Credit rating agencies and central banks: Does better central bank governance reduce the cost of capital?

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Abstract

Credit rating agencies have been an important determinant of countries' cost of capital in the last couple of decades. This paper studies the effect of the governance of modern central banks on the ratings assigned by the credit rating agencies Standard and Poor's and Moody's. The rating process is not public and we do not know precisely the factors or methodologies used by the agencies. Yet we argue that the independence and transparency of central banks are important to the overall risk of repayment. This is because both features are signals of high quality institutional governance, which credit rating agencies link to willingness and ability to repay. We suggest that both independence and transparency have the potential to improve economic and political stability, and, therefore improve countries' credit rating. On the other hand, we argue that open conflict between the central bank and the government, reflected in loss of employment for top central bank officials should have the opposite effect.

Introduction

This study investigates the impact of key features of modern central banks on decisions made by credit rating agencies about risks associated with lending and investment. Credit rating agencies are an important factor affecting the costs of capital to countries and companies. When rating the investment risks and the chances of a default by sovereign borrowers, credit rating agencies routinely invoke the quality of a particular country's governance and institutions. They are interested in factors that suggest stable and sustainable policies. For example, Moody's, one of the large credit rating agencies, states: "the quality of a country's institutional framework and governance is a key consideration in the rating process. This factor considers the extent to which a nation's political, social, and legal institutions act as a constraint on sudden and adverse changes in a country's ability and willingness to repay its debt. The stronger the institutions, the greater the constraint"[1]. Economic conditions play a role in the ratings given each year to countries, but since most bonds will be due for repayment years into the future, when they issue ratings, the agencies strive to assess whether a country will still be able to repay when they mature. Better domestic governance and institutions are thought to decrease the likelihood that a government will default on its borrowing.

An independent central bank is often seen as a sine qua non of good economic governance as it carries out the monetary policy of countries. During the first 30 years after the end of World War II, many central banks were an arm of the ministry of finance and monetary policy was directed by the government. In the last 30 years many countries have made their central banks more independent from politicians, ensuring low and stable inflation and inflation expectations. With more independence came, however, concerns about the accountability of

[1] Cited in Biglaiser and Staats (2012: 520).

these institutions. Therefore, more and more central banks, in addition to being independent from politics, have become more transparent in how they conduct operations, the kinds of data they use and their macro-economic forecasts.

In this paper, we explore the linkages between a country's central bank independence (CBI) and transparency and its credit rating. The institutional design of central banks has become a key aspect of good governance of the macro-economy. The International Monetary Fund, for example, makes its lending conditional on central bank reform (Polillo and Guillen 2005, McNamara 2011, World Economic Outlook 2013). Also, states appear to believe that there are costs in not adhering to global norms and will reform the legal status of their central banks because a critical mass of other countries has already done (Polillo and Guillen 2005, McNamara 2011, Bodea and Hicks 2015). Our argument is that CBI is a signal to investors that the government is committed to general macroeconomic stability, of which debt repayment is a crucial component. We further argue that increased central bank transparency clarifies who is the principle of the central bank and provides important information about how the bank views the economy in the future and how monetary policy relates to the state of the economy. Finally, we suggest that tensions in the relation between the central bank and the government, as reflected by abrupt and irregular firings of central bank governors, raise concerns about macro-economic instability and doubts about countries' future prospects. Our expectation is therefore that a country's legal independence and recent reforms of the central bank will have a positive effect on credit ratings. A similar effect is expected for central bank transparency. On the other hand, open conflict between the central bank and the government, reflected in loss of employment for top central bank officials should have the opposite effect.

Anecdotal evidence backs our argument. For example, in 2001, in the run-up to joining the European Union, Hungary reformed its central bank to give it more legal independence from the government. However, after a landslide election in 2010, Hungary's Fidesz party passed a controversial law undermining this independence (December 2011). Immediately following the legislative changes, all major credit rating agencies (Standard and Poor's, Moody's and Fitch) downgraded Hungary's credit rating to junk status. Standard and Poor's noted very specifically in their commentary of the downgrade: "In our opinion, changes to the constitution and the functioning of some independent institutions, including the central bank and the constitutional court, have undermined Hungary's institutional effectiveness. Following changes to the process of appointing members of the central bank's monetary policy committee in 2010, the authorities most recently have proposed legislation that we believe could further compromise the central bank's independence".[2] The Fidesz government restored the bank's legal independence in 2012, following actual large increases in borrowing costs and currency depreciation of the Hungarian Forint.

For systematic tests of our argument, we use a data set stretching from 1973 to 2010, and information on the credit ratings given to countries by two of the large credit rating agencies (Standard and Poor's and Moody's), as well as central bank independence (Bodea and Hicks 2012), central bank turnover (Dreher, Sturm, and de Haan 2008) and central bank transparency (Eichengreen and Dincer 2010). We have several findings: For the full sample of countries legal CBI has a positive and significant effect on ratings. That is, countries with more independent central banks have better credit ratings. For non-OECD countries CBI only improves the ratings given by Standard and Poor's ratings. Irregular turnover of central bank governors has a negative

[2] Cited in "Hungary's Central Bank Law Is Getting It In All Sorts Of Trouble", December 21, 2011. http://www.businessinsider.com.

and significant effect on ratings in both the full sample and the non-OECD sample. In our full sample, central bank transparency has a positive and significant effect on ratings, but this effect does not obtain in the smaller sample of non-OECD countries. Overall, these findings suggest that central bank governance is an important factor in explaining credit ratings.

The rest of the paper proceeds as follows. In the next section, we discuss current explanations for credit ratings. The second section relates existing work linking central bank governance to the costs of capital. Surprisingly, despite evidence suggesting that CBI can lower borrowing costs under certain conditions, no systematic links between CBI and credit ratings have been uncovered. In the third section, we present our argument for why there should be a link between credit ratings and central bank independence, transparency and personnel changes. The fourth section tests our argument and the fifth section concludes.

Countries and creditworthiness

In the last four decades more and more states, including developing countries, have come to rely on bond financing. Concomitant with this reliance on bonds, the leading rating agencies (Moody's, Standard and Poor's and Fitch) have provided investors with analysis and condensed ratings of a government's ability and willingness to repay public loans. While lacking transparency, the basic process of being rated involves countries inviting the credit rating agencies to assess risk, in the hopes that the analysis will improve the borrowing terms of public finance. Such ratings then become hugely important for not only the borrowing costs of countries[3], but also the particular ratings assigned to companies and banks in those countries and the portfolio allocation of institutional investors (White 2010; Sinclair 2001 and 2005).

[3] Kaminsky and Schmukler 2001; Vaaler and McNamara 2004

The research community does not know precisely the factors or methodologies that enter into generating credit ratings. Credit rating agencies are private companies that strive for profit, compete for business and are, therefore, far from transparent in their country analyses. In one of the pioneering studies of the influence of politics on credit ratings, Sinclair (2005), for example, discusses somewhat vague notions like "mental frameworks" that help explain how agencies view countries. This lack of transparency has led to a burgeoning scholarly literature attempting to explain rankings.

Broadly speaking, we can separate out the likelihood of bond repayment into an ability to repay debt and willingness to do so. Early work focused on a country's ability to repay debt. That is, do countries have the resources available to ensure that they will not default? As a result, scholars focused on the economic determinants of credit ratings, explaining country credit ratings through macro-economic conditions like per capita income, GDP growth, inflation, external debt, level of economic development, and default history (Cantor and Packer 1996)[4]. Subsequent work related credit ratings to factors that predict currency crises (Monfort and Mulder 2000).

But governments also have to be willing to repay their debt. Even if they have the resources, they may choose to default for ideological reasons, as Ecuador did in 2008 (Gray and Hicks 2014, 329). Willingness to repay debt, then, is the result of political factors that make defaulting more or less costly. North and Weingast (1989) argue that constraints on executive power in XVIII-th century England increased the credibility of promises to repay sovereign debt. By delegating authority to Parliament, English monarchs tied their hands and made reneging on debt more difficult. In a similar vein, Schultz and Weingast (2003) argue that voters in

[4] More recent evidence is in Canuto et al. 2012, Afonso et al. 2011, Nogués and Grandes 2001; and Rowland and Torres 2004.

democracies punish violations of international debt contracts, which enhances the credibility of sovereign borrowing by democratic countries. Recent work provides evidence that democracies and countries that have the characteristics of democracy, including rule of law, respect for property rights and constraints on executive authority tend to receive better credit ratings (Butler and Fauver 2006, Beaulieu et al 2012, Biglaiser and Staats 2012). Moreover, democracy is important not just for the level of credit ratings[5], but also for access to credit and countries being rated by credit rating agencies in the first place (Beaulieu et al. 2012).

Credibility in international debt markets may emerge from sources other than domestic political institutions. Tomz (2007) shows that countries fare better if they build a reputation for repayment. In this view, countries with little credit history face unfavorable borrowing terms, while proven borrowers enjoy low interest rates. Association with reputable international organizations is yet another strategy states can employ to reduce the cost of capital (Gray 2009, Dreher and Voight 2011), as is reliance on monopolist underwriting banks (Flandreau and Flores 2009) or allowing the presence of foreign banks (Grittersova 2014). For example, Gray (2013) argues that the process of accession to the European Union (EU) sends credible positive signals to financial markets about the domestic economic policies of would-be new members. Monopolist underwriters can enhance the credibility of dictatorships with their own ability to dictate conditions for loans, while foreign banks, as foreign direct investors, may signal creditworthiness under conditions of weak institutions or little credit history.

In addition, credit rating agencies consider directly the electoral and partisan cycles. For developing countries, agencies downgrade their ratings by up to 1 point before election years (Block and Vaaler 2004). Moreover, Vaaler et al. (2006) show that credit rating agencies are

[5] Earlier studies that do not account for credit rationing find that democracies do note enjoy better credit scores (Archer et al. 2007) or lower interest rates (Saiegh 2005).

more likely to downgrade countries if elections are likely to result in the ouster of right wing governments.

Central banks and the cost of capital

While democracy, constraints and rule of law are broadly related to the credibility of repayment, there are domestic institutions more directly related to macro-economic conditions that credit agencies care about and that increase the ability (and perhaps the willingness) of countries to service loans. Previous research relates various aspects of central banks to countries' cost of capital or investor behavior. Historically the existence of central banks has enhanced the ability of countries to borrow and lowered costs of loans during times of war (Broz 1998, 1999; Poast 2015). In fact, many central banks emerge during wars (Broz 1998). States charter central banks to be their fiscal agents, and, in turn, these privileged banks invest in government debt and de facto help lower the premium on government debt. The presence of representative institutions or the monopoly status of the fiscal agents may enhance the credibility that these designated banks will remain in-charge of debt management and repayment to the ultimate bond holders (Stasavage 2003; Flandreau and Flores 2009, 2012). Credibility may also be a function of the mutually beneficial relationship between the central bank and the government, via an exchange of rents for monopoly power (Poast 2015) or the reduction of inefficiencies and distortions (Broz 1998).

Additional research aims to directly connect features of modern central banks to the cost of capital. Early work shows that CBI does not reduce risk premia on real interest rates (Alesina and Summers 1993, Cukierman et al. 1993). On the other hand, Maxfield (1997) suggests that real autonomy granted to the central bank, even if not necessarily reflected in legal reform, signals creditworthiness to potential investors. Bond investors especially are argued to

understand the relationship between monetary policy authorities and the government, and react favorably to more autonomy. Maxfield's analysis also shows that legal CBI increases the share of private investment to GDP. In addition: Spiegel (1998) finds that the 1997 Bank of England reform and increased legal independence reduced inflation expectations as reflected in lower yields on long-term bonds. Moser and Dreher (2010) show that sovereign bond spreads in developing countries increase in reaction to the irregular replacement of central bank governors outside legal mandated term limits. Bodea and Hicks (2014) also bring evidence that, when credible, CBI increases FDI inflows and reduces long term bond yields, especially when other countries lag behind with regard to legal central bank reform.

There is thus evidence that rating agencies look for the quality of governance institutions and that international investors care about a country's level of central bank independence. Are there direct reasons, however, for central bank governance to influence a country's credit rating? In the next section, we relate the sovereign country ratings given by the most important credit rating agencies to the institutional, legal independence of the central bank from politicians, the central bank's transparency, as well as the actual turnover of central bank governors.

Central bank governance

Two of the main credit rating agencies, Moody's and Standard and Poor's cite very directly domestic institutions as important factors determining their rating: Moody's states that "the quality of a country's institutional framework and governance is a key consideration in the rating process" and Standard and Poor's write that "established institutions provide transparency and predictability".[6] To a large degree, as trade and investment became global by the late 1990s,

[6] Biglaiser and Staats (2012: 520).

legal central bank independence became a metric of good economic governance.[7] By the 1990s, for example, the International Monetary Fund (IMF) had made lending decisions conditional on central bank reform (Polillo and Guillen 2005, McNamara 2011, World Economic Outlook 2013). The interaction between the government and the central bank are then likely to be factors included in the rating agencies' calculus.

We argue that central bank governance and the de jure and de facto relationship between the government and the central bank serve as a broad signal of policy and institutional stability. Good institutions are not always directly related to favorable outcomes. However, regarding the importance of institutions, Sobel (1999) writes very directly that government *policies and institutions* give information to financial markets about the investment climate. More specifically, he argues that "differences among national central banks testify to wide variations in monetary institutions and policies across nations. Such differences help investors evaluate price volatility and inflation risks" (p.42). Mosley (2003) also treats the independence of the central bank, even if cursorily, and suspects that CBI will lower bond rates as "they will have some success in changing market participants' expectations regarding inflation" (p. 206).[8] Below we develop hypotheses related to the independence and transparency of modern central banks, as well as de facto tensions between the government and the central bank, as reflected in abrupt firing of central bankers.

Central bank independence

Central banks are independent from politics when allowed to set monetary policy with a focus on the stability of prices and without regard to politicians' short term concerns or re-election

[7] Some countries rush to reform their central bank without being certain of what McNamara (2011) calls "means-ends relationships", or what these reforms will bring.
[8] Ahlquist (2006) and Buthe and Milner (2008, 2012) argue about the importance of policy stability to foreign direct investment, and institutions, including an independent central bank, contribute to such stability.

prospects. There are plausible reasons credit rating agencies may interpret CBI as a signal of broad, forward-looking, policy stability. First, CBI improves the stability and predictability of monetary policy, and, if credible, it can restrain future deficit spending and flexibly respond to economic crises, without inflation flare-ups. Moreover, independent central bankers can also emerge as important domestic players supporting property rights and can contribute to broad political stability though information sharing and reducing intra-coalition conflict over contentions monetary policy. We explain below our arguments.

First and foremost, reforms aimed at increasing the independence of the central bank ought to increase the confidence of credit rating agencies that domestic prices will be stable into the future. Most of the reasons behind the central bank reforms rest with domestic conditions, starting most prominently with CBI solving the time inconsistency problem faced by governments in monetary policy (Kydland and Prescott 1977, Barro and Gordon 1983, Rogoff 1985).[9] Time inconsistency emerges because governments have incentives to generate economic growth through surprise inflation. With rational expectations, however, this increased inflation does not translate into more economic growth or employment. Governments then lack a credible commitment to price stability and delegate monetary policy to an independent central bank. A large body of evidence shows that CBI is indeed associated with low and stable inflation in developed countries (Cukierman et al. 1992, Grilli et al. 1991) or countries with transparent political systems and multiple veto players (Keefer and Stasavage 2003, Broz 2002, Bodea and Hicks 2015)

The independence of the central bank, if credible, can also act as a deterrent of fiscal deficits and thus help credit rating agencies better anticipate the path of countries' debt.

[9] Additional domestic factors more checks and balances (Moser 1999); federal systems and party veto players (Hallerberg 2002); the presence of coalitions favoring price stability (Goodman 1991, Treisman 2000); and transparent political systems (Broz 2002).

Independent central banks that are focused on price stability also prefer budget discipline because of the long run connection between deficits and inflation. Such independent banks can pursue their fiscal policy preference through interest rate hikes and refusal to lend to the government. Fiscal choices are not part of central bank de jure mandates. Still, in industrial countries fiscal policy is the topic of 40% of high level talks between the central bank and the government (Moser-Boehm 2006). Also, central bank official communication on fiscal policy increases as a reaction to fiscal deficits, showing clear concern for fiscal policy (Allard et al. 2013). More directly, in 2011 the European Central Bank (ECB) used secret correspondence (that leaked to the press) to demand sweeping deficit cuts from Ireland, Italy and Spain. These and additional measures were required as a condition for the ECB buying from the market Italian and Spanish bonds to reduce the high interest rates markets demanded of these countries.[10] The early evidence on the connection between CBI and fiscal deficits is mixed (Grilli et al 1991, Leone 1991, Barnhart and Darrat 1987, Franseze 2002a, Burdekin and Laney 1988, Jonsson 1995), with more recent evidence showing that where the central bank can credibly focus on inflation, the bank also deters deficit spending (Bodea 2013, Bodea and Higashijima forthcoming).

Another key concern for credit rating agencies is predictable economic growth. Credible and independent central banks may also be able to anchor inflation expectations and allow policymakers to focus on stable economic growth. Such central banks will engage in fewer interest rate increases in reaction to short term bumps in inflation[11] and can also flexibly respond to output drops, without tick-ups in inflation (Adolph 2013, Siklos 2002). CBI should then be

[10] In a similar fashion, in 2009 Mervyn King (Bank of England Governor) delivered a speech at the traditional official Mansion House Dinner in which he took a controversially public position on the British government's fiscal position, noting that "fiscal policy too will have to change" to develop a "clear path to show how prospective deficits will be reduced" (Irwin, p. 234).

[11] Siklos (2002) shows that for several OECD autonomous central banks credibility affords lower interest rates (New Zealand, United Kingdom, Switzerland). More evidence is in Adolph (2013).

perceived by the investor community as increasing welfare and stability by generating sustainable economic growth in the absence of inflation (Blinder 1998).

Credit rating agencies may also view central bank reforms as a step in strengthening the domestic broad rule of law. We believe that the central bank can also emerge as a veto player with respect to property rights protection[12] and contribute to broad institutional stability. For example, during the eurozone debt crisis, Jean Claude Trichet was firmly against a Franco-German plan to make bond-holders take a loss in any future eurozone bailouts. Trichet's position was that "introducing the prospect of losses for creditors was shortsighted … essentially begging bond investors to shun government debt across the eurozone, making the need for bailouts self-fulfilling" (Irwin, p. 291). Also, in the latest Eurozone bailout, Cyprus imposed significant losses on large bank depositors. Following, Benoit Coeure, a member of the executive board of the European Central Bank explicitly favored secured property rights, rejecting the idea that depositors should fear their savings on grounds of Cyprus' unique circumstances.[13] More formally, Banaian and Luksetich (2001) show that countries with greater economic freedom, of which secure property rights is a key component, tend to have more independent central banks.[14] This is not direct evidence that CBI leads to less expropriation, yet central banks, if independent, can be part of what Elkins et al. (2006: 827) call "institutions and practices that are favorable to investors, transparent and predictable."

Finally, while CBI is important to macroeconomic steadiness, credit rating agencies have reason to appreciate bank independence for its potential contribution to political stability. Worsening political conditions are routinely cited as reasons for credit rating agencies to

[12] ECB, Eurogroup at odds over Cyprus rescue as a model", Associated Press 3-2-2013..
[13] Biglaier and Staats (2012) argue that broad respect for domestic rule of law is an theoretical indicator of the likelihood of sovereign debt repayment.
[14] Banaian and Luksetich (2008) argue that property right protection is a key determinant economic freedom, while other components of economic freedom indexes are rather expressions of such freedom.

downgrade particular countries. For example in 2014 Moody's downgraded Turkey's outlook from stable to negative citing "political risk" as one motivating factor. Similarly in 2013, Standard and Poor's cut Tunisia's foreign and domestic long term credit rating citing violence and political instability. Also on 2013, Fitch revised its outlook for the US's AAA credit rating given the political instability revealed by the bitter fight over raising the debt ceiling. Central bank independence is argued to alleviate the government's time inconsistency problem in monetary policy. Yet an independent central bank is also shown to be a reliable source of information about the government's policies and a reason for legislators and coalition partners with diverse preferences to favor delegation in the first place (Bernhard 1998, Crowe 2008). Very directly, Bernhard and Leblang (2002) provide evidence that CBI improves the durability of cabinets, especially for coalition governments and under conditions of macroeconomic openness.

Following our discussion, we hypothesize that: *Countries with more independent central banks will see better credit ratings. (H1)*

Central bank transparency

A second important feature of good central bank governance is their transparency. More transparent central banks have clear mandates, publish their macroeconomic forecasts, explain how they reach monetary policy decisions and give a sense of the deliberation around such decisions (Fry et al. 2000, Eijffinger and Geraats 2006, Eichengreen and Dincer 2010, Crowe and Meade 2008).[15] In the past ten years transparency as a feature of central banks has become more prevalent in both developed and developing countries (Eichengreen and Dincer 2010). Traditionally, central banks thrived in secrecy: In the times when central banks did commercial business, confidentiality was important to protect their advantages over competitors. As fiscal

[15] A complementary way to think about transparency is in terms of financial market reaction to monetary policy (Blinder et al. 2008)

agents to the government, central banks would protect sensitive information about public finances. However, increased independence from the direct control of politicians raises concerns over the need for the central bank to remain accountable, and whether, in the absence of public accountability central banks may have other principals.

We argue that transparency could be important to credit rating agencies' decisions because, similar to independence; it increases the predictability of monetary policy and demystifies to a bureaucracy that remains opaque even to the most experienced central bank watchers (Broz 2002, Bodea 2010). While CBI should allow central banks to decide on monetary policy without political interference, transparency is important because it provides information about how the central bank views the economy in the future and how monetary policy relates to the state of the economy. This increases the predictability of monetary policy reactions, and therefore the predictability of the business cycle and inflation. Emerging evidence shows that the ability of economic agents to anticipate the central bank's reaction function helps stabilize inflation expectations and prices (Eichengreen and Dincer 2010, van der Cruijsen and Demertzis 2007). Also, Stasavage (2003) shows that countries with more transparent central banks incur lower costs in terms economic growth when they try to lower inflation. Finally, transparency has the potential to clarify who is the principal of the central bank and, in this sense, reduces the potential for corruption and undue influence from interest groups.[16]

Following, we hypothesize that: *Countries with more transparent central banks will see better credit ratings. (H2)*

<u>Fire a central banker</u>

[16] Corruption is shown to reduce credit ratings (Depken, Lafountain, and Butters 2011). [Corruption and Creditworthiness: Evidence from Sovereign Credit Ratings – in Sovereign Debt: From Safety to Default]

The consequence of the global trend towards CBI is that governments have less reliable access to monetary policy, which is still perceived as a powerful means to influence the economy. Therefore, with all the legal reforms to insulate monetary policy from politicians, there is little dispute that CBI remains contested in the political arena (Beck 1984, Lohmann 1992, Lohmann 1998, Franzese 1999). Politicians can use subtle means to influence nominally independent central bankers. These include threats to change the law and working around the law through the process of appointment of central bank governors and boards. At other times politician's conflict with the central bank can take a more overt form. Central bank governors usually serve a fixed term in office and many will be replaced when their terms eventually expire. But many central bank laws do give a government the right to terminate the term of a governor early, and there are a significant number of abrupt and irregular firings of central bank governors.

We suggest that tensions in the relation between the central bank and the government, as reflected by abrupt changes in high level personnel at the central bank, raise concerns about macro-economic instability and doubts about countries prospects. Some of the early economics literature on CBI suggests that central bank governor turnover or, in other words, the premature firing of central bank governors, is a metric able to distinguish de facto central bank autonomy in developing countries (e.g., Cukierman et al. 1992). Long tenures, however, may be a result of both autonomy and the lack of it. For example, the sitting governor of the Central Bank of Romania has been in office for over two decades, during periods of de facto subservience to politics (in the 1990s) and relative autonomy (in the 2000s). Even more important, Dreher et al. (2008) show that central bankers lose their jobs for high inflation, which makes central bank governor turnover a poor indicator of de facto CBI. For our argument, we do not need to assume that job losses by central bank governors are related to government's interference with central bank independence or, to the contrary, to central banker's inability to deliver stable prices. The irregular firing of central bank

governors sends a more broad signal of conflict over macroeconomic policy and raises uncertainty over future policy choices, leading rating agencies to reevaluate countries' outlooks. .

Credit rating agencies may be especially sensitive to instability in the relationship between governments and central banks in developing countries. In such countries, markets might be on the lookout for institutional weaknesses and lack of credible commitment to repay debt. Given the non-negligible risk of default in developing countries, the irregular firing of central bankers has the potential to be a more important cue when credit rating agencies evaluate countries outside the OECD. Significant evidence exists that developing countries face more investor scrutiny. For example, Mosley (2003) and Sobel (1999) find that interest rates on sovereign debt in developing countries react to comparatively more indicators than in developed economies. Similarly, Gray (2013) argues that developing nations need to strive continuously to show their creditworthiness, while Wibbels (2006) finds that such countries have precarious access to international finance and remain largely unable to borrow during tough times. In such environments, the irregular firing of central bank officials might, then, be a critical piece of information, potentially trumping the effect of de jure central bank governance and reforms.

Following our discussion we hypothesize that: *The irregular turnover of central bank governors will be associated with lowered credit ratings. Irregular turnover is a stronger signal in developing countries. (H3)*

Data and variable operationalization

The dependent variable in this paper is the credit rating (either Moody's or Standard & Poor's) given to a country. The ratings given by the agency are of in form AAA, AA, A, BBB, etc. As is usual in empirical studies, we convert the ratings to a 16-point numeric scale where a higher number represents a better rating. Our initial source for the credit ratings is Beaulieu, Cox, and Saiegh (2012). Their data end in 2007 so we extend the data through 2013, though data

availability limits the years in the sample to 2010. Standard & Poor ratings were updated from its report "Sovereign Rating and Country T&C Assessment Histories" published in January 2014. The Moody's ratings were updated based on press releases available on their website. We add 430 observations to the Moody's ratings and 422 to the S&P ratings.

Independent variables

A key explanatory variable is a country's level of central bank independence, which we measure in a few ways. First, we use a country's legal independence. Despite the popularity of central bank independence measures, there have been few attempts to code independence annually, to directly identify the year of reforms, or even, beyond a handful of countries, to code new legislation of the last twenty years. Our data does exactly this.[17] We code the level of central bank independence based on the Cukierman et al. (1992) original index and identify reform years when the central bank law is amended and the CBI index increases for 78 countries for years 1973 to 2012. The CBI scores are based on a weighted calculation of 16 indicators in 4 categories regarding the Chief Executive Officer, Policy Formation, Objectives, and Limitations on Lending to the Government.[18] The overall CBI index ranges from 0 to 1, with 1 representing the most independent central bank. A bank has more legal independence when the governor's term in office is longer; the appointment and dismissal procedures are insulated from the government; when the bank's mandate is focused on price stability; when the formulation of monetary policy is in the hands of the central bank; and when the terms on central bank lending to the government are more restrictive. We include both a country's current level and independence and its 5-year average.

[17] Other work covers specific decades: For the 1990s see Polillo and Guillen (2005); For the 2000s see Dincer and Eichengreen (2013).
[18] We use the original Cukierman et al. (1992) weights to aggregate the CBI index, as shown in the appendix.

Credit rating agencies may also respond to institutional reforms to increase the independence of the central bank. That is, countries may receive a bump in their ratings when they institute reforms that keep the government out of economic policy. To test this, we include a variable equal to 1 if a country has reformed their central bank in the last 5 years. In the robustness section, we report on results when we vary the reform window from 3 to 6 years. A time window greater than just one year is necessary because legal CBI reform is a rare event.

For central bank transparency we use the measure of Eichengreen and Dincer (2010). As we explained, transparency is a relatively new innovation, so the measure only covers the years 1998 to 2010 and we lose many of the early years when using it. Values range from 1 to 14.5 with a mean of 6.3. More transparent central banks are more likely to: have a clear mandate; explain what data is relevant for their deliberations; disclose their macro-economic model for policy analysis; publish macroeconomic forecasts; have a rule for monetary policy; give account of deliberations; announces promptly decision on changes to instrument of policy (e.g. interest rate, explain changes and give a sense of future changes; relate policy outcomes to its mandated objectives. The correlation between transparency and independence is 0.11.

We use data on the regular and irregular turnover of central bank governors from Dreher, Sturm, and de Haan (2008) and the 2010 data update. Irregular turnover is an instance where the central bank governor leaves office before the expiration of his or her term. Regular turnover, on the other hand, happens when central bank governors end their term in office.

Control variables

A number of other political and economic variables are thought to influence a country's credit rating. As discussed above, a country's level of democracy is argued to have a large effect on credit ratings. More democratic countries receive better ratings. To control for this, we include a

country's Polity score in all models. In developing countries, a country may fix its exchange rate to signal monetary policy credibility. We include a dummy variable for a fixed exchange rate regime based on Ilzetzki, Reinhart, and Rogoff's coding of the IMF's official classification. We code an observation as having a fixed regime if it is coded as 1 under the IMF's coarse coding.[19] All other values are considered non-fixed regimes.

We include two variables to control for bad economic conditions. First, we include a dummy variable equal to 1 if a country defaulted in the current year.[20] As with the rating data, we start with Beaulieu, Cox, and Saiegh's data, updating it to cover more years and countries. First, we use the Reinhardt and Rogoff data to add countries not in the Beaulieu et al. sample. Second, we use S&P's "Sovereign Rating and Country T&C Assessment Histories" to identify instances where a country is listed as in default. For countries in neither source, we rely on other sources. When we restrict our sample to non-OECD countries, we also include a dummy variable equal to 1 if the country received an IMF package in the year. The data are taken from Dreher and Vreeland (2009).

We include a number of variables to measure a country's past economic fundamentals. All models include lagged trade openness (imports plus exports divided by GDP), lagged GDP growth, the lagged log of GDP per capita, the lagged logged value of GDP (in constant dollars), and the lagged logged of inflation; all five variables are from the World Bank's *World Development Indicators*. We also use a lagged indicator of a country's fiscal balance. This is the budget deficit/surplus relative to GDP (IMF IFS, EBRD transitional reports, OECD statistics, Brender & Drazen 2005 and Hyde & O'Mahoney 2010). Additionally, we include a measure of capital

[19] The four types of regimes are "no separate legal tender," "pre-announced peg or currency board arrangement," "pre-announced horizontal band that is narrower than or equal to +/-2%" and "de facto peg."
[20] Alternatively, we code the years since default, with no change in our results.

account openness from Chinn and Ito (2008). Values range from -1.85 to 2.5 with larger numbers indicating more openness.

Estimation method

All models are run with random effects and include the lagged dependent variable. The previous year rating has a very sizable effect on the current year's value. In some countries, there is no change or very little change in ratings over time. Without a lagged dependent variable, each observation is treated independently and there is no temporal dynamic. Including the lag slightly changes the question. We are now asking about changes in ratings. In addition to the ratings measure, both Polity and CBI are slow-moving. This makes fixed effects estimation less useful. Finally, we cluster the standard errors in all models by country.

Results and discussion

We present our results in 4 tables. The first table shows models using our legal central bank independence measure. The second table shows models using the informal measure independence based on irregular central bank governor turnover. Table 3 uses our measure of whether the central bank has been reformed in the last 5 years. Finally, table 4 includes the transparency measure. All central bank measures are contemporaneous rather than lagged.

Table 1 shows mixed results for the legal measure of CBI. The first four models present models using the full sample of countries while models 5 to 8 restrict the sample to non-OECD countries. For the full sample of countries legal CBI has a positive and significant effect on ratings. These results hold whether we use the contemporaneous CBI level or the 5-year CBI average. The inclusion of the lagged dependent variable means that the coefficients on the other variables show the effect on the change in the dependent variable. Moving from the 10th to the 90th percentile of CBI suggests an improved credit rating of about a quarter of a point. The

control variables behave largely as expected. Openness, GDP growth, GDP per capita, GDP, and fiscal balance all have positive and significant effects on a country's ratings. Default has a negative and significant effect. Polity has a marginal significant effect in 3 of the 4 models using the full sample of countries.[21] Fixed exchange rates have a positive but largely marginally significant effect on ratings.

In the models restricted to non-OECD countries we also include a dichotomous variable for an IMF loan. Asking the IMF for a loan may affect a country's credit rating as much as a default. It does have a negative and significant effect on credit ratings across all models. There are few changes in the other control variables. Fiscal balance and GDP growth are less important. Fiscal balance is never significant and GDP growth is marginally significant in models 6 and 8. On the other hand, the effect of a fixed exchange rate is stronger in non-OECD countries, perhaps reflecting a stronger commitment mechanism. Central bank independence is significant in only the 2 models using the Standard & Poor rating. The size of the effect is similar as before.

In Table 2, we include the irregular turnover of governors alongside CBI.[22] Irregular turnover has a negative and significant effect in both the full sample and the non-OECD sample. Irregular turnover will reduce the rating by between 0.4 and 0.7 points. We include a country's legal CBI in these models. It is positive and significant in the full sample of countries, perhaps offsetting the effect of irregular turnover a bit. It is not significant in non-OECD countries.

In Table 3 we include a dummy variable equal to 1 if the country has reformed their central bank in the last five years. The results are mixed. Central bank reform has a positive and

[21] Beaulieu, Cox, and Saiegh normalize the ratings and use a selection model. When we ran selection models included the lagged dependent variable, the test that the equations were independent was not rejected.
[22] While they are often seen as substitutes, the correlation between the two measures is very low. Excluding legal independence from the models does not change the results for irregular turnover.

significant impact on a country's Moody rating but no effect on the S&P rating. The effect is relatively small as well: reform will increase the rating by only about 0.13 points.

Finally, we examine whether central bank transparency influences ratings. Transparency may not have much of an effect in developing countries for reasons stated above. If there is concern that governments in developing countries will cheat, then raters may look to more behavioral measures, such as irregular turnover. These expectations are largely met. In our full sample of countries, transparency has a positive and significant effect on ratings. Moving from the 10th percentile of transparency (2.5) to the 90th (10.5) will increase a country's rating by more than a quarter of a point. Perhaps because of the reduced sample size, GDP growth and GDP lose significance. Defaults no longer affect the S&P ratings and an IMF loan also loses significance in the S&P model for non-OECD countries. Transparency also has no effect in the non-OECD sample.

Robustness.

In table 5 we use the Institutional Investor rating as a dependent variable. The Institutional Investor rating has a larger number of countries. They do not rate only the countries that ask for a rating. We restrict the sample to non-OECD countries and include our different measures of central bank independence separately. As before, we do not find much of an effect of legal independence. The reform variable is positive and significant; reforming the bank in the last 5 years increases a country's rating. Irregular turnover has a negative and significant effect on the rating, as expected. Finally, the regular turnover of central bank governors has no effect on the rating, as expected. In these models the other control variables behave as expected: Polity has a positive and significant impact and an IMF loan or a default have negative and significant

effects. Openness and our GDP measures (growth, GDP per capita, and logged GDP) all have positive and significant effects as well.

Second, we examine whether our findings are robust to the inclusion of additional control variables: external debt as a percentage of GDP, partisanship, and elections. Including external debt does not impact the effect of irregular turnover of central bank governors; it remains significant. Legal CBI is also significant when external debt is included for both the full sample and non-OECD countries and for both S&P and Moody ratings. Neither transparency nor central bank reforms is significant though. External debt itself is generally significant and negative. Neither elections nor dummies for the partisanship of the executive have any impact on the ratings. Their inclusion does not affect our measures of central bank independence either.

As an additional test, we ranged the reform variable window from 3 years to 6 years. Reform continues to have a significant effect on the Moody's ratings for each of these periods, in both the OECD and non-OECD sample. The 4-year reform measure also has a significant effect on our new S&P rating variable (in the full and non-OECD sample). The 6-year reform measure is significant across all models.

Bealieu, Cox, and Saiegh argue that access to credit ratings is also important and run models for selection into the ratings, i.e. modeling countries' access to credit in the first stage and the rating in the second stage. Their excluded variable are decade fixed effects and a variable measuring a country's exports to the United States. Neither inflation nor capital controls have a significant effect in our models. Thus, we use these two variables and the decade variable as the excluded variables. If we include the lagged dependent variable in the second stage, we cannot reject the null hypothesis that the equations are independent, implying that selection is not a threat to our inferences so far.

Finally, is it the institutions associated with greater central bank independence or the economic aspects that are driving the association between CBI and rankings? That is, are raters looking at the political aspects of central bank independence and the fact that the central bank can make decisions without political pressure? Or do they focus more on the fact that many central bank laws now limit the financing a bank can provide to the government? Obviously, both measures will be correlated with the overall CBI measure. But the correlation between the political and economic aspects of CBI is not very high—it is only 0.61 in non-OECD countries—so there is some variation across countries.[23] Included separately, both aspects are significant for the full sample of countries, as was the overall legal measure. When we restrict the countries to non-OECD ones, however, we find the financial aspects to be insignificant, though positive. The political aspects, on the other hand, are positive and significant. Thus, it may be that rating agencies are more interested in the quality of the institutions than in whether the central bank is restricted from financing the government.

Conclusion

The arguments for a political effect on ratings suggest that credibility of economic policy is important. When a government can tie its hand more strongly--either through democracy or political constraints or respect to the rule of law--its promises to pay back its debt are more believable and thus its credit rating should be higher. In this paper, we have focused on the effect of one such domestic institution that ties a government's hands--central bank independence. The more independent the central bank, the greater the commitment to price stability which should please investors and lead to higher credit ratings. We find pretty strong evidence that this is the case. Legal independence has an effect on credit ratings in our full sample, as does central bank

[23] Nevertheless, because of the correlation we enter the political and economic aspects into the models separately.

reform. Similar to the literature that finds that informal of CBI better explain behavior in non-OECD countries, we find that the irregular turnover of central bank governors is more important in non-OECD countries than is the legal independence.

Central bank independence has come with calls for more transparency. In developed countries there are fears that the financial sector is the real principal of central banks, while in developing nations there are fears of corruption. We find that transparency is important in our full sample, but it effect is statistically insignificant in non-OECD countries, signaling a concern that the governments of such countries may cheat, and thus, making behavioral measures more important.

What is left for further study is whether central bank independence has an effect itself or whether its effect is part of a more general commitment to neoliberal policies. This includes commitments that countries make in their trade policies through preferential trade agreements or investment practices through bilateral investment treaties.

Table 1: Effect of Legal CBI on Credit Agency Ratings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged Moody's	0.906***		0.905***		0.879***		0.878***	
	(0.016)		(0.015)		(0.018)		(0.018)	
Lagged S&P		0.918***		0.916***		0.866***		0.865***
		(0.017)		(0.017)		(0.027)		(0.027)
CBI	0.363**	0.277***			0.343	0.316*		
	(0.146)	(0.104)			(0.219)	(0.178)		
5-year CBI average			0.322**	0.252**			0.329	0.350*
			(0.129)	(0.098)			(0.226)	(0.191)
Polity	0.027*	0.041*	0.026	0.039*	0.026	0.029*	0.027	0.028*
	(0.016)	(0.022)	(0.016)	(0.022)	(0.017)	(0.015)	(0.017)	(0.015)
De jure XR	0.138*	0.139**	0.101*	0.100*	0.210**	0.252***	0.211**	0.251***
	(0.071)	(0.061)	(0.059)	(0.055)	(0.101)	(0.091)	(0.103)	(0.092)
Default	-0.568***	-0.501**	-0.574***	-0.500***	-0.556***	-0.561***	-0.557***	-0.562***
	(0.123)	(0.196)	(0.118)	(0.189)	(0.111)	(0.183)	(0.109)	(0.178)
IMF					-0.588***	-0.687**	-0.581***	-0.681**
					(0.164)	(0.268)	(0.164)	(0.267)
Lag openness	0.004***	0.003***	0.003***	0.003***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Lagged GDP growth	1.591*	2.977***	1.553*	2.937**	1.143	2.836*	1.091	2.801*
	(0.916)	(1.147)	(0.909)	(1.152)	(1.017)	(1.505)	(1.006)	(1.525)
Lag GDP pc	0.221***	0.198***	0.221***	0.201***	0.186***	0.180***	0.187***	0.180***
	(0.038)	(0.040)	(0.036)	(0.040)	(0.042)	(0.035)	(0.041)	(0.036)
Lag log GDP	0.086***	0.090***	0.077***	0.080***	0.118***	0.091**	0.117***	0.091**
	(0.028)	(0.032)	(0.027)	(0.030)	(0.039)	(0.039)	(0.041)	(0.040)
Fiscal balance	0.017**	0.017**	0.016**	0.016**	0.018	0.026	0.018	0.026
	(0.007)	(0.007)	(0.007)	(0.008)	(0.013)	(0.016)	(0.013)	(0.016)
Lag Cap. controls	0.016	-0.018	0.016	-0.019	0.023	-0.050	0.021	-0.053
	(0.026)	(0.031)	(0.025)	(0.031)	(0.030)	(0.042)	(0.030)	(0.042)
Lag log inflation	-0.037	-0.031	-0.036	-0.034	-0.024	-0.027	-0.021	-0.023
	(0.038)	(0.047)	(0.036)	(0.046)	(0.048)	(0.066)	(0.047)	(0.067)
_cons	22.872**	5.471	23.411**	7.687	7.095	-27.907	7.158	-26.782
	(9.219)	(10.643)	(9.236)	(10.347)	(18.746)	(21.285)	(19.995)	(20.758)
N	920	886	966	932	512	477	511	476
Countries	69	66	69	66	48	45	48	45

Note: year variable included but not shown to conserve space

Table 2: Effect of CB Governor Turnover of Credit Agency Ratings

	(9)	(10)	(11)	(12)
Lagged Moody's	0.909***		0.880***	
	(0.014)		(0.017)	
Lagged S&P		0.914***		0.860***
		(0.018)		(0.028)
CBI	0.284*	0.226**	0.198	0.238
	(0.150)	(0.100)	(0.242)	(0.189)
irregturnover	-0.587***	-0.411***	-0.736***	-0.481**
	(0.126)	(0.128)	(0.155)	(0.191)
Polity	0.026	0.036	0.021	0.026
	(0.025)	(0.022)	(0.024)	(0.016)
De jure XR	0.113*	0.133**	0.206**	0.253***
	(0.063)	(0.058)	(0.089)	(0.084)
IMF			-0.507***	-0.643**
			(0.165)	(0.271)
Default	-0.545***	-0.500***	-0.577***	-0.579***
	(0.113)	(0.187)	(0.113)	(0.178)
Lag openness	0.004***	0.003***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Lagged GDP growth	1.481	2.776***	1.192	2.676*
	(1.121)	(1.068)	(1.271)	(1.410)
Lag GDP pc	0.203***	0.203***	0.170***	0.185***
	(0.036)	(0.039)	(0.039)	(0.031)
Lag log GDP	0.069**	0.082***	0.077*	0.086**
	(0.028)	(0.031)	(0.044)	(0.039)
Fiscal balance	0.014**	0.016**	0.015	0.027*
	(0.007)	(0.007)	(0.014)	(0.016)
Lag Cap. controls	0.009	-0.016	0.003	-0.042
	(0.024)	(0.030)	(0.033)	(0.042)
Lag log inflation	-0.016	-0.030	-0.001	-0.028
	(0.040)	(0.048)	(0.051)	(0.068)
year	-0.012**	-0.005	-0.013	0.006
	(0.005)	(0.005)	(0.011)	(0.010)
_cons	20.310**	5.940	23.386	-14.881
	(9.366)	(10.402)	(21.720)	(20.285)
N	896	884	489	476
Countries	66	66	45	45

Table 3: Effect of Central Bank Reforms on Credit Agency Ratings

	(13)	(14)	(15)	(16)
Lagged Moody's	0.907***		0.882***	
	(0.015)		(0.018)	
Lagged S&P		0.918***		0.870***
		(0.017)		(0.027)
Reform (last 5-years)	0.130**	0.095	0.180**	0.128
	(0.065)	(0.059)	(0.087)	(0.078)
Polity	0.028*	0.042**	0.028*	0.033**
	(0.015)	(0.021)	(0.016)	(0.015)
De jure XR	0.120**	0.092*	0.222**	0.225**
	(0.055)	(0.052)	(0.099)	(0.093)
IMF			-0.576***	-0.691**
			(0.167)	(0.269)
Default	-0.583***	-0.511***	-0.558***	-0.561***
	(0.123)	(0.193)	(0.115)	(0.182)
Lag openness	0.003***	0.003***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Lagged GDP growth	1.656*	3.104***	1.140	2.828*
	(0.923)	(1.126)	(1.004)	(1.475)
Lag GDP pc	0.212***	0.189***	0.184***	0.177***
	(0.034)	(0.040)	(0.040)	(0.032)
Lag log GDP	0.073***	0.075**	0.117***	0.086**
	(0.025)	(0.029)	(0.036)	(0.037)
Fiscal balance	0.013*	0.015**	0.015	0.023
	(0.007)	(0.007)	(0.014)	(0.016)
Lag Cap. controls	0.023	-0.013	0.026	-0.042
	(0.024)	(0.030)	(0.029)	(0.044)
Lag log inflation	-0.042	-0.040	-0.032	-0.039
	(0.036)	(0.044)	(0.049)	(0.065)
year	-0.011***	-0.005	-0.001	0.015
	(0.004)	(0.005)	(0.009)	(0.009)
_cons	18.982**	6.044	-1.427	-33.056*
	(8.075)	(9.314)	(17.687)	(18.798)
N	1009	971	520	481
Countries	70	67	49	46

Table 4: Effect of Central Bank Transparency on Ratings

	(17)	(18)	(19)	(20)
Lagged Moody's	0.892***		0.873***	
	(0.022)		(0.029)	
Lagged S&P		0.890***		0.863***
		(0.026)		(0.036)
CB Transparency	0.043**	0.034*	0.027	0.027
	(0.022)	(0.019)	(0.029)	(0.024)
Polity	0.036	0.054	0.033	0.056
	(0.038)	(0.038)	(0.037)	(0.035)
De jure XR	0.252**	0.270***	0.266**	0.279**
	(0.101)	(0.104)	(0.122)	(0.123)
IMF			-0.433**	-0.196
			(0.196)	(0.193)
Default	-0.547***	-0.354	-0.592***	-0.385
	(0.178)	(0.227)	(0.211)	(0.250)
Lag openness	0.003**	0.003**	0.003**	0.004**
	(0.002)	(0.001)	(0.002)	(0.002)
Lagged GDP growth	1.986	2.548*	1.498	2.056
	(1.470)	(1.496)	(1.448)	(1.582)
Lag GDP pc	0.221***	0.252***	0.227***	0.264***
	(0.063)	(0.054)	(0.066)	(0.057)
Lag log GDP	0.072	0.066	0.067	0.043
	(0.050)	(0.042)	(0.068)	(0.050)
Fiscal balance	0.017	0.036**	0.012	0.047**
	(0.015)	(0.016)	(0.024)	(0.021)
Lag Cap. controls	-0.045	-0.117***	-0.046	-0.140***
	(0.048)	(0.036)	(0.053)	(0.044)
Lag log inflation	-0.045	-0.044	-0.057	-0.043
	(0.047)	(0.039)	(0.059)	(0.052)
year	0.022	0.028*	0.033	0.040*
	(0.020)	(0.015)	(0.032)	(0.022)
_cons	-47.364	-59.004**	-69.839	-82.940*
	(39.718)	(29.229)	(62.988)	(44.134)
N	407	407	320	320
Countries	51	51	41	41

Table 5: Institutional Investor ratings, non-OECD

	(21)	(22)	(23)	(24)
Lagged II rating	0.877***	0.879***	0.875***	0.875***
	(0.017)	(0.016)	(0.019)	(0.019)
CBI	0.913		0.653	0.795
	(0.804)		(0.865)	(0.838)
Reform (last 5-years)		0.522**		
		(0.237)		
Irregular turnover			-0.810***	
			(0.254)	
Regular turnover				-0.197
				(0.298)
Polity	0.102**	0.102***	0.072*	0.073*
	(0.041)	(0.036)	(0.042)	(0.042)
De jure XR	0.512	0.377	0.693**	0.681**
	(0.327)	(0.296)	(0.300)	(0.310)
IMF	-1.056***	-0.970***	-1.024***	-1.082***
	(0.325)	(0.313)	(0.326)	(0.320)
Default	-2.182***	-2.160***	-2.188***	-2.229***
	(0.386)	(0.352)	(0.425)	(0.424)
Lag openness	0.009**	0.009**	0.009**	0.010**
	(0.004)	(0.004)	(0.004)	(0.005)
Lagged GDP growth	25.959***	26.019***	29.957***	30.257***
	(4.472)	(3.932)	(3.872)	(3.957)
Lag GDP pc	0.440***	0.484***	0.449***	0.440***
	(0.155)	(0.142)	(0.152)	(0.152)
Lag log GDP	0.477***	0.440***	0.413***	0.425***
	(0.142)	(0.124)	(0.142)	(0.146)
Fiscal balance	0.032	0.035	0.031	0.026
	(0.033)	(0.034)	(0.030)	(0.030)
Lag Cap. controls	0.099	0.138	0.012	0.003
	(0.105)	(0.099)	(0.095)	(0.094)
Lag log inflation	-0.144	-0.116	-0.076	-0.099
	(0.117)	(0.106)	(0.118)	(0.116)
year	0.075***	0.081***	0.101***	0.104***
	(0.027)	(0.024)	(0.030)	(0.030)
_cons	-161.214***	-171.885***	-211.248***	-217.344***
	(53.780)	(46.561)	(59.025)	(59.263)
N	798	874	771	771
Countries	52	53	49	49

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