theory, the level of accuracy of predictions (see Figure 5.7) suggests a satisfactory specification of models. However, the results advocate a more cautious approach to the analysis of inter-branch relationships and the need of a more detailed account of other factors that were not included in these models.

7.2 LIMITATIONS OF THE ARGUMENT

My theory attempts to explain CBI and central bank reform in developing countries, and accounts for the domestic dynamics of democratic presidential systems. Therefore, the findings have limited

generalization. Furthermore, this is an institutional approach to the study of CBI. The theory presented here will certainly benefit from the inclusion of other theoretical approaches to the study of political economy.

Regarding the international determinants of CBI, my findings suggest that there is a set of factors that predicts changes in CBI in developing countries. Said factors, indicators of the country's need for capital, do not have the same effects on CBI in developed and in developing countries. My theory does not provide an explanation for why need for capital has the opposite effect in developed countries. My assumption is that developing countries cannot rely on a reputation of stable economic or institutional environment, but developed countries can. Therefore, developed countries in need for capital can use monetary policy without generating distrust in international investors or international financial institutions. However, there is variance in both economic reputation and institutional strength across developed countries that may affect their credibility. Further research can explore the concrete mechanisms linking need for capital and CBI in developed countries.

The second level of the theory attempts to account for domestic dynamics that may affect the elasticity of countries' response to international determinants of CBI. However, the explanation is restricted to democratic presidential systems. I argue that interinstitutional bargaining in separation of power systems is of a different nature than the bargaining in parliamentary systems. In particular, it is reasonable to assume that preferences of the executive and of the legislative majority do not diverge significantly in parliamentary systems.¹⁷⁸ However, in presidential systems it is possible and not unusual that the president does not share the congress's preferences (divided government). Additionally, certain features of presidential systems (such as the extent of the

¹⁷⁸ As explained above, given that the executive's origin and survival depend on the parliament, if the preferences of the two branches differed drastically a new government would be formed.

president's powers) might make this inter-institutional bargaining more or less costly, affecting the elasticity of the country's response to international incentives or pressures. Recognizing these differences, my theory does not attempt to explain domestic politics in parliamentary developing countries. This is not a minor limitation: models restricted to presidential systems make better predictions than the baseline model including all developing countries. This suggests the need to integrate an explanation for non-presidential developing countries, in order to provide a complete account of CBI and central bank reforms in developing countries.

Finally, the theory does not account for central bank reforms in countries that are not facing need for capital. I do not dispute (or intend to explain) the domestic incentives in presidential or parliamentary system when there are not international pressures for CBI. The case of developed parliamentary countries is explained in the literature. There is still a lacuna for presidential developed countries. However, that would imply developing a theory for a single case – the U.S..¹⁷⁹

Regarding the limitations imposed by the theoretical approach, this theory assumes, but does not test, an electoral connection. Theoretical reasons, methodological preferences and parsimony considerations lead to the exclusion of voters' behavior and public opinion as a "moving part." The inclusion of these variables can certainly enhance the explanatory power of the theory, and possibly, improve the predictions of the statistical models. However, my theory does not include an account of how electoral behavior or public opinion can condition the relationship studied here.

¹⁷⁹ The origins of the Federal Reserve are not part of this study. However, I would argue that at the beginning of the 20th century, the U.S. was a developing country in need for capital too.

7.3 IMPLICATIONS OF THE FINDINGS

My findings suggest caution. First, one should be cautious when applying models developed and tested on developed countries to developing countries. Second, one should be careful when interpreting institutional reforms in developing countries. Finally, one should be prudent regarding the limits of generalization.

For example, the early literature on CBI indicates that CBI is an adequate instrument to control inflation. In consequence, this literature assumed a policy implication: Governments attempting to control inflation would delegate monetary policy to their central banks. The German case seemed to respond to this kind of incentives. Interestingly, most governments – both in developed and developing countries – have not responded to high inflation with more CBI. This result is robust in statistical analyses, and is corroborated by anecdotic evidence produced in the interviews and journalistic accounts. In fact, the argument that is often used to justify increases in CBI in many cases is the need to attract foreign investors or to please the IMF or the World Bank. The first word of caution when interpreting reforms in developing countries is to be aware of the context in which they happen. The possibly rational development of independent central banks in developed countries does not imply that similar reforms respond to the same logic elsewhere. Sometimes developing countries adopt reforms that *look like* credible institutions precisely because they are well regarded by third actors. Therefore, it should not surprise that said institutions' effects differ between developed and developing countries. This requires prudence and deeper analyses of data that may suggest equivalence of observations across cases.

Regarding the limits of generalization, my findings suggest that evidence produced by single or small-N case studies might be misleading. For example, although Delia Boylan makes an excellent case explaining how the Chilean government reformed the central bank to tie the hands of

the future democratic governments (Boylan 1998), the hands-tying argument does not find support in larger samples. A similar thing happens regarding Maxfield's findings (Maxfield 1997). After studying the cases of Thailand, Korea, Brazil and Mexico, Maxfield presents a series of conclusions that have been considered the conventional wisdom regarding CBI in developing countries. However, multivariate analyses conducted on a much larger sample (and in a different time-frame) reveals that one of the four cases (Brazil) behaves more as an outlier than as the prototypical case. Furthermore, Thailand and Korea are countries with especially low propensities for CBI changes (see Figure 4.8.4).

Finally, many economic and political processes overlap in developing countries. Developing countries often experience low growth rates, low levels of FDI, high levels of foreign debt, balance of payments deficits, etc. However, not all these circumstances are linked to the same outcomes. For example, although balance of payment deficits and growth problems are correlated, they do not generate the same reactions in the political system. Although Maxfield shows a temporal correlation between balance of payment deficits and central bank reforms, multivariate analyses show that this association is not statistically significant. On the contrary, growth problems are robustly associated to central bank reforms in developing countries.

7.4 PATHS FOR FUTURE RESEARCH

My dissertation leaves opened a new set of questions that deserve further study. Some of these questions attempt to better understand central banks, and others explore more general implications of my findings.

The first path of research involves studying the actual implications of central bank reforms and CBI. In my dissertation, I argue that developing countries reform their central banks in order to attract capital. However, what is the effect of CBI and central bank reform on credit and investment? I plan to use the data I have collected to study what kinds of reforms are more successful in attracting FDI and in obtaining better conditions in loans. In my dissertation, I only use the aggregate index of CBI, but I will use the data I have already collected to examine the effects of different types of reforms (measured as components of the CBI index). For example, I plan to analyze whether the turnover rates of central bank CEOs condition the effect of increases in personnel independence, or whether previous budget deficits condition the impact of financial independence on FDI. Furthermore, I do not distinguish between sources or types of FDI. I am interested in exploring whereas some kinds of FDI respond differently to CBI. In particular, I suspect that some investors value more policy flexibility than policy stability (Jensen 2006; MacIntyre 2001). If that is the case, the expectations should be different depending on the type of FDI flow.

I am also interested in how different central banks' institutional designs affect the ability of countries to cope with financial crises. Central banks are blamed for the magnitude and the diffusion of the current financial crisis, and critics demand to rethink the fundamentals for CBI. However, it will be useful to know what instruments allow central banks to better respond to financial shocks under different exchange rate regimes. On the same line of query, I am interested in studying the impact of different central bank designs on the level and volatility of international reserves.

Regarding institutional and policy diffusion, my dissertation poses another set of questions. First, this dissertation explains under what conditions governments will satisfy international demands for institutional reform. Do these conditions explain institutional reform in different policy areas or do they have a particular impact on monetary institutions? I intend to study whether

these conditions have a distinct impact in monetary policy, or if they have a similar effect on policy and institutional diffusion in other areas.

Second, my dissertation shows patterns of geographical diffusion. The data I have collected will also allow me to track specific institutional changes. This will help unveiling the specific mechanisms of said diffusion.

Finally, and as another extension of my dissertation, I plan to model the success of different strategies used by international institutions to foster domestic reforms. Is coercion or incentives and information the most successful way to influence domestic policy and institutional reform? Under what conditions do carrots or sticks produce the results desired by international financial institutions?

APPENDIX A

METODOLOGICAL NOTES

Computation of marginal effects

After a probit analysis, the marginal effects are not linear: the marginal effects depend on the value of x . One way to estimate the marginal effects of different variables included in the model is to use the mean values of every independent variable included in the model, and evaluate the marginal effects at that point.

$$\frac{\partial p}{\partial x_k} \Bigg|_{x=x_{bar}} = \beta_k f(x'_{bar} \beta)$$

The marginal effects presented in the tables are computed holding all the variables at their mean. This is why the statistical significance of the marginal effects do not always correspond with the statistical significance of the coefficients.

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