Why Do Politicians Implement Central Bank Independence Reforms?

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Abstract

This paper is a first empirical attempt to investigate why politicians around the world have chosen to give up power to independent central banks, thereby reducing their ability to fine-tune the economy. A new data-set covering 132 countries, of which 89 countries had implemented such reforms, was collected. Politicians in non-OECD countries were more likely to delegate power to independent central banks if their country has been characterized by a high variability in historical inflation and if they faced a high probability of being replaced. No such effects were found for OECD-countries.

Keywords: inflation; institutional reforms; monetary policy; time-inconsistency

JEL-codes: E52; E58; P48

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1 Introduction

Over the two last decades many countries, including New Zealand, Lesotho, England, Kazakhstan, Sweden and Chile, have implemented institutional reforms which granted their central banks more independence from the political process. It is something of a puzzle, however, that politicians choose to give up control over monetary policy when they knew that (at least in the short run) it can influence employment and production levels.

There are many possible theoretical explanations. It has been suggested, for example, that central bank independence (CBI) reforms occur in countries with high and persistent inflation (Rogoff, 1985); where price stability has already been achieved (Cukierman, 1994); where government debt is relatively high (Maxfield, 1997); where the political system is highly competitive (Cukierman, 1994); where the financial sector is relatively influential (Posen, 1993); and there are more possibilities (Eijffinger and de Haan, 1996; ch. 5, provides an overview).

However, the question why political politicians choose to delegate authority to central banks has (as far as we know) never been tested empirically. Previous empirical studies (de Haan and Van't Hag, 1995; Cukierman and Webb, 1995; de Haan and Siermann, 1996; Bagherei and Habib, 1998) instead used various CBI-indices to investigate what determined a given level (i.e., not a change) of independence. These studies can thus only explain cross-country differences, while the more interesting question, why politicians choose to implement CBI-reforms, remains unanswered.

The purpose of this paper is to study the determinants of CBI-reform

using a new data set that covers its possible occurrence in 132 countries, of which 89 had implemented such a reform during 1980-2005. Thus, the literature on the time-inconsistency of monetary policy (Kydland and Prescott, 1977; Barro and Gordon, 1983), together with Rogoff's (1985) suggestion that politicians should delegate power to a more inflation-averse central bank, seem to have been very influential.

It was found in this study that non-OECD countries with a history of high variability in inflation were more likely to implement CBI-reforms, suggesting that politicians in those countries have received a strong aversion to inflation and therefore implement CBI-reforms to establish credibility for a price stability rule. In addition, the likelihood of a CBI-reform seems to have increased when politicians in non-OECD countries faced a high probability of being replaced. No such effects were found for OECD-countries, implying that politicians in more industrialized countries do not feel a need to tie the hands of incoming governments and that the credibility of a low inflation goal can be achieved with other means. Finally, countries that were members of an economic cooperation organization seem to have been more likely to implement CBI-reforms if other countries in the organization recently had recently done so.

In the next section, possible determinants of CBI-reform are discussed. The data used are described in Section 3. Section 4 then describes the econometric specification, while the results are presented in Section 5. Finally, section 6 summarizes and draws conclusions.

2 Determinants of central bank independence reforms

It is commonly believed that CBI-reforms will reduce the inflationary bias of policy and make a low inflation rule credible. Kydland and Prescott's (1977) and Barro and Gordon's (1983) work on time inconsistency in monetary policy, together with Rogoff's (1985) suggestion that a more inflation-averse central bank can make a low inflation policy credible, constitute the theoretical rationale for this belief.

Empirical studies have also found a negative correlation between an index reflecting the degree of CBI and average inflation (e.g., Alesina, 1988; Grilli et al., 1991; Cukierman et al., 1992; Alesina and Summers, 1993; Jonsson, 1995; and Eijffinger et al., 1998). Alesina and Summers (1993) could also not find any correlation between CBI and unemployment, real economic growth, or real interest rates. As a result, there is a broad consensus that CBI improves the likelihood of achieving low inflation at no real economic cost.

According to the time-inconsistency theory, achievement of price stability cannot be explained by a commitment to central bank autonomy. If announcement of a CBI-reform were sufficient for achieving low inflation, then it would be optimal for politicians to violate the commitment once price stability was achieved (McCallum, 1997). Thus, time-inconsistency theory suggest that irreversible CBI-reforms (or reversible only with great difficulty) are implemented because politicians want to achieve low and stable inflation.

On the other hand, Cukierman (1994) suggested that CBI-reforms might be implemented to maintain low inflation, i.e., as a commitment against future incautious politicians. This implies that politicians implement CBI-reforms only when they have already achieved low inflation. And in fact, by comparing the implementation dates of CBI-reforms with long-term inflation trends for 29 OECD-countries, Daunfeldt and de Luna (2008) found that price stability had been achieved in most countries before their central banks became more independent.

According to the time-inconsistency model of monetary policy, the benefit of surprise inflation is directly related to the gap between politicians desired unemployment rate and the natural rate of unemployment. Thus CBI-reform would be more valuable when the natural rate of unemployment is high (Cukeriman, 1994; Eijffinger and Schaling, 1995).

It has been suggested, moreover, that CBI-reforms have been implemented, especially in less-developed countries, to signal creditworthiness to foreign investors (Maxfield, 1997). Many less-developed countries have problems with high debt-ratios. Delegation of monetary policy to an independent central bank may then signal creditworthiness. The International Monetary Fund (IMF) can also demand more CBI as a prerequisite for obtaining funds. Maxfield (1997) presents some descriptive results indicating that CBI-reforms have in fact been implemented in developing countries to signal creditworthiness.

Political factors may also influence the decision to delegate power to independent central banks. According to Cukierman (1994), politically instable countries are less likely to implement CBI-reforms. When irregular changes

of government due to revolution, coup d´etat, etc, occur often, politicians are mainly concerned with their own survival. On the other hand, when they fear that they might lose power in the next election, CBI-reforms might be implemented to limit the power of the incoming government. In addition, Moser (1994) presented some evidence that central banks in countries with extensive checks and balances were more independent.

Posen (1993) argued that the observed negative correlation between CBI-indices and inflation was not causal, because both were determined by financial opposition to inflation, suggesting that CBI-reforms had been implemented in countries where the financial sector was more influential. Similarly, CBI-reforms are more likely in countries where public opposition to inflation is strong. Posen (1993), Forder (1996), and Hayo (1998) have all argued that CBI and commitment to low inflation are jointly determined by social attitudes, i.e., that CBI is endogenous. This suggests that politicians in countries characterized by a high variability in historical inflation might have created a strong aversion against inflation (Hayo, 1998) and therefore implemented institutional reforms that delegates power to independent central bankers. Thus, independent central banks are successful in implementing low and stable inflation merely because their independence reflects a social attitude that supports low inflation.

3 Data

The dependent variable in our empirical analysis is a qualitative variable indicating whether a CBI-reform was implemented in a particular year. How-

ever, implementation years of CBI-reforms are not readily available anywhere. Therefore, to obtain the dates, all (162) central banks listed in Morgan Stanley's *Central Bank Directory 2004* were asked by e-mail: (i) Has your country implemented any institutional reforms that grant your central bank more independence from elected policymakers? (ii) If yes, when? (iii) Where can we find more information about this?

Our study focused on a change towards more CBI, without regard to the magnitude of the reform. We consider all legal reforms that reduced the influence of politicians on monetary policy making as CBI-reforms, whereas a mere statement that price stability is the only goal of monetary policy was not regarded as sufficient. We included legal reforms that safe-guard the low inflation goal in the legislation; reduce the possibility for government to override central bank decisions on operating targets; reduce governments opportunities to use central bank credits to finance budget deficits; reduce the possibility of dismissing central bank governors or increasing their term in office or their numbers; and so on.

95 central banks (59%) finally answered the questionnaire. In a formal analysis of the response rate (with a simple probit model), the probability of response is increased in GDP and was lower for Asian, South American and African countries compared to Australian, European, and North American countries (statistically significant results at conventional levels). The country's inflation rate did not seem to affect the probability of response.[1]

Other sources (e.g., central bank publications, legislative acts, and sci-

[1] The analysis was hampered by lack of data, especially for the countries that did not respond to the e-mail questionnaire.

entific articles) were used to validate the e-mail answers and to obtain the dates of CBI-reforms for countries that did not respond. The final sample consists of 132 countries (81% of those initially contacted), of which 89 had implemented CBI-reforms. Table A1 (in the Appendix) lists the countries for which information on CBI-reforms is still missing; whereas Table A2 (in the Appendix) lists the dates when CBI-reforms occurred and sources that were used to verify them.

Figure 1 shows the time trend of adoption of CBI-reforms around the world during 1980-2005. New Zealand is often considered the first country to implement CBI-reform with its 1989 Reserve Bank Act, which substantially reduced politicians ability to produce surprise inflation.[2] New Zealand was soon followed by Belize, El Salvador, Hungary and Uganda in 1991. The peak of the movement was perhaps in 1998 when eleven countries launched CBI-reforms.

- Figure 1 About Here -

Figures 2 and 3 show the frequencies of CBI-reform for OECD and non-OECD countries. In the OECD countries, CBI-reforms started in 1989 (New Zealand) and peaked in 1998, with reforms in nine European countries. Most were prospective members of the ESCB (European System of Central Banks), for whom the Maastricht Treaty required their central banks to be independent before the ESCB's establishment date. Other more recent prospective members of the European Monetary Union (e.g., Czech Republic and Poland) have also implemented CBI-reforms.

[2] Evans et al. (1996), Silverstone et al. (1996), and Daunfeldt and de Luna (2001) provide more information on the regime shift in New Zealand.

- Figure 2 About Here -

Non-OECD countries (Figure 3) were the first to implement CBI-reforms, with many in the early 1990s, mostly in South-America, peaking in 1995, with five there, one in Asia, one in Africa and one in Europe. A second-wave of non-OECD CBI-reforms started in 2002, mostly in Asia and Africa**.**

- Figure 3 About Here -

In the empirical study the reform year is indicated by one, when that series was terminated, and all previous years are indicated with zeros. This is done in order to avoid explaining the period after the CBI reform. Table 1 shows the frequency of CBI-reform and non-reform for the full, OECD, and non-OECD samples.

-Table 1 About Here -

We control for both economic characteristics, political factors, and geographical determinants in the analysis.

Economic characteristics are the level and variability of inflation, measured by the annualized percentage change in consumer prices, from *IMF Financial Statistics*; unemployment rates, obtained from the *International Labor Organization (ILO)*; gross domestic product per capita (GDP) in US dollars and the use of fund and credits from the International Monetary Fund, both from the World Bank's *World Development Indicators*; and total debt services (%)[3], from the World Bank's *Global Development Finance.*

[3] The sum of principal repayments and interest actually paid in foreign currency, goods, or services on long-term debt, interest paid on short-term debt,and repayments (repurchases and charges) to the IMF, as a percentage of exports of goods services and income. The variable is obtained from the Quality of Government Dataset (Teorell et al., 2009).

In addition, the strength of the financial sector is measured by liquid liabilities as a percentage of GDP, using data from the *World Bank* (Beck et al., 1999).[4] All the economic variables are lagged one period to avoid endogenity problems.[5]

Political factors used in the analysis are political fragmentation in the parliament and whether the country is a federation or not, both from Lundell and Karvonen's (2003) *Comparative Data Set on Political Institutions*[6], and the number of coups in previous periods from the *Coup Data Codebook* (Marshall and Marshall, 2007).

The simple use of implementation dates for CBI-reforms neglects the degree of previous CBI. For example, CBI-reforms in some countries might predate the study period. Therefore, the CBI-index developed by Cukierman et al. (1992) is used to analyze whether CBI-reform (or not) depends on the initial level of CBI. Finally, geographical determinants used are the number of CBI-reforms in the previous period in the same economic cooperation organization: the European Union (EU), the African Economic Community (AEC), the Asia-Pacific Economic Cooperation (APEC), or the Latin American Free Trade Association (LAFTA).

A problem when working with macro-data for the many countries considered here is missing data. Table 2 shows the number of missing observations

[4] Liquid liabilities include currency as well as demand and interest-bearing accounts of banks and other financial intermediaries.

[5] We also tried lagging all the economic variables two or three periods, but all qualitative results remained the same. The results are available from the authors upon request.

[6] The purpose of the data set is to gather information on political institutions around the world since 1960. The data is compiled at the Department of Political Science, Åbo Akademi, in collaboration with Professor Torsten Persson at the Institute of International Economic Studies, Stockholm University.

in the full, OECD, and non-OECD samples. The problem is largest for the non-OECD sample, especially for unemployment, political fragmentation, federation, and the presence of coups. For the OECD sample the problem is largest for liquid assets and total debt, and for the full sample for unemployment and total debt.

-Table 2 About Here -

Since missing data (if not random) can obscure the results, multiple imputation (see e.g., Graham et al., 2003) is used as replacement method. Multiple imputation has been shown to produce unbiased parameter estimates which reflect the uncertainty associated with the missing observations. The method has further been shown to provide adequate results in presence of high rates of missing data (Schafer and Graham, 2002). An iterative Markov chain Monte Carlo method is used to impute missing observations and 5 data sets are created. The empirical analysis is then performed on each of the data sets and the estimation results for each are later combined, using the rules established by Rubin (1987), to produce one set of estimation results. The means and standard deviations for all variables (with imputed values) averaged over the 5 data sets are shown in Table 3. The variables are further discussed in the next section.

- Table 3 About Here -

4 Empirical model

To investigate why politicians choose to implement CBI-reforms, we define the unobserved latent reform pressure in country $i = 1, 2, ..., n$ in year $t = 1, 2, ..., T$ as

$$y_{it}^{*} = \boldsymbol{\theta}_{j}^{\prime}\mathbf{X}_{it} + \boldsymbol{\lambda}_{k}^{\prime}\mathbf{Z}_{it} + \varepsilon_{it},$$

where $\mathbf{X}_{it}$ and $\mathbf{Z}_{it}$ are vectors of economic and political variables, respectively, assumed to affect reform pressure, while $\boldsymbol{\theta}_{j}^{\prime}$ and $\boldsymbol{\lambda}_{k}^{\prime}$ are the corresponding parameter vectors. The error term is specified as $\varepsilon_{it} = \mu_i + \eta_{it}$, where μ_i denotes country specific unobservable effects and η_{it} is a random error. In the specification of a probit random-effects model, as here, it is assumed that $\eta_{it} \sim IN(0, \sigma_{\eta}^{2})$.[7] Reform pressure can only be observed in dichotomous form, i.e., via the observed reform decision

$$y_{it} = \begin{cases} 1, \ y_{it}^{*} \geq 0 \ (if \ reform) \\ 0, \ y_{it}^{*} < 0 \ (if \ no \ reform) \end{cases}$$

The parameters of the model are estimated by noting that the distribution of y_{it}^{*} conditional on μ_i is independent normal (Heckman, 1981). Thus

$$\Pr(y_{it} = 1 | \mu_i, \mathbf{X}_{it}, \mathbf{Z}_{it}) = \Pr(\frac{\eta_{it}}{\sigma_{\eta}} > \frac{-\boldsymbol{\theta}_{j}^{\prime}\mathbf{X}_{it} - \boldsymbol{\lambda}_{k}^{\prime}\mathbf{Z}_{it} - \mu_i}{\sigma_{\eta}}) = \Phi(z_{it}),$$

where

$$z_{it} = -(\boldsymbol{\theta}_{j}^{\prime}\mathbf{X}_{it} + \boldsymbol{\lambda}_{k}^{\prime}\mathbf{Z}_{it} + \mu_i)/\sigma_{\eta},$$

[7] Fixed and random-effects Logit models, as well as linear probability models with random effects, gave similar results.

and Φ is the distribution function for a standard normal variate.

Domestic inflation is included in the vector of economic explanatory variables, $\mathbf{X}_{it}$, to study whether CBI-reforms are more likely in countries with high inflation (Kydland and Prescott, 1977; Barro and Gordon, 1983; Rogoff, 1985), in which case we expect a positive effect; or in countries that have already achieved low inflation (Cukierman, 1994), in which case we expect a negative effect.

In addition to the level of previous inflation, a history of high inflation variability might lead to an anti-inflation culture that induces the politicians to implement CBI-reforms (Hayo, 1998). To account for historical volatility in inflation in country i, without loosing too many observations, the historical variance at time t is calculated as $\sigma_{it}^2 = 1/(t-1)\sum_{j=2}^{t}(Inflation_{ij-1} - \overline{Inflation_{ij-1}})^2$. Thus, the number of observations used in the calculation of the mean inflation, $\overline{Inflation_{ij-1}}$, and the variance, σ_{it}^2, increases for each successive observation, i.e. $\sigma_{i,1985}^2$ is based on the observations from 1980-1984 while $\sigma_{i,1990}^2$ is based on the observations from 1980-1989.

Unemployment is included to study whether a high natural rate of unemployment makes surprise inflation more beneficial and thereby reduces the likelihood of a CBI-reform, or whether it instead strengthens the need for a CBI-reform.[8]

Total debt services and the use of funds and credits from the IMF are use to study whether countries with high debt-ratio might be "forced" to implement CBI-reforms in order to signal creditworthiness to foreign investors.

[8] Actual unemployment tends to follow the natural rate of unemployment (Elmeskov, 1994) and is, therefore, used as a proxy.

Political instability is assumed to reduce the probability of CBI-reform, and is therefore proxied with an exponential weighted moving average (EWMA, 20 years) of the number of coups in the country. The weights for successive past observations in the moving average were calculated as $(1-\lambda)\lambda^0$, $(1-\lambda)\lambda^1, (1-\lambda)\lambda^2, ...$, where λ is 0.75.[9]

Political fragmentation, measured by Rae's index of party fractionalization in the parliament, is also included in the vector of political variables, $\mathbf{Z}_{it}$, to study whether more fragmented countries are more likely to implement CBI-reform. A value of zero would indicate that one party had all seats in parliament, whereas a value of 10,000 would indicate that each party had only one seat.

Federation, a dummy variable taking the values one or zero, is included to study whether countries practicing fiscal federalism are more likely to implement CBI-reform. Liquid assets, a proxy for the strength of the financial sector, is included to study whether countries with a strong financial sector are more likely to implement CBI-reform. The CBI-index, a measure of pre-existing CBI, is included to study whether countries with high independence were less likely to implement further CBI-reform.

Finally, in order to control for geographical effects, the number of CBI-reforms in period $t-1$ in the same economic cooperation organization was included.

[9] The values $\lambda = 0.94$, and $\lambda = 0.5$ gave similar results.

5 Results

The combined estimation results (combined over the 5 imputed data sets) for the random-effects probit models are displayed in Table 4. In the full sample, countries with a historically high inflation variability and a high degree of political fragmentation in the parliament were more likely than others to implement CBI-reforms, at 5% levels of significance. However, when the sample was divided into OECD and non-OECD countries, these results seem driven by the later group of countries.

Table 4 About Here

The results indicate that politicians in non-OECD countries implement CBI-reforms when their country has a history of high variable inflation. This supports Hayo's (1998) claim that CBI is related to an historical feedback process, suggesting that CBI-reforms are implemented because a high historical inflation variability creates stronger preferences for lower inflation. No such effect was present for OECD-countries. This might indicate that the credibility of a low inflation goal can be achieved without CBI-reforms in more industrialized countries, thereby reducing the need for a CBI-reform to achieve stable inflation.

Contrary to prevailing theories of the effect of inflation on CBI-reforms, the estimated inflation level parameter is not statistically significant for any of the samples.[10] In fact, no other economic variable is statistically significant at any conventional significance level for the full sample. Note, however,

[10] Different lag structures for the inflation variable (2 to 5 periods) were also tested, but rendered insignificant results.

that CBI-reforms might be implemented when inflation is high in order to achieve price stability or when inflation is low to maintain price stability. The likelihood of implementing a CBI-reforms can thus be influenced by both hypotheses, thereby canceling out any significant effects of inflation on the decision to implement CBI-reforms.

Highly political fragmented non-OECD countries (but not OECD countries) were more likely to implement CBI-reforms, perhaps by politicians afraid that they will be replaced, and eager to tie the hands of incoming governments. The frequency of coups did not seem to influence the occurrence of CBI-reforms. However, the number of CBI-reforms in the same economic cooperation organization in the previous period seemed to increase the likelihood of reform, generating geographical clustering in time.

A likelihood ratio test for the models, estimated on each of the samples, was used to assess overall performance (against a constant only specification). The LR-statistics (with 12 d.f.) averaged over the 5 imputed samples were 37.20, 15.19 and 27.95 for the full, OECD, and non-OECD samples, respectively, indicating that the estimated models are significant at conventional levels for the full sample and the non-OECD sample. Analysis of the generalized residuals (based on Gourieroux et al., 1987) for each model showed no residual autocorrelation. The total variance of the point estimates is composed of two components; the natural variability in the data (the within-imputation variability) and the uncertainty introduced by missing data (the between-imputation variability). The second component reflects how the point estimates vary between the 5 imputed samples. On average the missing data contributed to the total variance of the point estimates

with 14, 8, and 17 percent for the full, OECD, and non-OECD samples. Table 4 reports the contribution to the total variance for the point estimates due to missing data for each of the variables.

6 Summary and conclusions

It is something of a puzzle that politicians in many countries have recently implemented CBI-reforms, thereby reducing their ability to fine-tune the economy. This paper is a first empirical attempt to investigate why they would do so.

The lack of compiled data on the occurrence of CBI-reforms is probably why no previous study has investigated this question. Therefore, we collected and analyzed data on the possible occurrence of CBI-reform during 1980-2005 in 132 countries, 89 of which (67%) had implemented such a reform. Hence, CBI-reform seems to be a major recent trend, illustrating the influence of the time-inconsistency literature on policy outcomes around the world.

To investigate why politicians implement CBI-reforms, a random-effects probit regression model was estimated. It was found that politicians in non-OECD countries were more likely to formally grant their central bank greater independence if their country had a history of high inflation variability. This might indicate that politicians aversion against inflation have increased during the periods of high inflation variability and that CBI-reforms are implemented as a consequence of changed preferences. No such effect was found for OECD-countries, implying that they might be able to establish

credibility for a price stability rule with other means.

It was also found that politically fragmented non-OECD countries were more likely to implement CBI-reforms. This could indicate that the fear of losing power induced politicians to delegate power to independent central banks.

Finally, the likelihood of CBI-reform increased if other countries in the same economic cooperation organization had recently implemented such reform.

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Table 1: Frequencies of dependent variable for 132 countires, 1980-2005.

	Full sample	OECD	Non-OECD
No CBI-reform in observation year	2719	554	2165
CBI-reform in observation year	89	26	63
Total	2808	580	2228

Table 2: Number of missing observations for independent variables, 1980-2005.

	Full sample		OECD		Non-OECD	
	Missing	Percent	Missing	Percent	Missing	Percent
Inflation	331	12%	14	2%	317	14%
GDP per capita	387	14%	33	6%	354	16%
Unemployment	1608	57%	99	17%	1509	68%
Liquid assets	962	34%	261	45%	701	31%
Total debt	1302	46%	519	89%	783	35%
Use of funds and credits	283	10%	0	0%	283	13%
Political fragmentation	1121	40%	50	9%	1071	48%
Federation	1154	41%	0	0%	1154	52%
Coups	1000	36%	43	7%	957	43%

Table 3: Descriptive statistics, 1980-2005

	Full sample		OECD		Non-OECD	
Variable	Mean	s.d.	Mean	s.d.	Mean	s.d.
Inflation	25.91	73.84	12.32	33.20	29.44	80.77
GDP per capita	6465	8188	17310	9275	3642	4851
Unemployment	8.27	4.84	7.24	4.26	8.54	4.95
Liquid assets	0.47	0.31	0.60	0.35	0.43	0.29
Total debt	18.83	13.86	21.09	12.42	18.24	14.14
Pol fragmentation	5591	2176	5316	2256	6651	1399
Federation	0.21	0.32	0.27	0.44	0.20	0.23
Coups	0.25	0.57	0.10	0.36	0.29	0.61
CBI index	35.39	8.19	36.92	15.11	34.99	4.95
Number CBI-reforms	0.18	0.62	0.25	0.80	0.16	0.56
Number of obs.		2808		580		2228
Number of countries		132		30		102

Table 4: Probit estimates regarding the determinants of CBI-reform, 1980-2005

	All countries			OECD			Non-OECD		
Variable	Estimate	z-value	%	Estimate	z-value	%	Estimate	z-value	%
Constant	-2.28	-6.86	15	-2.16	-2.80	1	-2.76	-5.47	9
Inflation (L)	-0.012	-1.19	24	-0.067	-0.94	22	-0.012	-1.08	27
Inflation variability	0.002	2.34	7	0.001	0.31	1	0.001	2.12	2
GDP per capita (L)	0.005	0.73	15	-0.007	-0.42	11	-0.006	-0.31	39
Unemployment (L)	0.006	0.50	17	0.010	0.37	6	0.004	0.32	25
Liquid assets (L)	0.013	0.06	25	0.26	0.70	23	-0.082	-0.26	43
Total debt (L)	0.010	0.27	24	-0.009	-0.085	32	0.011	0.28	14
Fund and credits (L)	0.36	1.58	33	11.86	1.68	5	0.35	1.57	30
Pol fragmentation	0.062	2.39	8	0.11	1.21	4	0.055	1.90	12
Federation (D)	-0.25	-1.36	10	-0.29	-0.83	1	-0.18	-0.80	14
Coups	-0.068	-0.67	1	-2.58	-1.48	1	-0.051	-0.58	2
CBI index	-0.002	-0.26	1	-0.008	-0.87	1	0.015	1.25	0
Nr. CBI-reforms (L)	0.20	3.83	0	0.16	1.78	0	0.22	3.31	0
Log L	-367.8			-95.2			-265.8		
Number of obs.	2669			545			2124		
Number of countries	132			30			102		

Note: (L) = lagged one period, (D) = dummy variable, % = percentage of total variation due to variation in point estimate between the 5 samples.

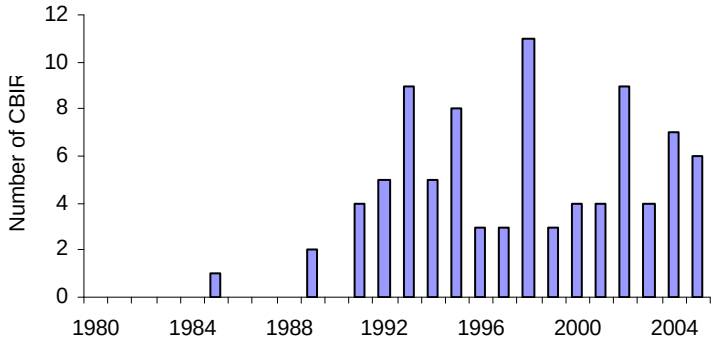

Figure 1: Number of central bank independence reforms for the full sample.

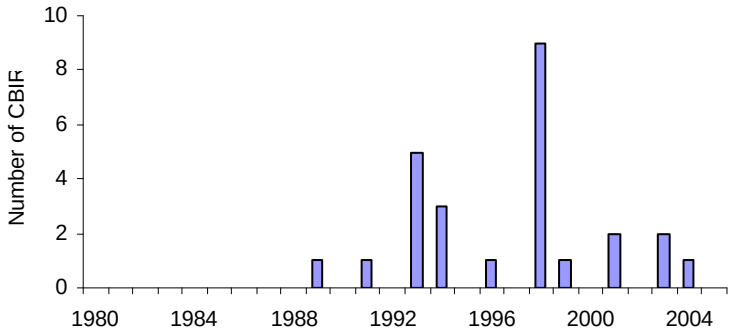

Figure 2: Number of central bank independence reforms in OECD countries.

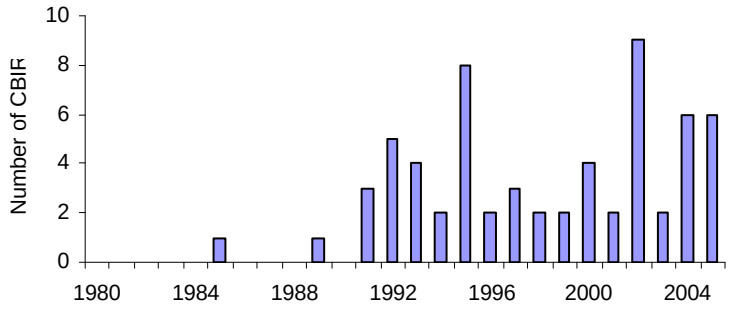

Figure 3: Number of central bank independence reforms in non-OECD countries.

Appendix

Table A1: Countries for which no information on CBI reforms was available

Country	Country	Country
Algeria	Liberia	Qatar
Angola	Libya	Rwanda
Armenia	Malawi	São Tomé and Príncipe
Congo	Mauritania	Saudi Arabia
Eritrea	Moldova	Senegal
Guinea	Morocco	Sierra Leone
Haiti	Mozambique	Taiwan
Hong Kong	Myanmar	Tajikistan
Kyrgyz Republic	Netherlands Antilles	Tonga
Lebanon	Panama	United Arab Emirates

Table A1: Year and sources of CBI-reform in 132 countries, 1980-2005

Country	Year	Sources
Afganisthan	2003	Law Da Afganisthan Bank (www.centralbank.gov.af), and e-mail correspondence
Albania	1998	Constitution of the Republic of Albania (Article 161), (www.bankofalbania.org)
Argentina	1992	BCAR's chapter reform, law 24.144 (www.bcar.gov.ar), and e-mail correspondence
Australia	1996	Statement on the conduct of monetary policy (www.rba.gov.au), Polillo and Gillen (2005), Acemoglu et al. (2008), Daunfeldt and de Luna (2008), and e-mail correspondence
Austria	1998	Nationalbankgesetz-Federal Law Gazette Part I No.161/2004 (www.oenb.at), and e-mail correspondence.
Azerbaijan	2004	Law of the Republic of Azerbaijan on the National Bank of the Republic of Azerbaijan (www.nba.az)
Bahamas	2000	Central Bank Act of the Bahamas 2000 (www.centralbankbahamas.com), and e-mail correspondence
Bahrain	None	e-mail correspondence
Bangladesh	None	www.bangladesh-bank.org
Barbados	None	www.centralbank.org.bb
Belarus	None	www.nbrb.by, and e-mail correspondence
Belgium	1999	Polillo and Gillen (2005), Acemoglu et al. (2008), and Daunfeldt and de Luna (2008)
Belize	None	www.centralbank.org.bz
Bhutan	None	www.rma.org.bt

Table A2 (Cont): Year and sources of possible CBI-reform in 132 countries, 1980-2005

Country	Year	Sources
Bolivia	1995	Jácome and Vazques (2005)
Bosnia	1997	Dvorsky (2004), cbbh.ba, and e-mail correspondence
Botswana	None	Bank of Botswana Act (www.bankofbotswana.bw)
Brazil	None	Ribeiro (2002)
Brunei	None	www.finance.gov.bn/bcb/bcb_index.htm, and e-mail correspondence.
Bulgaria	2005	Law on the Bulgarian National Bank (www.bnb.bg), and e-mail correspondence
Burundi	None	e-mail correspondence
Cambodia	None	www.imf.org/external/np/ms/2004/071504.htm
Canada	None	www.bankofcanada.ca/en/about/act_loi_boc_bdc.pdf, and e-mail correspondence
Cap Verde	None	www.bcv.cv
Cent. Af. States	None	www.beac.int
Chad	None	www.beac.int
Chile	1989	www.bcentral.cl/eng/funorg/organiclaw/, Jácome and Vazques (2005), and e-mail correspondence
China	None	Law of the People´s Bank of China (www.pbc.gov.cn/english)
Colombia	1992	www.banrep.gov.co/board_directors/bd_mission.htm, Jácome and Vazques (2005), and e-mail correspondence
Comoros	None	www.bancecom.com/bcc_home.php
Costa Rica	1995	Law No. 7558, Act of the Central Bank of Costa Rica (www.bccr.fi.cr), e-mail correspondence, and Jácome and Vazques (2005)
Croatia	2001	Dvorsky (2004), Law of the Croatian National Bank (www.hnb.hr), and e-mail correspondence

Table A2 (Cont): Year and sources of possible CBI-reform in 132 countries, 1980-2005

Country	Year	Sources
Cyprus	2002	Central Bank of Cyprus Law L138(I)/2002 (www.mof.gov.cy), and e-mail correspondence
Czech Republic	1993	Constitutional Court of the Czech Republic, Decision No. 278/2001 (www.cnb.cz), and e-mail correspondence
Denmark	None	www.nationalbanken.dk, and e-mail correspondence
Djibouti	2005	e-mail correspondence
Dominican Rep	2002	Jácome and Vázquez (2005)
Ecuador	1992	Jácome and Vázquez (2005)
Egypt	None	www.cbe.org.eg
El Salvador	1991	Organic Law of the Central Reserve Bank of El Salvador www.bcr.gob.sv/ingles/acerca/resenia.html), e-mail correspondence, and Jácome and Vázquez (2005)
Estonia	2004	Eesti Pank Act (www.legaltext.ee/text/en/X70022.htm), and e-mail correspondence
Ethiopia	None	www.nbe.gov.et
Fiji	None	www.reservebank.gov.fj, and e-mail correspondence
Finland	1998	The Act on the Bank of Finland (www.bof.fi), and e-mail correspondence
France	1993	www.banque-france.fr/gb/instit/histoire/histor5.htm, and e-mail correspondence
Gambia	2005	www.cbg.gm/pdf/strategic%20plan.pdf
Georgia	1995	Organic Law of Georgia on the National Bank of Georgia (www.nbg.gov.ge/nbg_new/about_the_bank/nbg_history.htm)
Germany	None	www.bundesbank.de, and e-mail correspondence
Ghana	None	www.bog.gov.gh/privatecontent/File/Secretarys/bog-act.pdf

Table A2 (Cont): Year and sources of possible CBI-reform in 132 countries, 1980-2005

Country	Year	Sources
Greece	1994	Law 2275, Articles 45 and 46 (www.bankofgreece.gr/en), Maxfield (1997), Panagioditis and Triampella (2006), and Acemoglu et al. (2008)
Guatemala	2002	Principales Leyes Bancarias y Financieras (www.banguat.gob.gt), and e-mail correspondence
Guyana	1998	The Bank of Guyana Act (www.bankofguyana.org.gy/legalregframewk.htm), and Jácome and Vázquez (2005)
Honduras	1996	Jácome and Vázquez (2005)
Hungary	1991	Act of the Magyar Nemzeti Bank (english.mnb.hu)
Iceland	2001	www.sedlabanki.is, and e-mail correspondence
India	None	Polillo and Guillen (2005), and Acemoglu et al. (2008)
Indonesia	1999	Central Bank Act, UU No. 23, 1999 (www.bi.go.id), Polillo and Guillen (2005), and Acemoglu et al. (2008)
Iran	2005	www.cbi.ir/default_en.aspx
Ireland	1998	Central Bank Act 1998 and convergence report (www.ecb.int/pub/pdf/conrep/cr1998en.pdf)
Israel	None	e-mail correspondence
Italy	1993	Legislative Decree 385, 1993 (www.bancaditalia.it), Polillo and Guillen (2005), and Acemoglu et al. (2008)
Jamaica	None	www.boj.org.jm/uploads/pdf/qmp_report/fqmp_report_october_december2003.pd, and Nelson-Fouglas (2004)
Japan	1998	www.boj.or.jp/en/type/exp/about/foboj.htm, and Werner (2003: ch 18)
Jordan	None	www.cbj.gov.jo/pages.php
Kazakhstan	2005	www.nationalbank.kz/cont/publish626681_1720.doc, and e-mail correspondence

Table A2 (Cont): Year and sources of possible CBI-reform in 132 countries, 1980-2005

Country	Year	Sources
Kenya	None	e-mail correspondence
Korea	1997	Polillo and Guillen (2005), and Acemoglu et al. (2008)
Kuwait	None	www.cbk.gov.kw/WWW/index.html
Lao	None	www.bol.gov.la/bollaw1.html, and e-mail correspondence
Latvia	2002	www.bank.lv/eng/main/lvbank/llb/), convergence report (www.ecb.int/pub/pdf/conrep/cr2004en.pdf), and e-mail correspondence
Lesotho	2000	www.centralbank.org.ls/about/default.htm), and e-mail correspondence
Lithuania	2001	Morgan Stanley (2004)
Luxemburg	1998	www.bcl.lu/en/bcl/index.html
Macedonia	2002	Dvorsky (2004)
Madagascar	1994	e-mail correspondence
Malaysia	1994	Arnone et al. (2007)
Maldives	None	e-mail correspondence
Malta	2002	www.centralbankmalta.com/site/about4a.html), and e-mail correspondence
Mauritius	2004	e-mail correspondence
Mexico	1994	Jácome and Vázquez (2005), and e-mail correspondence
Mongolia	1995	Slok (2002), and Polillo and Guillen (2005)
Namibia	2004	e-mail correspondence
Nepal	2002	www.nrb.org.np/index.htm, and e-mail correspondence
Netherlands	1998	www.dnb.nl/dnb/home/file/bankact1998_tcm13-36143.pdf, and e-mail correspondence

Table A2 (Cont): Year and sources of possible CBI-reform in 132 countries, 1980-2005

Country	Year	Sources
New Zealand	1989	Evans et al. (1996), Silverstone et al. (1996), Daunfeldt and de Luna (2001), and e-mail correspondence
Nicaragua	1992	www.bcn.gob.ni/english/about/origin_bank.htm, and Jácome and Vázquez (2005)
Nigeria	1999	e-mail correspondence
Norway	2003	www.regjeringen.no/Rpub/OTP/20022003/081/PDFS/ OTP200220030081000DDDPDFS.pdf), and e-mail correspondence
Oman	None	www.cbo-oman.org/BankingLaw/BankingLaw.pdf
Pakistan	1997	Morgan Stanley (2004)
New Guinea	2000	www.imf.org/external/pubs/ft/scr/2000/cr00137.pdf), and e-mail correspondence
Paraguay	1995	Jácome and Vázquez (2005)
Peru	1993	Jácome and Vázquez (2005)
Philippines	1993	www.bsp.gov.ph/about/history_cbp.asp
Poland	1998	www.nbp.pl/en/publikacje/integracja/role_nbp_en.pdf, and e-mail correspondence
Portugal	1998	www.bportugal.pt/default_e.htm, ECB (1998), and e-mail correspondence
Romania	2004	Dvorsky (2004), www.bnro.ro/def_en.htm, and e-mail correspondence
Russia	1995	www.cbr.ru/eng/today/history/central_bank.asp
Samoa	None	e-mail correspondence
Serbia	2003	Dvorsky (2004)
Seychelles	2004	www.cbs.sc/acro/QuarterlyReviewQ22005.pdf, and e-mail correspondence

Table A2 (Cont): Year and sources of possible CBI-reform in 133 countries, 1980-2005

Country	Year	Sources
Singapore	None	Polillo and Guillen (2005)
Slovak Rep	1993	www.nbs.sk/INDEXA.HTM, and e-mail correspondence
Slovenia	2002	ECB (2004)
Solomon Isl	None	www.cbsi.com.sb/CBSI%20ACT.pdf
South Africa	1996	www.reservebank.co.za/internet/Publication.nsf/LADV /700A8754AC98C40242257037003CAB4C/$File/Factsheet1.pdf
Spain	1994	www.bde.es/normativa/be/leyautone.pdf, and e-mail correspondence.
Sri Lanka	2002	e-mail correspondence
Sudan	None	(http://www.bankofsudan.org/)
Suriname	2005	e-mail correspondence
Swaziland	None	(http://www.centralbank.org.sz/history.php)
Sweden	1999	www.riksbank.com/templates/Page.aspx?id=9173, Daunfeldt and de Luna (2008), and e-mail correspondence.
Switzerland	2004	www.snb.ch/e/snb/index.html?file=recht/content_recht.html, and e-mail correspondence
Syrian	None	www.banquecentrale.gov.sy/eg-laws/law23-eg.htm, and e-mail correspondence.
Tanzania	1995	www.bot-tz.org/AboutBOT/BOT_Function.htm
Thailand	None	www.bot.or.th/bothomepage/BankAtWork/AboutBOT /Response/History/Response_E.pdf)
Trinidad	None	www.central-bank.org.tt/the_bank/1041.pdf), and e-mail correspondence.
Tunisia	None	(http://www.bct.gov.tn/bct/siteprod/english/presentation/historique.jsp)

Table A2 (Cont): Year and sources of possible CBI-reform in 133 countries, 1980-2005

Country	Year	Sources
Turkey	2001	www.tcmb.gov.tr/yeni/banka/law.html, and e-mail correspondence
Turkmenistan	None	www.heritage.org/Index/country.cfm?id=Turkmenistan
Uganda	1993	e-mail correspondence
Ukraine	1999	Schwödiauer et al (2006)
United Kingdom	1998	www.bankofengland.co.uk/about/legislation/legis.htm, Morgan Stanley (2004), and e-mail correspondence
United States	None	e-mail correspondence
Uruguay	1995	Jácome and Vázquez (2005)
Uzbekistan	1995	Jácome and Vázquez (2005)
Vanuatu	None	e-mail correspondence
Venezuela	1992	Jácome and Vázquez (2005)
Vietnam	1997	e-mail correspondence
Yemen	2000	Central Bank Law No. 14 (www.buyusa.gov/yemen/en/yemen2008.pdf)
Zambia	None	e-mail correspondence
Zimbabwe	None	www.rbz.co.zw/about/about.asp

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