

FIXED EXCHANGE RATES, INDEPENDENT CENTRAL BANKS AND
PRICE STABILITY IN POSTCOMMUNIST COUNTRIES:
CONSERVATISM AND CREDIBILITY

CRISTINA BODEA*

Central bank independence (CBI) and fixed exchange rates are used by governments to achieve stable prices. This article analyzes the mechanisms through which the two monetary institutions could work: Indirectly via a disciplinary effect on money growth rates or via an additional credibility effect on inflation expectations and the cost of capital. I further explain how both discipline and credibility are affected by the distinct flaws of independent central banks and fixed exchange rates: central banks lack transparency and fixed exchange rates take many shapes and are routinely devalued. The argument is tested with quarterly data from postcommunist countries for years 1991 to 2007. The findings show a strong disciplinary effect of monetary institutions on rates of M2 change and an effect on inflation controlling for money growth, but credibility does not extend to lower real short-term market interest rates. Political institutions do condition the effect of central bank independence, while the types of fixed exchange rates affect money growth rates and inflation to different degrees.

1. INTRODUCTION

Governments often find it in their interest to delegate functional or policy areas to institutions or specialized bureaucracies. These include statistical agencies, financial supervisors, or the central bank. The purpose of delegation is to tie government's own hands and generate credibility that a particular function or policy area is removed from short-term political maneuvers. In monetary policy, governments have incentives to generate economic growth through surprise inflation and therefore their own announcements and commitment with regards to inflation have little credibility (Barro and Gordon, 1983; Kydland and Prescott, 1977). Extant research suggests that independent central banks and fixed exchange rates are key institutional mechanisms that governments can use to increase credibility in monetary policy and maintain stable prices.¹ Has this been the case in postcommunist countries? Arguably the overall credibility of domestic institutions was low in the region (Stone, 2002) and the public may simply not respond to institutional change because such changes lack credibility (Granato, 1996). An early study of macroeconomic conditions in the region even suggests that in transition economies, there seemed to be "few (if any) domestic coalitions that lobby the government to cut its budget deficit and reduce inflation" (Loungani and Sheets, 1997, p. 392).²

To achieve stable prices, postcommunist countries used the experience of western countries or followed International Monetary Fund or European Union prescriptions. Thus, they created new and, sometimes, very independent central banks or fixed their

*Corresponding author: Cristina Bodea, Department of Political Science, 342 South Kedzie Hall, East Lansing, MI 48824. E-mail: bodeaana@msu.edu

¹Literature includes Rogoff (1985), Giavazzi and Pagano (1988), Cukierman et al. (1992), Lohmann, 1992; Milesi-Feretti (1995), Ghosh et al. (1997), Levy-Yeyati and Sturzenegger (2001), Keefer and Stasavage (2003), Broz (2002), Cukierman et al. (2002), Jacome and Vazquez, 2008; Crowe and Meade (2008).

²Treisman (1998) argues that in Russia in 1995 a key reason for the surprisingly successful stabilization was government compensation of stakeholders in inflation.

exchange rate to a low inflation currency. For example, countries as diverse as the Czech Republic, Hungary or Poland and Belarus, Kazakhstan or Armenia passed legislation making their respective central banks legally independent. Also, in an effort to both capture the credibility benefits of fixed exchange rates and minimize their constraints, postcommunist countries experimented widely with the exchange rate regime. For example: Bulgaria, Estonia, and Lithuania entered currency board arrangements that remained unchanged since adoption. Slovakia chose a fixed exchange rate in 1993, which was adjusted five times before a move to floating in 1998. In addition, Russia tied the Ruble to the US dollar in 1995 with a narrow fluctuation band until a year later when it introduced a crawling band with preannounced monthly widening. More, countries like the Czech Republic, Poland, or Hungary had for extended periods of time both an independent central bank and a fixed exchange rate regime in place.³

This article investigates the effect on price stability of independent central banks and fixed exchange rates in countries from Eastern Europe and the former Soviet Union. In particular, the article suggests that there are two distinct aspects to the evaluation of monetary institutions' performance. A first question is whether indeed independent central banks resist political pressure from the government or fixed exchange rates *de facto* restrain politicians. A second question is whether monetary institutions achieve disinflation more effectively than governments that choose to self-discipline rather than tie their hands. That is, do fixed exchange rates or delegation to an independent central bank actually increase the credibility of monetary policy? Therefore, I analyze the effect of central bank independence and fixed exchange rates on rates of money growth to assess a first, disciplinary effect of institutions, and on inflation (controlling for money growth rates) and real market interest rates, to distinguish an additional, credibility effect. Furthermore, I suggest that both discipline and credibility are affected by the distinct flaws of independent central banks and fixed exchange rates. Based on the political economy literature (Bodea, 2010a; Broz, 2002; Keefer and Stasavage, 2003), central bank independence is an opaque commitment mechanism aided by the transparency and constraints in the political system. At the same time, fixed exchange rates can and are being devalued on occasion, hurting their credibility (Bodea, 2010b; Ghosh et al., 2011; Guisinger and Singer, 2010; Levy-Yeyati and Sturzenegger, 2001; Reinhart and Rogoff, 2004). Independent central banks are then more likely to be both disciplinarian and credible when aided by the configuration of political institutions. At the same time, *de jure* fixed exchange rates can be expected to have both a discipline and credibility effect when *de facto* policy matches government announcements.

The data cover 23 postcommunist countries for years 1991 to 2007. Consistent with the theoretical approach, the empirical section tests the effect of fixed exchange rates and independent central banks on quarterly money growth rates, inflation, and real interest rates. In recent work, Klomp and de Haan (2010) find that central bank independence has a significant effect in less than 20% of the countries in their sample and

³Direct targeting of inflation (IT) is adopted first by the Czech Republic (1998) and Poland (1999). In the early- and mid-2000s, IT is adopted by more postcommunist countries (Hungary, Romania, and Slovakia), so the empirical models in the article include an IT variable. I still focus in the article on exchange rates and CBI because, due to imperfect control over inflation, the medium term horizon of targeting and imperfect reliability of inflation forecasting, an independent central bank is a precondition for successful inflation targeting (Eichengreen et al., 1999; Masson et al., 1997).

suggest that future research identify circumstances when CBI matters. This article shows that, in postcommunist countries that are democratic and have a free press, increasing the independence of the central bank leads to more discipline (via lower rates of money growth) and more credibility (lower inflation controlling for money growth). The types of fixed exchange rates (currency boards, pegs, and intermediary rates) affect money growth rates and inflation to different degrees. For example, currency boards have strong credibility effect on inflation, achieved without clear lower rates of money growth. Pegs in postcommunist countries behave like de facto intermediary rates and have both a credibility and disciplinary effect. Surprisingly, although the effect is smaller, so do intermediary rates that behave like de facto floats. The data show no effect on real interest rates: While central banks and fixed rates have under certain conditions reduced money growth rates and inflation expectations, this effect does not extend to the cost of domestic capital.

Extant research in postcommunist countries investigates the relationship between monetary institutions and inflation (Loungani and Sheets, 1997; De Haan et al., 2001; Lybek 1999, Maliszewski, 2000; Cukierman et al., 2002; De Grauwe and Schnabl, 2008). This article improves previous work in several respects: First, the article adds value by (i) looking at both at discipline and credibility effects of monetary institutions, as well as (ii) exploring how both exchange rates and CBI may have worked, given their respective imperfections. While the literature on exchange rates⁴ is differentiating between a direct effect on rates of money growth and an indirect effect, via public expectations, on inflation, the CBI research is focused on inflation.⁵ Disentangling the source of price stability is important. In particular, fixed rates have costs in terms of overvalued real exchange rates and loss of export competitiveness.⁶ Such costs need not be incurred if price stability can come from politicians enforcing themselves low rates of money growth or if the government is sufficiently constrained that an independent central bank can be both disciplinarian and build a reputation for conservatism. Second, the data here cover a large sample of postcommunist countries (including former USSR Republics) and accounts for the multiple central bank reforms experienced by several countries, as well as, the de facto – de jure dichotomy of fixed exchange rates. Finally, the research design and empirical estimations consider the possible endogeneity of monetary institutions⁷, country fixed effects and the coexistence of central bank independence with fixed exchange rates.

The article proceeds as follows: Section 2 describes the background for the article and develops the theoretical hypotheses; Section 3 describes the data and methods; Section 4 discusses the results and Section 5 concludes the article.

⁴Levy-Yeyati and Sturzenegger (2001) and Ghosh et al. (1997, 2011).

⁵This includes the initial work on CBI: Alesina and Summers (1993), Cukierman et al. (1992), Grilli et al., 1991; Work on transition countries: Cukierman et al., 2002; Maliszewski (2000), Loungani and Sheets, 1997; Work using political institutions to capture legal CBI effectiveness: Broz (2002); Keefer and Stasavage (2002, 2003). Empirical examinations looking just at inflation, without controlling for the behavior of rates of money growth, may be a biased estimate of a posited credibility effect. The effect of CBI on real interest rates is explored the early literature, including Alesina and Summers (1993), Cukierman et al. (1993), De Haan and Sturm (1992).

⁶The costs of fixed exchange rates lead to boom and bust cycles that may be opportunistically connected to the electoral cycle (Bloomberg et al., 2005; Schamis and Way, 2003). The choice of fixed exchange rates may also postpone broader structural reform (Thies and Arce, 2009).

⁷Crowe and Meade (2008) account for endogeneity of central bank independence, including for some of the countries in this article, but their data only cover two points in time. Cukierman et al. (2002) cover data until 1998 but do not consider endogeneity, nor do they account for the prevailing exchange rate regime.

2. BACKGROUND AND THEORY

2.1 Monetary Policy and Credible Commitment Mechanisms

Inflation – a general increase in the level of prices – results from money supply increases not matched by a large enough desire of the public to hold cash balances. The reason the public is reluctant to hold money is that it does not trust its future value. Economists now agree that, at least in the short term, more liquidity in an economy (increasing the money supply) can achieve real objectives such as increasing employment, financing the government budget, or stabilizing the financial system (Iversen and Soskice, 2006). The consequences of loose monetary policy, however, depend on whether the public believes the government can be tough on inflation. Kydland and Prescott (1977) and Barro and Gordon (1983) model the situation as a sequential game of policy-makers who make inflation-target announcements, private actors who make decisions based on their inflationary expectations, and again policy-makers who now can take advantage of rigidities in the market and cheat by introducing surprise inflation after nominal contracts have been signed. If cheating comes as a surprise, the effect is more employment. Rational actors, however, anticipate high prices from policy-makers with little reputation for price stability and the result is just higher inflation than optimally desired. Thus, incentives to cheat on the part of the government and public rational expectations combine to create a time-inconsistency problem.

Incentives to cheat come from a variety of sources. In electoral democracies, political constraints work to shorten politicians' horizons. Because the state of the economy is highly relevant for voters and therefore determines government's tenure in office (Alesina et al., 1997; Hibbs, 1977; Nordhaus, 1975), the government has strong incentives to attempt to manipulate the policies they control, including monetary policy and stimulate economic growth. In the early transition, the employment motive may have had only limited traction because in a high inflation environment nominal contracts have a short duration and include indexation, not allowing much of an inflationary surprise. The inflationary bias was, however, strongly reinforced in postcommunist countries by the government's need to raise revenue in the face of massive loss of taxable base, protect the stability of the financial system, and improve the balance of payments given the combination of trade liberalization, collapse of export markets in the former Soviet block and uncompetitive domestic firms (Maliszewski, 2000). Successive rounds of price liberalization and tax increases added to the governments' credibility problem by creating uncertainty about the sources of the inflationary phenomenon.

Unsurprisingly, policy-makers facing a time inconsistency problem in transition countries found it difficult to make credible commitments by themselves. Rogoff (1985), Giavazzi and Pagano (1988), Lohmann (1992), Milesi-Feretti (1995) show the advantages of mechanisms that tie the hands of the government and signal to rational actors that the government will honor monetary commitments.⁸ The literature points to two mechanisms that can be employed to achieve the goal of low inflation: fixing the exchange rate and delegating monetary policy to an independent central banker. Central bank independence relies on the delegation of monetary policy to a domestic player assumed to be more conservative than elected politicians. Central bankers come

⁸Related, Stone (2002) argues that the International Monetary Fund programs in transition countries lent external credibility to government economic policy.

from business, financial, or academic circles tend to take a longer view of the policy process, and value price stability more than elected politicians or the median voter.⁹ Exchange rates work by tying economic policy to that of a less inflation-prone country, thus importing lower inflation from abroad. Fixed exchange rates are argued to anchor inflation expectations because they are visible commitments that raise the political costs of excessive monetary growth in case the commitment is abandoned (Bloomberg et al., 2005; Bodea, 2010a; Broz, 2002; Cooper, 1971; Frankel, 2005).

The time-inconsistency approach has been critiqued in reference to developed countries, because, presumably, monetary policy has been delegated to the central bank and the bank has no incentives to create surprise inflation (Blinder, 1998). Cukierman and Gerlach (2003), however, show that even for central banks who do not have a preferred output level above the natural rate, an inflation bias can result from uncertainty around prediction of the state of the economy and more concern about negative (vs. positive) output gaps. Moreover, time inconsistency remains relevant in to post-communist countries because in the 1990s many central banks were either newly created institutions or managed new currencies (e.g., Slovakia or the former USSR Republics) and the overall credibility of institutions was very low (Stone, 2002). Granato (1996) also shows that the public may not respond to policy changes because such changes lack credibility. In this scenario, a conservative policy leads to reductions in the money supply, while leaving short-run inflation expectations unchanged. So, the first relevant question when looking at monetary institutions in postcommunist countries is whether they are in fact more conservative than elected politicians. A second question is whether monetary institutions achieve disinflation more effectively than governments that choose to self-discipline rather than tie hands.

In such countries, then, it becomes important to understand to what extent price stability emerges from the conservatism of governments working to preserve an exchange rate commitment and the conservatism of central banks, or, in addition, from the credibility that fixed exchange rates and an independent central bank lend to monetary policy. Theoretically, inflation results from a mismatch between money supply and demand. Thus, the low inflation due to either independent central banks or fixed exchange rates results from two separate effects. A first effect comes from increased discipline and reflects the fact that inflation is a monetary phenomenon. Countries with independent central banks will simply have lower rates of growth of the money supply, reflecting the conservative stance of the central bank governor. Also, countries with fixed exchange rates have lower money growth because of the political costs of abandoning a fix or performing a large devaluation.¹⁰ Second, an independent central bank or a credible peg insure a more robust money demand and this reduces the inflationary effects of any given monetary expansion (Ghosh et al., 1997, 2011; Levy-Yeyati and Sturzenegger, 2001; Stockman, 1996). That is, the public has lower inflation expectations and wants to hold relatively more of the money controlled by a policy-maker trusted to be anti-inflationary, which, in turn, reduces realized inflation. A more robust money demand and lower inflation expectations can

⁹Lohmann (1998) argues that independent central banks lower inflation even if policy makers have low inflation preferences. The central bank insures the consistency of *ex ante* and *ex post* inflation preferences.

¹⁰Cooper, 1971 shows that after devaluations, about 30% of governments fell within 12 months, as opposed to 14% in a control group. Frankel, 2005 finds that the chief executive loses office roughly twice as often in the 6 months following a currency crash. Leblang (2005) finds that abandoning a *de jure* exchange rate peg decreases the probability of re-election by 60%.

also be reflected in lower real and nominal interest rates, and thus cheaper cost of capital (Alesina and Summers, 1993; Ghosh et al., 1997; Levy-Yeyati and Sturzenegger, 2001). This analysis implies that independent central banks and fixed exchange rates have a disciplinary effect and result in lower rates of money growth. Also, the two institutions can have an additional credibility effect to be observed in lowering of inflation beyond the effect of low rates of money growth, as well as, in lower real market interest rates for government borrowing.¹¹

The two monetary institutions – fixed exchange rates and independent central banks – have different weaknesses in promoting price stability. Legal central bank independence is opaque and its effect is contingent on political institutions. On the other hand, fixed exchange rates can and are being devalued on occasion, hurting their credibility. Next, I develop on the weaknesses of both an independent central bank and fixed exchange rates and derive testable hypotheses about their effect on money supply growth rates, inflation rates and interest rates.

2.2 *When are Independent Central Banks de facto Conservative and Credible?*

In the early-1990s, postcommunist countries chose highly de jure independent central banks when replacing their earlier mono-bank system and delegated even more legal independence in subsequent reforms (Bodea, 2013; Cukierman et al., 2002; Maliszewski, 2000). However, both the conservatism and credibility of the central bank are affected by the shadow of subsequent political interference from the government that delegated monetary policy in the first place (Broz, 2002; Cukierman et al., 1992; Keefer and Stasavage, 2003). The risks to bank independence come from both informal violations of the law, and overt threats to amend the central bank law. Two factors increase the chances that countries follow the rule of law and that central bank legislation will not be changed within short time spans and without proper public debate. These include a relevant political opposition and the freedom to criticize the government in power.

Prominently, Broz (2002) argues that central banks are opaque commitment mechanism and, therefore, political system transparency prevalent in democracies allows central banks to become credible and reduce inflation expectations. Also, Keefer and Stasavage (2003) show that the presence of more veto players in monetary policy reduces the probability that the central bank will be overridden on any of its decisions. This in turn increases the credibility of the bank for pursuing its mandated tasks and results in lower inflation expectations. Lower inflation expectations should then be reflected in de facto better inflation performance and lower borrowing costs for government debt.¹² In addition, freedom of the press (more broadly freedom of speech) allows the opposition to blow the whistle on government interfering with the

¹¹The ex ante real interest rate will be lower to the extent that fixed rates and independent central banks are credible and reduce uncertainty about inflation and money growth (Eijffinger and de Haan, 1996; Mascaro and Meltzer, 1983). However, when low inflation is achieved through a restrictive monetary policy and low rates of money growth, this can have the opposite effect and lead to high real interest rates (De Haan and Sturm, 1992).

¹²Notably, for postcommunist countries, the conditioning effect may not work or be completely reversed. Loungani and Sheets (1997) suggest an alternative view of veto players in postcommunist countries. They see few domestic coalitions that would lobby the government to cut budget deficits and reduce inflation while the pressure from most segments in the society is to increase government spending, leading to larger deficits and inflation. Also, Stone (2002) is skeptical of the ability of domestic political institutions to lend credibility to monetary policy, suggesting that an active IMF program can substitute the missing domestic reputation for conservatism.

central bank (Broz, 2002);¹³ it allows anti-inflationary constituencies and the central bank to explain the sources of inflation and point to fiscal policy, as well as expand the public support for price stability (Berger, 1997; Bernhard, 1998); finally, it is likely to showcase competing views for proposed changes to central bank law and disallow short-term interests to drive the legislature.

As suggested before, however, central banks have only imperfect control of inflation and inflation is likely resulting both from money growth rates and inflation expectations used in negotiated wage contracts (Walsh, 1998). The International Monetary Fund (2006) writes that in developing countries central banks still have an imperfect understanding of the transmission mechanism of domestic monetary policy, money demand functions are unstable and inflation forecasting remains inaccurate. Rather, changes in monetary policy instruments affect more directly the supply of money in the economy. Therefore, first and most directly, countries with independent central banks and institutional configurations that guarantee the rule of law will have lower rates of growth of the money supply. Control of the money supply thus directly reflects the ability of an independent central bank to actually enforce the delegation contract.

The discipline and credibility effect of placing CBI in the context of political institutions can be used to generate the following hypothesis:

H1 (a, b, c) Rates of money growth (a), inflation (b) and market interest rates (c) are lower when the central bank is independent and the country is democratic, has a free press and constraints on the executive exist.

2.3 *De jure vs. de facto exchange rates*

Compared to central banks, fixed exchange rates suffer from different pathologies. The early-1990s witnessed a heated debate on the appropriateness of fixing the exchange rate as part of stabilization policy in transition countries.¹⁴ Not surprisingly, then, the official exchange rate regimes of postcommunist countries varied widely. Poland, Hungary, Czech Republic, and Slovakia adopted a pegged exchange rate regime in the early 1990s and moved progressively to intermediary regimes – fluctuation bands around the central parity and crawling rates – later in the transition. Russia and Ukraine, on the other hand, had floating rates in the beginning of the 1990s and later on used an official fluctuation band: Russia in 1995 and Ukraine in 1997. Three countries – Bulgaria, Estonia, and Lithuania – went a step further and formally adopted currency board arrangements.¹⁵

¹³Broz (2002) uses a cross-section of 68 countries to model empirically the effect on inflation of CBI conditional on political regime. The empirical models do not test the causal mechanisms that may be linking CBI with low inflation in democracies.

¹⁴Sachs (1996) argues that fixed rates enhance financial discipline and would thus help reduce inflation as a result of deficit financing. Bruno (1991) concedes that fixed rates could be beneficial to inflation performance if fiscal discipline could be enforced. On the other hand, Dornbusch and Werner (1994) and Edwards (1996) view fixed rates as inherently doomed because price liberalization implies overvalued real exchange rates and loss of export competitiveness.

¹⁵Currency boards have strict foreign reserve requirements that ensure the convertibility of the domestic currency. They function as extreme versions of a peg and this formula increases the transparency of monetary policy and constrains the scope for arbitrary monetary expansion. Since February 1994 Latvia has had a de facto peg to the IMF's SDR and its de facto policies have been similar to those of a currency board.

When fixed exchange rates are implemented in practice two issues emerge. A first is that declaratory policy is different from de facto practice. Reinhart and Rogoff (2004) point out that the existence of parallel markets signals a lack of credibility of the announced exchange rate regime and that the behavior of the currency in the parallel market is a good indicator of the fate of the declaratory exchange rate policy. Levy-Yeyati and Sturzenegger (2001) argue that one ought to actually consider more than just the de jure exchange rate regime and look at how often and by how much exchange rate commitments change. They suggest that, for example, fixed rate regimes that undergo multiple devaluations are substantively different from fixed rates that are maintained unaltered. Guisinger and Singer (2010) show that following through on exchange rate commitments has the greatest influence on inflation and inflation credibility.¹⁶ And, historically, postcommunist countries that used fixed exchange rates as a disinflation mechanism have, in fact, consistently loosened their commitments via devaluations, increases in the crawling peg rates of devaluation or widening of the fluctuation bands for the currency (Bodea, 2010b).¹⁷

A second issue is that, in practice, there are various types of fixed regimes from crawls and fluctuation bands to pegs and currency boards. However, pegs, crawls, bands, and currency boards are different in how much of a constraint they place on the policy maker and it can be misleading to bundle them together. For example, the adaptive rule of the crawl is a less efficient disinflation mechanism, as the crawl allows policy-makers to incorporate inflation into currency parity and crawling exchange rates have lower transparency and credibility (Frankel et al., 2001). A currency board, on the other hand, should suffer less from lack of credibility because of its strict reserve requirements. In the empirical section, therefore, I determine the specific effect of pegs, intermediary exchange rates (crawls and fluctuation bands), and currency boards. A hypothesis follows:

H2 (a, b): De jure fixed exchange rates can be expected to have more of a discipline and credibility effect when de facto policy matches government announcements (a). The different types of fixed exchange rates have varying effects on discipline and credibility (b).

3. DATA AND RESEARCH DESIGN

This section describes the data for 23 postcommunist countries for years spanning between 1991 and 2007.¹⁸ The article uses all available data in quarterly frequency and, consistent with the theoretical approach, it tests the effect of fixed exchange rates and independent central banks on three dependent variables: money growth rates, inflation rates and real short-term market interest rates. The International Monetary Fund (IMF) International Financial Statistics is the source for the monetary aggregates (M2) and the consumer price index data. The most widely available market interest

¹⁶Also shown in Ghosh et al. (2011).

¹⁷Except for currency boards, transition countries have abandoned all de jure fixed exchange rate regimes. Many countries in the region continue to have de facto pegs, crawls, or fluctuation bands without de jure commitments (Ilzetzki et al., 2008).

¹⁸Included are given in the following: Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Czechoslovakia, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Slovenia, Ukraine, Georgia, Kazakhstan, and Kyrgystan. The end of the period is determined by the onset of the ongoing economic and financial crisis and by Slovenia joining of the euro zone in 2007.

rate data for transition countries is the 3-month T-bill yield from the Global Financial Data. I compute the real yield on the 3-month T-bill using quarterly data (the last auction of the quarter) and deflating the 3-month t-bill yield with inflation over the next quarter (the inflation rate over the maturity of the bill).

The key explanatory variables code the independence of a country's central bank, its exchange rate regime and the features of the political regime. To measure central bank independence I use the weighed index described in Cukierman et al. (1992), applied to postcommunist states in Cukierman et al. (2002), updated in Bodea (2013) to 2002 and extended for this research to 2007.¹⁹

The index varies between 0 and 1 (larger values indicate more legal independence) and aggregates political and economic factors that affect independence, including categories regarding the chief executive officer, policy formation, objectives, and limitations on lending to the government. A central bank is legally more independent when the bank governor has a longer term in office; the government is more removed from the appointment and dismissal procedures; the bank's mandate is more focused on price stability and the bank has more control over the formulation of monetary policy; and when central bank lending carries more restrictive conditions.

I code a country's de jure exchange rate regime using the IMF's Annual Reports on Exchange Rate Arrangements and Restrictions (1990–2008). I define dummy variables that take the value 1 for announced fixed rates: pegs, intermediary rates (crawls and bands), and currency boards.²⁰ Data on de facto exchange rate policy come from Reinhart and Rogoff (2004), supplemented with Ilzetzki et al. (2008). This data distinguish (to the month) fixed rates that are subject to frequent devaluations from fixed rates that are only rarely (or never) adjusted. For their reclassification of fixed rates, Rogoff and Reinhart examine several measures of exchange rate variability, based on monthly observations and averages over 24 month and 5 year rolling windows. In my sample, all exchange rate pegs are soft pegs, that is, pegs are revalued often enough to be classified as de facto bands or de-facto crawling rates. About 60% of the announced intermediary rates (bands and crawls) are de-facto intermediary rates, whereas 40% are de-facto floats. All currency boards are de-facto pegs, that is, the exchange rate under currency boards moves very little.

To measure democracy, I use the Freedom House data, aggregating countries political rights and civil liberties. I rescale the original measure, so that lower scores correspond to dictatorships and high scores denote democracies, and the index ranges from 0 to 12. For robustness I use Polity IV scores and add 10 to the Polity score to convert the range to a

¹⁹Several differences exist compared to the Cukierman et al. (2002) coding: The quarterly data capture precisely the timing of reform within the year and more reforms are coded after 1998, the end year for Cukierman et al. (2002). When the law has no information on any of the 16 criteria, the particular index component is coded as zero (Cukierman et al. code it as missing and reweigh the whole index), because failure to mention an aspect of central bank governance in the law very likely leaves it to the will of politicians. In addition to the legislative changes documented in Bodea (2013), several reforms are included: Slovakia 2002, Bulgaria 2005, Moldova 2005, Romania 2004, Estonia 2006, Azerbaijan 2005, and Kazakhstan 2003 & 2006. Alternative measures of central bank independence include the scale used by Grilli et al. (1991), which calculates a separate score for political and economic independence, or the index proposed by Loungani and Sheets (1997). There is a substantial correspondence in the findings of research utilizing different indices (Oatley 1999 is an exception).

²⁰Hungary is coded as a crawling peg regime until 2001. In May 2001, Hungary widened the fluctuation band around the forint parity against the euro to ± 15 percent. It is debatable whether after 2001, Hungary should be coded as having a de jure exchange rate commitment, but this coding choice does not affect the results.

scale of 0 to 20, where zero denotes dictatorships. In addition, I use two available measures for constraints and transparency: the log of checks (Keefer and Stasavage, 2003); and the freedom of the press (Freedom House). The checks variable comes from the Database of Political Institutions (DPI 2010) and measures independent checks and balances in the political system. Finally, Freedom House provides freedom of the press scores starting in 1980, and ranging from 0 (not free), to 1 (partially free) and 2 (free).²¹ In the theory section, significant constraints on the executive reduce the likelihood of arbitrary action against an independent the central bank and a free press is likely to increase the transparency of politicians' interaction with the central bank, so, the expectation is that both should allow the central bank to be both more disciplinarian and have credibility.

In addition to the core variables, I use standard controls as well as variables specific to transition countries. These include the 1 year lag of GDP growth (European Bank for Reconstruction and Development – EBRD); the 1 year lag of trade openness (World Development Indicators – WDI); an indicator for parliamentary elections (two quarters prior to elections) (Bagashka and Stone 2013); the 1 year lag of fiscal deficit (EBRD); the 1 year lagged value of EBRD's index of price liberalization;²² indicator variables for EU membership; direct inflation targeting and membership in the Exchange Rate Mechanism (ERM) II.

The main estimation method is OLS regressions with panel-corrected standard errors and lagged dependent variable. Panel-corrected standard errors correct for heteroskedasticity within panels and contemporaneous correlation across panels. The lagged dependent variable controls for the backwards indexation of inflation and potentially serially correlated error terms (Beck and Katz, 1995).²³ The inflation models also includes up to the fourth lag of the quarterly change in M2, to control for the disciplinarian effect of the central bank/the exchange rate on inflation. This way, the coefficient on the CBI index reflects the additional credibility. To control for country and time specific factors, all models include country, year, and quarter dummies.²⁴ Instrumental variable estimation is also used to alleviate endogeneity concerns.

In the sample, the key independent variables exhibit outliers²⁵ and, due to the quarterly frequency, there are a significant number of negative values (13% of observations for M2 changes, 12% observations for inflation and 27% observations for real interest rate). Negative values for both inflation and money growth rates are important to retain in the sample to capture episodes when money supply contracts or countries experience disinflation. To limit the influence of outliers, the sample is includes observations where the dependent variable is less than 25%.²⁶ In addition to reducing the

²¹Missing observations in the Freedom of the Press time series are coded as not free.

²²EBRD's indexes of banking sector and enterprise reform are highly correlated to the price liberalization index and have been used as alternative controls. The key results remain similar.

²³Fixed effects OLS models with lagged dependent variable, year, and quarter dummies, and standard errors clustered on country give similar results.

²⁴Simple OLS models with fixed effects, lagged dependent variable, year, and quarter dummies, and standard errors clustered on country give substantively similar results.

²⁵For example, quarterly inflation in Ukraine (1993–1994), Bulgaria (q1 1997), Croatia (1993) was above 100%.

²⁶6% of observations are lost for M2 change models; 9% of observations are lost in the inflation models. For the real interest on the government issued t-bill I exclude only two very clear outliers: These are the observations for Bulgaria 1996 q4 (–266.08), when the market clearly did not anticipate the high rate of inflation in the next quarter, and Bulgaria 1997 q1 (128.66), when investors thought inflation will continue to be extremely high. Next section discusses the robustness of results when including larger values or using the natural log of the dependent variable (and loosing observations with negative values).

influence of outliers, limiting the sample is also done because expectations about monetary policy are likely to become unanchored in high inflation environments (Ghosh et al., 1997; Levy-Yeyati and Sturzenegger, 2001).

4. RESULTS AND DISCUSSION

Table 1 investigates whether and how fixed exchange rates and an independent central bank affect the quarterly rates of growth of the money supply. Model 1 includes fixed exchange rates disaggregated into currency boards, pegs and intermediary rates and the CBI index and the Freedom House democracy score as stand-alone variables. The results show a strong disciplinary effect for all de jure fixed exchange rates (pegs, intermediary exchange rates, and currency boards): All de jure fixed rate regimes are associated with lower rates of M2 growth. Generally, in all models in Table 1 it appears that, among fixed rates, pegs have the largest negative effect on money growth rates. In contrast, in some of the models the coefficient of currency boards, while remaining negative, loses its statistical significance.²⁷By themselves, central bank independence and the Freedom House score do not significantly affect the growth rate of M2. The rest of the models in Table 1 accomplish two goals: First, Models (2–5) test the theoretical hypotheses positing a conditional effect of CBI on political institutions. Second, I look into whether de jure exchange rates that are fixed de facto as well are associated with more discipline, and whether instrumental variable estimation retains the effect of fixed rates on M2 changes (Models 6&7).²⁸

Models 2 & 3 introduce the interaction between the CBI index and the Freedom House and Polity IV democracy scores. As predicted, the interaction terms are negative and statistically significant. This implies that as the democracy scores increase, legal CBI results in lower rates of money supply growth. The coefficient on the CBI index also becomes positive and statistically significant in Model 2. Because the effect of an interaction term varies at different levels of the interacted variables, Figure 1 graphs the marginal effect of the CBI index (and the 90% confidence interval) as the conditioning variables change. The figures support the expectation in H1: The marginal effect of CBI is downward sloping but is only negative and statistically significant for high levels of democracy (transformed Freedom House score of 10 and higher; Polity IV scores of 18 and higher).

Model 3 interacts the CBI index with the DPI log of checks, while Model 4 uses freedom of the press. Again, the results conform to expectations: Coefficients in of the interacted terms are negative and statistically significant. The marginal effect of CBI at different levels of checks and balances and press freedom is shown in Figure 1. For both conditioning variables, the marginal effect is downward sloping and, when significant, it is negative. The CBI index significantly reduces changes in M2 only at the highest levels of political checks and press freedom. Roughly, this means that legal CBI has a discipline effect for more than about 5 meaningful veto players and for a fully free media.

²⁷The lack of a robust negative coefficient may be due to the fact that, by the early-2000s, currency board arrangements become sufficiently credible that they insure a robust money demand. This explanation is supported by the fact that currency boards continue to have a large negative effect on inflation.

²⁸Support for H1 remains robust to changing the dependent variable to quarterly M2 growth rates lower than 50% or using the natural log of the M2 rates of change.

TABLE 1 M2 CHANGE MODELS

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Gdp growth ^a	0.082 (0.048)*	0.070 (0.046)	0.057 (0.048)	0.066 (0.045)	0.075 (0.047)	0.070 (0.046)	0.071 (0.054)
Openness ^a	-0.008 (0.008)	-0.009 (0.008)	-0.007 (0.008)	-0.010 (0.009)	-0.008 (0.008)	-0.008 (0.008)	-0.008 (0.008)
Peg	-4.347 (1.062)***	-3.652 (1.056)***	-3.716 (1.060)***	-5.239 (1.053)***	-3.990 (1.056)***	-3.439 (1.051)***	
Intermediary	-1.935 (0.847)**	-1.998 (0.831)**	-1.965 (0.828)**	-2.134 (0.816)***	-1.974 (0.836)**		
Currency board	-2.324 (1.353)*	-0.727 (1.346)	-1.586 (1.364)	-2.026 (1.433)	-2.138 (1.350)	-0.348 (1.366)	
CBI index	1.320 (1.624)	16.420 (4.755)***	14.813 (5.343)***	7.926 (3.780)**	5.430 (2.699)**	16.637 (4.746)***	16.339 (4.722)***
FH democracy	0.208 (0.226)	1.557 (0.410)***				1.660 (0.414)***	1.593 (0.420)***
Pre-election period	-0.445 (0.439)	-0.454 (0.437)	-0.404 (0.439)	-0.279 (0.446)	-0.401 (0.440)	-0.423 (0.437)	-0.349 (0.493)
Price liberalization index ^a	-1.149 (0.681)*	-1.854 (0.716)***	-1.198 (0.647)*	-0.856 (0.626)	-1.196 (0.660)*	-1.820 (0.715)**	-2.032 (0.905)**
Budget balance ^a	0.119 (0.077)	0.077 (0.076)	0.065 (0.070)	0.071 (0.074)	0.090 (0.071)	0.068 (0.076)	0.063 (0.070)
EU member	-0.443 (0.894)	0.029 (0.881)	-0.653 (0.935)	-0.324 (1.002)	-0.123 (0.898)	0.091 (0.880)	0.643 (0.575)
ERM II member	0.448 (0.837)	0.611 (0.856)	0.711 (0.851)	0.722 (0.915)	0.695 (0.851)	0.570 (0.846)	
Inflation targeting	-2.352 (0.767)***	-0.828 (0.818)	-1.748 (0.791)**	-2.372 (0.819)***	-1.731 (0.808)**	-0.535 (0.828)	-0.461 (0.871)
FH dem.* CBI index		-2.186 (0.559)***				-2.262 (0.560)**	-2.193 (0.559)***
Polity IV			0.404 (0.198)**				
Polity IV*/ CBI index			-0.964 (0.331)***				

TABLE 1 (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Log of checks				3.442 (1.519)**			
Log of checks* CBI index				-5.279 (2.539)**			
Press status					2.819 (1.299)**		
Press status* CBI index					-4.333 (1.844)**		
Super intermediary						-1.169 (0.873)	
Intermediary – floats						-3.212 (1.141)***	
Fixed							-1.852 (0.634)***
Constant	11.718 (3.507)***	6.316 (3.811)*	9.682 (4.168)**	9.616 (3.624)***	11.572 (3.498)***	5.252 (3.831)	4.838 (4.081)
R ²	0.31	0.33	0.32	0.36	0.31	0.33	0.36
N/countries	1,233/23	1,233/23	1,233/23	1,130/22	1,233/23	1,233/23	1,227/23

Notes: The dependent variable is the quarterly change in M2. Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
^aLagged 1 year. Models include the lagged dependent variable, country, year, and quarter dummies. Model 7 uses an instrumental variable approach (Stata 11 ivreg2) for fixed exchange rates broadly (pegs, intermediary rates, currency boards, ERM II member): The Hansen J statistic Chi-sq(2) p -value is 0.23; The weak identification Kleibergen-Paap rk Wald F statistic is 236.5.

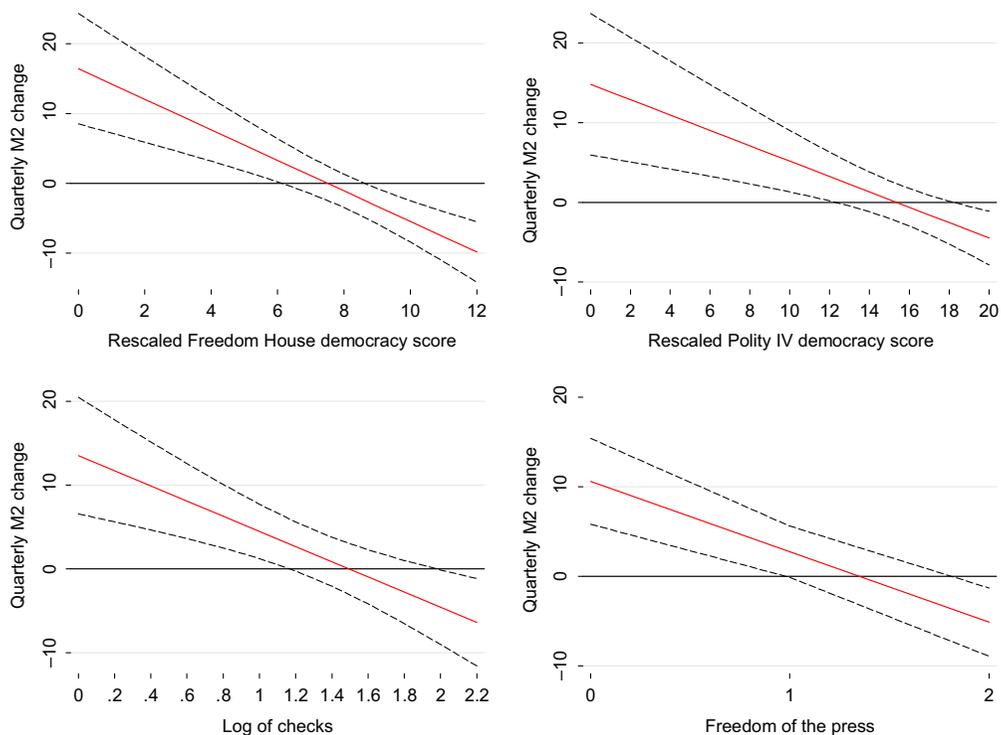


Figure 1. M2 Change – Marginal Effect of CBI Conditional on Political Institutions.

Note: Graphs show the marginal effect on M2 changes (and the 90% confidence interval) of the CBI index for the range of conditioning variables: democracy scores (Freedom House and Polity IV); log of checks; and press freedom) from Models 2-5, Table 1.

With fixed exchange rates, a large concern is that de jure classification does not match de facto behavior. I already note that all de jure pegs behaved as de facto intermediary fixed exchange rates, while all currency boards were de facto pegs. Model 6 further disaggregates de jure intermediary rates (crawls, bands, crawling bands) into de facto intermediary rates and rates that de facto behave as floating exchange rates. Results are at odds with initial expectations: Pegs, for which declaratory policy is not matched by action, have a significant and negative effect on M2 changes. On the other hand, currency boards, where there is a perfect match between announced and de facto policy, have an insignificant effect on M2 changes. Also, for intermediary fixed exchange rates the large disciplinary effect is driven by those regimes where de jure exchange rate policy is not matched in practice. While the results do not conform with the initial expectation, they may be consistent with policy-makers that attempt to carry out policies consistent with their de jure exchange rate commitments, but they end up devaluing or otherwise changing such pegs under market pressure. For example, Frankel observes that “a still better way to view the public [exchange rate] commitments may be as sincere expressions of a strong desire to maintain the peg. The [finance] ministers may realize that events could force the abandonment of the exchange rate policy, if speculative pressures accelerate and it develops that reserves

are about to run out, leaving little other option ... but making the promise is a way of buying a bit of credibility, and buying some time. Specifically, it is a device for signaling that their determination to hold the line on the currency is so strong that they are willing to risk sacrificing their jobs” (Frankel, 2005, p. 9). The evidence here suggests that even for de jure fixed exchange rates that end up being devalued, lower rates of money growth are consistent with the de jure commitment.²⁹

Model 7 addresses another concern with fixed exchange rate regimes, namely the possibility of reverse causality, in that lower rates of money growth help countries maintain fixed exchange rates. All types of de jure fixed exchange rates are aggregated in an indicator variable and the instruments are the second lag of fixed exchange rates and the second lag of a country’s change in international reserves.³⁰ The results (Stata 11 ivtreg2) confirm an aggregate negative and statistically significant effect of de jure fixed exchange rates on rates of money growth. The chosen instruments perform well: The Hansen test of over-identifying restrictions tests the overall validity of the instruments (including the choice of exogenous variables) and failure to reject the null hypothesis gives support for the model. For Model 7, the Hansen J statistic Chi-sq(2) *p*-value is 0.23, so we can reject the null hypothesis. In instrumental variable models, while chosen instruments may be exogenous they may be weak, biasing the estimated coefficients. For model 7, the weak identification Kleibergen-Paap rk Wald F statistic is 181.7. This value easily passes the “rule of thumb” (Staiger and Stock, 1997) that the F statistic should be at least 10 for weak identification not to be considered a problem.³¹

Next, I test the credibility hypotheses and use inflation as the dependent variable. Results are shown in Table 2. All models include both the lagged inflation rate and the first and second lags of the change in the money supply which controls for the disciplinary effect of monetary institutions.³² As shown in Model 8, all types of fixed exchange rates have an independent effect on inflation, while the CBI index is not statistically significant. Currency boards, pegs and intermediary rates are associated with lower inflation, even after controlling for the lagged change in M2. Currency boards have the largest effect among fixed rates. Similar to the M2 models, in the simple OLS model there is a concern about the possible reverse causality between inflation and fixed exchange rates. In addition, central bank reforms and independence may also be endogenous to high inflation. For example, in Bulgaria (1997) the central bank was given more legal independence and the currency was fixed in a currency board arrangement during stabilization efforts aimed at controlling rampant inflation. I use instrumental variable estimation to ameliorate such concerns (Stata 11 ivtreg2). Again, I aggregate all types of fixed exchange rates into a single category of “fixed” and use

²⁹The issue of reverse causality puts some limits on how much weight we can attach to the results for each specific type of de jure fixed rate. The instrumental variable results are robust, however, in showing that de jure fixed rates (aggregated for all categories) lower rates of money growth and inflation.

³⁰Other work uses similar instruments for fixed rates. In their model of inflation, Ghosh et al., 1997 use the two period lagged values of fixed rates, the change in foreign reserves, and the ratio of money to quasi-money as instruments. Also for inflation, De Grauwe and Schnabl (2008) use trade openness, export concentration to the EU(15), and volatility of foreign reserves as instrumental variables.

³¹Regarding the control variables in the M2 change models: The EBRD price liberalization index is statistically significant, showing that countries with fewer administered prices see lower rates of money growth. Direct inflation targeting is negative and statistically significant in some of the models. EU and ERM II membership do not significantly reduce rates of money growth.

³²M2 change lags up the fourth lag have been included, but only the first two lags are statistically significant. Inclusion of the other lags of M2 change does not affect the results.

TABLE 2 INFLATION MODELS

	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Gdp growth ^a	-0.020 (0.021)	-0.006 (0.024)	-0.027 (0.020)	-0.035 (0.021)*	-0.028 (0.022)	-0.030 (0.021)	-0.027 (0.020)
Openness ^a	-0.004 (0.005)	-0.003 (0.003)	-0.004 (0.005)	-0.002 (0.005)	-0.003 (0.005)	-0.003 (0.005)	-0.004 (0.005)
Peg	-3.549 (0.623)***	-3.263 (0.628)***	-3.263 (0.628)***	-3.128 (0.613)***	-2.984 (0.652)***	-3.257 (0.628)***	-3.166 (0.616)***
Intermediary	-0.940 (0.484)*	-0.977 (0.483)**	-0.977 (0.483)**	-0.865 (0.488)*	-0.700 (0.517)	-0.855 (0.493)*	-0.855 (0.493)*
Currency board	-5.448 (0.959)***	-5.448 (0.959)***	-4.816 (0.975)***	-4.871 (0.969)***	-5.725 (1.006)***	-5.312 (0.959)***	-4.627 (0.999)***
CBI index	1.149 (0.800)	0.276 (0.977)	7.427 (1.801)***	8.721 (1.715)***	6.385 (1.453)***	3.727 (1.176)***	7.565 (1.809)***
FH democracy	0.380 (0.135)***	0.361 (0.112)***	0.956 (0.190)***	0.956 (0.190)***	0.956 (0.190)***	0.956 (0.190)***	1.008 (0.192)***
Pre-election period	-0.431 (0.242)*	-0.407 (0.221)*	-0.437 (0.242)*	-0.416 (0.242)*	-0.251 (0.252)	-0.396 (0.243)	-0.422 (0.242)*
Price liberalization index ^a	-0.941 (0.502)*	-0.471 (0.689)	-1.242 (0.504)**	-0.812 (0.479)*	-0.483 (0.490)	-0.781 (0.489)	-1.240 (0.504)**
Budget balance ^a	0.063 (0.056)	0.034 (0.040)	0.049 (0.056)	0.010 (0.048)	0.021 (0.049)	0.019 (0.048)	0.043 (0.057)
EU member	0.557 (0.485)	0.860 (0.285)***	0.770 (0.490)	0.648 (0.485)	0.561 (0.470)	0.814 (0.489)*	0.800 (0.496)
ERM II member	0.223 (0.331)	0.299 (0.337)	0.299 (0.337)	0.380 (0.324)	0.415 (0.376)	0.382 (0.336)	0.284 (0.336)
Inflation targeting	-1.582 (0.453)***	-1.373 (0.406)***	-0.951 (0.447)**	-1.207 (0.441)***	-1.407 (0.480)***	-1.312 (0.456)***	-0.812 (0.442)*
Fixed	-1.753 (0.449)***						
FH dem.* CBI index			-0.913 (0.201)***				-0.954 (0.204)***
Polity IV				0.311 (0.076)***			

TABLE 2 (continued)

	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Polity IV* CBI index				-0.541 (0.106)***			
Log of checks					1.837 (0.814)**		
Log of checks* CBI index					-4.123 (1.103)***		
Press status						1.637 (0.629)***	
Press status* CBI index						-2.441 (0.802)***	
Super intermediary							-0.600 (0.473)
Intermediary – floats							-1.542 (0.702)**
Constant	3.674 (2.391)	0.582 (2.963)	1.365 (2.479)	3.057 (2.424)	3.539 (2.528)	5.238 (2.454)**	0.903 (2.456)
R ²	0.58	0.58	0.58	0.58	0.60	0.58	0.58
N / countries	1,228 / 23	1,227 / 23	1,228 / 23	1,228 / 23	1,128 / 23	1,228 / 23	1,228 / 23

Notes: The dependent variable is the quarterly cpi inflation. Standard errors are in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
^aLagged 1 year. Models include the lagged dependent variable, the first and second lags of the M2 change, country, year, and quarter dummies. Model 9 uses an instrumental variable approach (Stata 11 ivreg2 command) for the fixed exchange rates and CBI. The Hansen J statistic Chi-sq(2) p -value is 0.55; The weak identification Kleibergen-Paap rk Wald F statistic is 138.2.

as instruments the second lag of fixed rates and the second lag of the change in a country's international reserves. The instruments for the CBI index are the two quarter lag of the country's CBI index and two quarter lag of the average regional CBI index.³³ The specification tests support the choice of instruments: The Hansen J statistic Chi-sq(2) *p*-value is 0.55 and the weak identification Kleibergen-Paap rk Wald F statistic is 138.2. As started earlier, both tests support the instrumental variable model specification. Also, using the instrumental variable estimation confirms the earlier findings: Fixed exchange rates have a stand-alone effect in lowering inflation above and beyond the control of the money supply, while, by itself, an independent central bank does not reduce inflation.³⁴

In terms of the *de facto* vs. *de jure* dichotomy for the different types of exchange rates (Model 14), pegs that behave like *de facto* intermediary rates and currency boards that behave like strong pegs are associated with lower inflation. Of intermediary rates, however, the negative effect on inflation appears driven, as in the case of M2 changes, by those rates that do not match announced *de jure* policy and those that do not. The hypothesis of a conditional effect of CBI on democracy, veto players and media freedom is tested in Models 10–13. The interaction effect of the CBI index with the democracy scores (Models 10 & 11) is negative and statistically significant. Also, Figure 2 shows that, as in the case of M2 growth rate models, the marginal effect of CBI is negative and statistically significant at high levels Freedom House and Polity IV scores. Models 11 and 12 include the interaction of the CBI index with the log of checks variable and, respectively, the press freedom variable. The coefficients of the interaction terms are negative, as expected, and statistically significant. The conditional effect of the CBI index is more clearly illustrated in Figure 2. Increasing press freedom unambiguously enhances the effect of central bank independence. More veto players also appear to support the anti-inflationary effect of central bank independence: For countries with multiple checks and balances, the marginal effect of the CBI index is negative and statistically significant. The results on the conditional effect of the CBI index are robust to using predicted values from the first stage of the instrumental variable estimation in Model 9 for the interaction terms and using bootstrapped standard errors in the inflation model. The coefficients of the CBI index and its interactions with the conditioning variables retain their signs and statistical significance when using the 50% quarterly inflation as the limit for inclusion in the sample or when using the natural log of inflation as the dependent variable.³⁵

Finally, I use the real interest rates on short-term government debt as the dependent variable to further test the credibility hypothesis. Lower real interest rates are important because they reflect part of production costs, and, for postcommunist countries, the cost of a scarce factor of production. Results from the models are shown in Table 3. Model 15 uses OLS regression with panel corrected standard error and lagged dependent variable.³⁶ Model 16 uses an instrumental variable approach. All

³³Regional CBI averages are computed for two groups: former USSR republics (except Estonia, Latvia, and Lithuania) and the rest of postcommunist countries. Similarly, Jacome and Vazquez (2008) use lagged values of the CBI index as instruments.

³⁴The instrumental variable estimates in Model 9 are robust to using a quarterly rate of inflation of 50% as the limit for sample inclusion or using the natural log of inflation as the dependent variable.

³⁵Regarding the control variables – only direct inflation targeting is consistently statistically significant. Countries with IT see lower inflation.

³⁶The first four lags of M2 change and well as inflation variation in the previous year are also included.

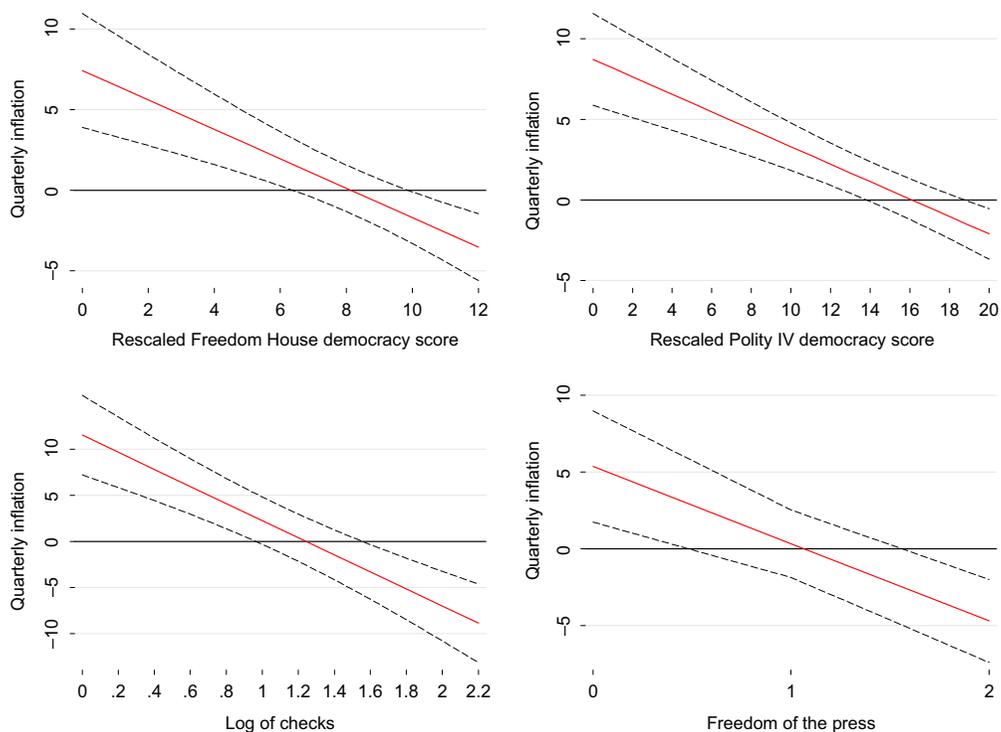


Figure 2. Inflation – Marginal Effect of CBI Conditional on Political Institutions.

Note: Graphs show the marginal effect on inflation (and the 95% confidence interval) of the CBI index for the range of conditioning variables: democracy scores (Freedom House and Polity IV); log of checks; and press freedom from Models 10–13, Table 2.

types of fixed exchange rates are aggregated into a single category of “fixed” and the instruments are second lag of fixed and the second lag of the change in international reserves. The instruments for the CBI index are two quarter lag of both the CBI index and of the region’s CBI (by former USSR Republic or not). The specification tests support the specification and the choice of instruments: The Hansen J statistic Chi-sq (2) *p*-value is 0.149 and the weak identification Kleibergen-Paap rk Wald F statistic is 105.8. The estimations using real market interest rates for all available countries (1990–2007)³⁷, do not support the idea that fixed exchange rates or independent central banks lower short-term real interest rates in postcommunist countries.

Real market interest rates for postcommunist countries reflect many of the problems singled out in extant work (Levy-Yeyati and Sturzenegger, 2001): missing values for many countries, high volatility and a substantial number of observations with negative real rates (35% of observations) reflecting unexpected inflation and inflation volatility. Indeed, the data show that yearly inflation volatility (from quarterly data) has been especially high in the early transition. However, limiting the sample to years with the lowest volatility of inflation (75th percentile) does not show a lower cost of capital for

³⁷Hungary is able to borrow from capital markets already in 1990. Poland starts borrowing in 1991 and Bulgaria in 1992.

TABLE 3 T-BILL MODELS

	Model 15	Model 16
Gdp growth ^a	-0.084 (0.038)**	-0.058 (0.033)*
Openness ^a	-0.001 (0.005)	-0.0001 (0.004)
Inflation variability ^a	0.015 (0.006)***	2.649 (0.871)***
Peg	-0.081 (1.150)	
Intermediary	3.019 (0.986)***	
Currency board	1.660 (2.639)	
CBI index	2.620 (1.433)*	2.069 (1.551)
FH democracy	0.591 (0.276)**	0.667 (0.261)**
Election	0.494 (0.369)	0.363 (0.416)
Price liberalization index ^a	3.781 (1.549)**	4.763 (2.544)*
Budget balance ^a	-0.035 (0.068)	-0.111 (0.061)*
EU member	1.644 (0.675)**	0.918 (0.353)***
ERM II	-0.397 (0.432)	
Inflation targeting	2.312 (0.887)***	0.936 (0.579)
Fixed		0.615 (0.846)
Constant	0.27	0.35
N / countries	879 / 19	879 / 19

Note: The dependent variable is the 3-month real t-bill rate. Standard errors are in parentheses.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

^aLagged 1 year. Models include the lagged dependent variable, up to the fourth lag of M2 change, country, year, and quarter dummies. Model 16 uses an instrumental variable approach (Stata 11 ivreg2 command) for the fixed exchange rates and CBI: The Hansen J statistic Chi-sq(2) p -value is 0.149; The weak identification Kleibergen-Paap rk Wald F statistic is 105.8.

fixed exchange rates or countries with independent central banks. Also, estimations do not show a robust support for a conditional effect of the CBI index on political institutions. And, if anything, some of the estimations show that democracies with independent central see higher real t-bill rates.³⁸

³⁸The interaction terms between the CBI index and democracy, veto players and a free press do not reach conventional levels of statistical significance. Graphical representation shows, however, statistically significant marginal effect for democracies and countries with a free press. Still, these results on the conditional effect of the CBI index are not robustly statistically significant to using predicted values from the first stage of the instrumental variable estimation in Model 16 for the interaction terms and using bootstrapped standard errors in the real t-bill model.

The earlier findings on inflation rates show that monetary institutions do have a credibility effect on inflation and appear to lower inflation beyond the control of the money supply. They also show that the same monetary institutions reduce the quarterly growth rate of M2. The real interest rate results, however, suggest that a so called “peso problem” (Levy-Yeyati and Sturzenegger, 2001) occurs in postcommunist countries. That is, domestic short-term real interest rates have remained high very likely in order to discipline money growth rates, support fixed exchange rates and increase the credibility of central banks. The estimations also reveal that EU membership raises the real cost of borrowing in the domestic currency³⁹, as do domestic liberalization of prices, high inflation volatility and democracies. Only higher economic growth contributes to lowering real rates, although fiscal discipline also gains statistical significance in Model 16.

In addition to the robustness checks reported so far more empirical analysis has been used to verify the key findings. First, the results are robust to the inclusion of potentially relevant control variables: dummy variable for the two quarters before a government fall (Bagashka and Stone 2013); dummy variable for EU accession talks; dummy variable for membership in the CIS (Community of Independent States); dummy variable for ongoing war; variable coding capital account liberalization. Second, I include an indicator variable for whether the largest party in the executive is on the right of the political spectrum (DPI 2010). Partisanship based on the DPI causes a loss of five countries and more than 250 observations (20% of the data). The key results are unaffected when partisanship is included. Third, I use a different measure for the strength of political opposition (political constraints based on Henisz, 2002; 2010 data version) and the results are very similar: More constraints increase the disciplinary effect of central bank independence on rates of growth of the money supply while not effecting the effect of CBI on inflation.

5. CONCLUSION

Price stability has been an important concern in the transition from centrally planned economies in Eastern Europe and the former Soviet Union. Extant work suggests that independent central banks and fixed exchange rates are institutional solutions fostering price stability. This article investigates whether such institutions have in fact helped price stability in the unpropitious environment of postcommunist and what was the specific mechanism involved. A key contribution of the article comes from looking at both discipline and credibility effects of monetary institutions, as well as exploring the distinct flows of both fixed exchange rates and CBI. The literature on exchange rates (Ghosh et al., 1997, 2011; Levy-Yeyati and Sturzenegger, 2001) has been differentiating between a direct effect on rates of money growth and an indirect effect, via public expectations, on inflation rates and real bond rates. The exchange rate work that makes this differentiation, however, habitually ignores the status of the central bank,

³⁹A similar effect obtains if a dummy for the EU accession periods is included: Countries that have started accession talks with the EU see higher real short-term interest rates for domestic government debt. This finding is in contrast with work looking at borrowing costs in foreign currency. For example, Gray (2009) shows that domestic policy reforms in transition countries do not have a consistent effect in reducing interest rate spreads on 3 year foreign denominated bonds (vis-à-vis German rates). She shows, rather, that the European Union’s endorsement of policy reform through negotiations and membership has a large and robust effect in lowering foreign currency borrowing costs.

potentially suffering from missing variable bias.⁴⁰ On the other hand, the same kind of question has really not been addressed in the central bank independence literature, where research focuses on CBI and inflation alone, with some early work looking at real interest rates. The argument here is that democracy and the posited mechanisms should aid CBI not just to lower inflation via a credibility effect (Broz, 2002; Keefer and Stasavage 2002, 2003), but also to reduce money growth rates. And, if direct empirical models of inflation are to be closer to capturing CBI credibility research ought to include measures of the direct discipline effect.

Several empirical findings stand out. Most robustly fixed exchange rates and an independent central bank aided by democratic political institutions have a disciplinary effect on rates of money supply growth. Controlling for the rates of money growth, the same configuration of institutions have a credibility effect on inflation. The disciplinary and credibility effect of fixed exchange rates depend on the type of *de jure* commitment, and whether that is matched by *de facto* behavior: For example currency boards consistently reduce inflation (controlling for the rates of money growth), while not having a consistent effect on the rates of M2 growth themselves. Surprisingly, even intermediary fixed rates that behave like *de facto* floats reduce money growth and inflation, consistent with policy-makers attempting to carry out policies consistent with *de jure* exchange rate commitments. Finally, there is no credibility effect as reflected in lower real borrowing costs, suggesting that price stability has been achieved with the collateral of persistent high cost of domestic capital. These results are robust to different estimation methods, including instrumental variable techniques, different samples and controls for country and time fixed effects.

In addition, ancillary findings have implications for the literature on the choice of monetary institutions. In the inflation models, the instrumental variable approach explores the determinants of the CBI level and fixed exchange rates. One important argument in the literature has been that democracies should be more adept at increasing CBI because of the relative lack of transparency of central banks, which can be aided by democratic institutions. In contrast, dictatorships – which are opaque political regimes – should prefer the more transparent fixed exchange rates (Broz, 2002).⁴¹ For the sample of countries in this article, democracy seems unrelated to either the choice of an exchange rate regime or the independence of the central bank and there is no support for a substitution hypothesis between central bank independence and fixed exchange rates. cursorily looking at the data, such a result makes sense: Fixed rates were adopted by democratic countries like Hungary, Poland, the Czech Republic, Lithuania, or Estonia. In the dictatorship camp, fixed rates (intermediary rates) were used for brief periods of time by Russia and Ukraine. Moreover, with regards to CBI, it is not only democracies that have changed the law of their central bank.

⁴⁰Ghosh et al. (1997, 2011) include central bank turnover, but as explained earlier in the article, by itself this indicator may mean different things: Argentina is a classic example where high turnover signals lack on independence. At the other end of the scale, in an example from postcommunist countries, Romania has had the same central bank governor for the last 22 years, during periods of both *de facto* subservience (until early 2000s) and *de facto* independence. Levy-Yeyati and Sturzenegger (2001) do not consider central bank independence at all.

⁴¹Bearce and Hallerberg (2011) extent the argument to the relationship between political regime and *de facto* (rather than *de jure*) fixed exchange rates. For them, democracies should make less use of *de facto* fixed exchange rates because in democracies the median voter is more likely to be a domestically oriented producer and societal groups are more able to influence public policy.

Countries like Belarus, Russia, Kazakhstan, or Armenia have also nominally delegated more independence.

Policy implications follow as well. After a landslide election in 2010, Hungary's Fidesz party passed a controversial law undermining the independence of its central bank (December 2011). This law was repealed in 2012 due to European Union's threat to withhold a bailout package to Hungary until the government restored the bank's independence. The evidence here suggests that a move to restrict central bank autonomy in a democracy like Hungary is likely to result in upward pressure on prices, both due to higher growth of the money supply and because of lack of monetary policy credibility. On the other hand, partial democracies with partly free media like Albania or Georgia do not stand to gain much in terms of price stability from their own reforms of the central bank law. And, authoritarian regimes in Azerbaijan, Kazakhstan, or Russia are unlikely to benefit at all from the legal changes to the status of their central banks that took place in mid-2000s.

Finally, foreign currency debt is generally perceived as accompanied by a host of negative macroeconomic implications and debt denominated in domestic currency is preferable (Calvo and Reinhart, 2000). Extant work on the 'domestic original sin' and the development of local bond markets show that monetary credibility (proxied by low inflation) is associated with the ability of developing countries to borrow domestically in local currency, at long maturities and without indexation (Claessens et al., 2007; Hausmann and Panizza, 2003; Mehl and Reynaud, 2010). The evidence here shows that in postcommunist countries monetary institutions associated with low inflation are not able to reduce the real cost of capital for short-term borrowing. Independent central banks in democracies may in fact contribute to higher real interest rates. This discussion points to an important potential tradeoff between access to borrowing in domestic currency and the cost of such capital in developing countries.

CRISTINA BODEA

Michigan State University

REFERENCES

- Alesina, A. and Summers, L., 1993, Central bank independence and macroeconomic performance: some comparative evidence. *Journal of Money, Credit, and Banking* 25, 151–162.
- , Roubini, N. and with Gerald, C., 1997, *Political Cycles and the Macroeconomy* (The MIT Press, Cambridge).
- Barro, R. and Gordon, D., 1983, Rules, discretion, and reputation in a model of monetary policy. *Journal of Monetary Economics* 12, 101–120.
- Bagashka, T. and Randall, S., 2013, Risky signals: the political costs of exchange rate policy in post-communist countries. *International Studies Quarterly* 57, 519–531.
- Bearce, D. and Hallerberg, M., 2011, Democracy and de facto exchange rate regimes. *Economics and Politics* 23, 172–194.
- Beck, N. and Katz, J., 1995, What to do (and not to do) with time-series cross-section data. *American Journal of Political Science* 89, 634–647.
- Berger, H., 1997, The *Bundesbank's* path to independence: evidence from the 1950s. *Public Choice* 93, 427–453.
- Bernhard, W., 1998, A political explanation of variations in central bank independence. *American Political Science Review* 92, 311–327.
- Blinder, A., 1998, *Central Banking in Theory and Practice* (MIT Press). <http://mitpress.mit.edu/books/central-banking-theory-and-practice>

- Bloomberg, S. B., Frieden, J. and Stein, E., 2005, Sustaining fixed rates: the political economy of currency pegs in Latin America. *Journal of Applied Economics* VIII, 203–225.
- Bodea, C., 2010a, Exchange rate regimes and independent central banks: a correlated choice of imperfectly credible institution. *International Organization* 64, 411–442.
- , 2010b, The political economy of fixed exchange rate regimes: the experience of post-communist countries. *European Journal of Political Economy* 26, 248–264.
- , 2013, Independent central banks, regime type and fiscal performance: the case of post communist countries. *Public Choice* 155, 81–107.
- Broz, J. L., 2002, Political system transparency and monetary commitment regimes. *International Organization* 54, 861–888.
- Bruno, M., 1991, *High Inflation and the Nominal Anchors of an Open Economy*. Princeton Essay in International Finance, No. 183 (Princeton University, Princeton, NJ).
- Calvo, G. and Reinhart, C., 2000, When capital flows come to a sudden stop: consequences and policy, in: Kenen P. K. and Swoboda A. K., eds., *Reforming the International Monetary and Financial System*. (International Monetary Fund, Washington, DC).
- Claessens, S., Klingebiel, D. and Schmuckler, S., 2007, Government bonds in domestic and foreign currency: the role of macroeconomic and institutional factors. *Review of International Economics* 15, 370–413.
- Cooper, R., 1971, *Currency Devaluations in Developing Countries*. Essays in International Finance, Vol. 86 (Princeton University).
- Crowe, C. and Meade, E., 2008, Central bank independence and transparency: evolution and effectiveness. *European Journal of Political Economy* 24–4, 763–777.
- Cukierman, A. and Gerlach, S., 2003, The inflation bias revisited: theory and some international evidence. *The Manchester School* 71–5, 541–565.
- , Webb, S. and Neyapti, B., 1992, Measuring the independence of central banks and its effect on policy outcomes. *The World Bank Economic Review* 5, 353–398.
- , Kalaitzidakis, P., Summers, L. H. and Webb, S. B., 1993, Central bank independence, growth, investment, and real rates. *Carnegie-Rochester Conference Series on Public Policy* 39, 95–140.
- , Miller, G. P. and Neyapti, B., 2002, Central bank reform, liberalization and inflation in transition economies – an international perspective. *Journal of Monetary Economics* 49–2, 237–264.
- De Grauwe, P. and Schnabl, G., 2008, Exchange rate stability, inflation, and growth in (South) Eastern and Central Europe. *Review of Developmental Economics* 12–3, 530–549.
- De Haan, J. and Sturm, J. E., 1992, The case for central bank independence. *Banca Nazionale del Lavoro* 182.
- , Berger, H. and van Fraassen, E., 2001, How to reduce inflation: an independent central bank or a currency board? The experience of the Baltic countries. *Emerging Markets Review* 2–3, 218–243.
- Dornbusch, R. and Werner, A., 1994, Mexico: stabilization, reform, and no growth. *Brookings Papers on Economic Activity* 1, 253–297.
- Edwards, S., 1996, The determinants of the choice between fixed and flexible exchange-rate regimes. NBER Working Paper 5756.
- Eichengreen, B., Masson, P. R., Savastano, M. and Sharma, S., 1999, *Transition Strategies and Nominal Anchors on the Road to Greater Exchange-Rate Flexibility*. Princeton Essays in International Finance 213 (Princeton University Press, Princeton, NJ).
- Eijffinger, S. and de Haan, J., 1996, The political economy of central bank independence. Princeton Special Papers in International Economics No. 19.
- Frankel, J., 2005, Contractionary currency crashes in developing countries. IMF Staff Papers, 2005.
- Frankel, J. A., Fajnzylber, E., Schmukler, S. L. and Servén, L., 2001, Verifying exchange rate regimes. *Journal of Development Economics* 66–2, 351–386.
- Ghosh, A., Gulde A.-M., Ostry, J. and Wolf, H., 1997, Does nominal exchange rate regime matter? NBER Working Paper 5874.
- Ghosh, A. R., Qureshi, M. S. and Tsangarides, C., 2011, Words vs. deeds: what really matters? IMF Working Paper 11/112.

- Giavazzi, F. and Pagano, M., 1988, The advantage of tying one's hands: EMS discipline and central bank credibility. *European Economic Review* 32, 1055–1082.
- Granato, J., 1996, The effect of policymaker reputation and credibility on public expectations: an application to macroeconomic policy changes. *Journal of Theoretical Politics* 8–4, 449–470.
- Gray, J., 2009, International organization as a seal of approval: European Union accession and investor risk. *American Journal of Political Science* 53, 931–949.
- Grilli, V., Masciandaro, D. and Tabellini, D., 1991, Political and monetary institutions and public financial policies in the industrial countries, in: Persson T. and Guido T., eds., *Monetary and Fiscal Policy*, Vol. 2. 1995. (The MIT Press, Cambridge).
- Guisinger, A. and Singer, D. A., 2010, Exchange rate proclamations and inflation-fighting credibility. *International Organization* 64, 313–337.
- Hausmann, R. and Panizza, U., 2003, On the determinants of original sin: an empirical investigation. *Journal of International Money and Finance* 22, 957–990.
- Henisz, W., 2002, The institutional environment for infrastructure investment. *Industrial and Corporate Change* 11–2, 355–389.
- Hibbs, D., 1977, Political parties and macroeconomic policy. *American Political Science Review* 71, 1467–1487.
- Ilzetzki, E., Reinhart, C. and Rogoff, K., 2008, Exchange rates agreements entering the 21st century: which anchor will hold? Working Paper.
- International Monetary Fund, 2006, *Inflation targeting and the IMF*. Unpublished Manuscript, IMF, Washington, DC.
- Iversen, T. and Soskice, D., 2006, New macroeconomics and political science. *American Review of Political Science* 9, 425–453.
- Jacome, L. I. and Vazquez, F., 2008, Any link between legal central bank independence and inflation? Evidence from Latin America and the Caribbean. *European Journal of Political Economy* 24–4, 788–801.
- Keefer, P. and Stasavage, D., 2002, Checks and balances, private information, and the credibility of monetary commitments. *International Organization* 56, 751–774.
- and Stasavage, D., 2003, The limits of delegation: veto players, central bank independence and the credibility of monetary policy. *American Political Science Review* 97, 407–423.
- Klomp, J. and de Haan, J., 2010, Central bank independence and inflation revisited. *Public Choice* 144, 445–457.
- Kydland, F. and Prescott, E., 1977, Rules rather than discretion: the inconsistency of optimal plans. *Journal of Political Economy* 85, 493–492.
- Leblang, D., 2005, Pegs and politics, Working Paper.
- Levy-Yeyati, E. and Sturzenegger, F., 2001, Exchange rate regimes and economic performance. IMF Staff Papers, Vol. 47.
- Lohmann, S., 1992, Optimal commitment in monetary policy: credibility versus flexibility. *American Economic Review* 82, 273–286.
- , 1998, Reputational versus institutional solutions to the time-consistency problem in monetary policy. in: Eijffinger, H., ed., *Positive Political Economy: Theory and Evidence*. (Cambridge University Press, Cambridge) pp. 9–22.
- Loungani, P. and Sheets, N., 1997, Central bank independence, inflation, and growth in transition economies. *Journal of Money, Credit and Banking* 29–3, 381–99.
- Lybek, T., 1999, Central bank autonomy, and inflation and output in the Baltic States, and other countries in the former Soviet Union, 1995–1997. IMF Working Paper 99/4.
- Maliszewski, W., 2000, Central bank independence in transition economies. *Economics of Transition* 8–3, 749–789.
- Mascaro, A. and Meltzer, A. H., 1983, Long and short-term interest rates in a risky world. *Journal of Monetary Economics* 12, 485–518.
- Masson, P., Savastano, M. and Sharma, S., 1997, The scope for inflation targeting in developing countries. IMF Working Paper 97/130.
- Mehl, A. and Reynaud, J., 2010, Risky public domestic debt composition in emerging economies. *Journal of International Money and Finance* 29, 1–18.
- Milesi-Feretti, G. M., 1995, The disadvantage of tying their hands: on the political economy of policy commitments. *Economic Journal* 105, 1381–1402.
- Nordhaus, W., 1975, The political business cycle. *Review of Economic Studies* 42, 169–190.

- Oatley, T., 1999, Central bank independence and inflation: corporatism, partisanship, and alternative indices of central bank independence. *Public Choice* 98, 399–413.
- Reinhart, C. and Rogoff, K., 2004, The modern history of exchange rate arrangements: a reinterpretation. *Quarterly Journal of Economics* 119–1, 1–48.
- Rogoff, K., 1985, The optimal degree of commitment to an intermediate monetary target. *Quarterly Journal of Economics* 100, 1169–1190.
- Sachs, J., 1996, Economic transition and the exchange rate regime. *American Economic Review* 86–2, 147–152.
- Schamis, H. and Way, C., 2003, Political cycles and exchange rate-based stabilization. *World Politics* 56–1, 43–78.
- Staiger, D. and Stock, J., 1997, Instrumental variables regression with weak instruments. *Econometrica* 65–3, 557–586.
- Stockman, A., 1996, *Introduction to Economics*. (The Dryden Press, Orlando, Florida).
- Stone, R., 2002, *Lending Credibility: The International Monetary Fund and the Post-Communist Transition*. (Princeton University Press, Princeton).
- Thies, C. and Arce, M., 2009, The politics of exchange based stabilization versus structural reforms in Latin America. *Comparative Political Studies* 42–9, 1193–1216.
- Treisman, D., 1998, Fighting inflation in a transitional order: Russia's anomalous stabilization. *World Politics* 50–2, 235–265.
- Walsh, C., 1998, *Monetary Theory and Policy* (MIT Press, Cambridge, MA).

APPENDIX

TABLE A1 SUMMARY STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
Quarterly inflation	1294	5.85	20.22	−29.945	385.3891
M2 change	1294	8.14	13.39	−63.3388	175.8139
GPD/ capital lagged 1 year	1294	3.10	6.65	−30.9	34.5
Trade openness lagged 1 year	1294	93.34	35.64	8.96168	191.4397
Peg	1294	0.07	0.26	0	1
Intermediary fixed rates	1294	0.07	0.26	0	1
Currency board	1294	0.12	0.33	0	1
CBI index	1294	0.63	0.19	0.177625	0.954
Transformed Freedom House democracy	1294	8.12	3.08	1	12
Polity IV democracy score	1294	15.68	5.34	3	20
Log of checks	1183	1.06	0.54	0	2.079442
Press status	1294	1.10	0.76	0	2
Elections in quarter & previous quarter	1294	0.13	0.34	0	1
EBRD price liberalization index lagged 1 year	1294	3.98	0.49	1	4.3
EBRD budget balance lagged 1 year	1294	−3.30	4.43	−24	15.6355
EU Member	1294	0.08	0.28	0	1
ERM II Member	1294	0.04	0.21	0	1
Inflation Targeting	1294	0.10	0.29	0	1
3 month real t-bill rate	954	1.11	10.61	−266.08	128.67

TABLE A2 CENTRAL BANK YEARS COVERED AND YEARS OF REFORM

	CB years	Reforms
Albania	1992–2007	1997
Armenia	1993–2007	1996, 2001
Azerbaijan	1992–2007	1996, 2004
Belarus	1992–2007	2001
Bulgaria	1991–2007	1997, 2005
Croatia	1992–2007	2001, 2002, 2007
Czech Republic	1992–2007	2001
Estonia	1993–2007	2006
Georgia	1995–2007	
Hungary	1991–2007	2001
Kazakhstan	1993–2007	1995, 1997, 2003, 2006
Kyrgyz Republic	1992–2007	1997
Latvia	1992–2007	1998, 2001, 2002
Lithuania	1991–2007	1996
Macedonia, FYR	1995–2007	2002
Moldova	1991–2007	1995, 2006
Mongolia	1991–2007	1996
Poland	1991–2007	1997
Romania	1991–2007	1998, 2004
Russian Federation	1993–2007	1995, 2002
Slovak Republic	1992–2007	1999, 2002
Slovenia	1991–2007	2002
Tajikistan	1993–2007	1996
Turkmenistan	1992–2007	1994
Ukraine	1991–2007	1999
Uzbekistan	1992–2007	1995