

Determinants of Central Bank Independence Reforms

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Abstract

It is something of a puzzle that politicians in a large number of countries around the world have chosen to give up power to independent central banks. In this paper the determinants of central bank independence (CBI) reforms are studied using a new data set on the possible occurrence of such reforms in 119 countries. The data reveal that as much as 81 countries had implemented CBI-reforms during the study period. Moreover, policymakers seem more likely to delegate power to independent central banks when the foreign debt is relatively high and when it is likely that they might be replaced by another government.

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1 Introduction

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

There exist a number of theoretical explanations. It has been suggested, for example, that central bank independence (CBI) reforms should occur in countries with high and persistent inflation (Rogoff, 1985), where price stability has already been achieved (Cukierman, 1994), where the government debt is relatively high (Maxfield, 1997), where the political system is characterized by a high degree of competition (Cukierman, 1994), where the financial sector is relatively influential (Posen, 1993), and so on.¹

However, the question why political policymakers 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) have instead used various CBI-indices to investigate what determines a given level (i.e., not a change) of CBI. This means that these studies only can explain cross-country differences in CBI, while the more interesting ques-

¹A number of other explanations have also been suggested in the literature (for an overview, see e.g., chapter five in Eijffinger and de Haan, 1996). The possible determinants of central bank independence reforms are thoroughly discussed in the next section, while the empirical proxies that are used in this paper are presented in Section 3.

tion concerning why policymakers choose to implement CBI-reforms remain unanswered.

The purpose of this paper is to study the determinants of CBI-reforms using a new data set that contain the possible occurrence of CBI-reforms in 119 countries. According to the data, 81 of the 119 countries had implemented a CBI-reform during the period 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 political policymakers should delegate power to a central bank with more inflation averse preferences, seem to be one of the most influential macro-economic findings in recent time.

The results presented in the paper indicate that countries with a high foreign debt ratio and where the policymakers face a high probability of getting replaced are more likely to implement CBI-reforms. Countries in Europe and South-America also seem more likely to delegate power to independent central banks if other countries in the region recently have implemented such institutional reforms. On the other hand, CBI-reforms seem unrelated to the level of inflation.

In the next section, possible determinants of CBI-reforms are presented. The data used in this paper 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 should 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 central bank with more inflation averse preferences can make a low inflation policy credible, constitute the theoretical rationale for this belief.

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

Note that achievement of price stability, according to the time-inconsistency theory, cannot be explained by a pre-commitment to central bank autonomy. If announcement of a CBI-reform is sufficient for achieving a low-inflation goal, then it is optimal for the political policymakers to violate this promise when price stability is achieved (McCallum, 1997). Thus, the time-inconsistency theory and empirical work on the correlation between average inflation and CBI suggest that CBI-reforms are implemented because policymakers want to achieve low and stable inflation.

On the other hand, Cukierman (1994) have suggested that CBI-reforms may be implemented to maintain low inflation, i.e., as a committing device against future uncarefull policymakers. This implies that political policymakers implement CBI-reforms when they already have achieved a low and stable inflation. Daunfeldt and de Luna (2002) found, by comparing the implementation dates of central bank independence reform with the long term inflation trends for 29 OECD-countries, that price stability had been achieved in most countries before their central banks did became more independent. This constitute support for Cukierman's (1994) argument that CBI-reforms can be used as an instrument against future uncarefull policymakers.

According to the time-inconsistency model of monetary policy, the benefits of surprise inflation is directly related to the gap between the policymakers unemployment target and the natural rate of unemployment. This implies that an institutional reform that delegates authority to an independent central bank is more valuable for the policymakers when the natural rate of unemployment is relatively high (Cukierman, 1994; Eijffinger and Schaling, 1995).

It has, moreover, been suggested that CBI-reforms are implemented, especially in developing countries, to signal creditworthiness to foreign investors (Maxfield, 1997). Many developing countries have problems with high debt ratios. In this case, delegation of monetary policy to an independent central bank may signal creditworthiness to foreign investors. The International Monetary Fund (IMF) may also demand more central bank autonomy as a prerequisite for obtaining more funds. Maxfield (1997) presents

some descriptive results indicating that CBI-reforms are implemented in developing countries in order to signal creditworthiness.

Political factors may also influence the decision to delegate power to independent central banks. According to Cukierman (1994), countries that are characterized by a high degree of regime political instability are less likely to delegate authority to independent central banks. Irregular changes of government due to revolutions, coup d'état etc often occur in these countries, implying that policymakers mainly are concerned with its own survival. On the other hand, when the politicians in office fear that they might lose power in the next election, central bank independence reforms may be implemented to reduce the decision-power of the incoming government. Moser (1994) has presented some evidence indicating that countries characterized by extensive check and balances (i.e., multiple veto players) have more independent central banks.

Posen (1993) argued that the observed negative correlation between the degree of CBI and inflation is illusionary. The reason is that inflation and degree of CBI primarily is determined by financial opposition to inflation, suggesting that CBI-reforms are implemented in countries where the financial sector is relatively influential. Analogously, CBI-reforms are also more likely to be implemented in countries where public opposition to inflation is relatively strong. Posen (1993), Forder (1996) and Hayo (1998) have all argued that CBI and the commitment to a low inflation rule is jointly determined by social attitudes, i.e., CBI is an endogenously determined variable. This suggests that 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 the a CBI-reform has been implemented in a particular year. Implementation years of CBI-reforms are, however, not readily available anywhere. Therefore, to obtain dates of CBI-reforms, all central banks listed in the Morgan Stanleys *Central Bank Directory 2004* were contacted by e-mail. The e-mail contained the following questions: (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?

In total, 164 central banks were contacted and 95 central banks finally answered the questionnaire, corresponding to a respondent rate of 58 percent. Other means of information (e.g., central bank publications, central bank acts, and scientific articles) were used to valid the e-mail answers and to obtain the relevant dates of CBI-reforms for the countries that did not respond to the e-mail questionnaire. The final sample used in this paper consist of 119 central banks. This means that we have information about the occurrence of CBI-reforms in 73 percent of the countries that initially were contacted by e-mail.²

A list of all countries included in the final sample can be found in Table A1 in the Appendix. Note that 81 of the 119 countries studied in this paper

²The various sources that were used to classify whether and when a particular country has implemented a CBI-reforms are available on [www.hig.se/...](http://www.hig.se/)

have implemented institutional reforms which grant their central banks more independence from the political policymakers. This means that CBI-reforms have been one of the most significant trends in international politics during the last decades. It also illustrates the influence of the time-inconsistency literature on policy outcomes around the world.

The time trend in the number of CBI-reforms around the world during the period 1980-2005 is displayed in Figure 1. New Zealand is often considered to be the first country that implemented a CBI-reform when they implemented the Reserve Bank Act in 1989³, thereby substantially reducing the politicians ability to produce surprise inflation. New Zealand was soon followed by others. Central bank independence reforms started to increase in 1991 when three countries (Belize, El Salvador and Hungary) delegated power from their elected policymakers to the central bank. An all-time high number was reached in 1998 when twelve countries launched institutional reforms that granted their central banks more independence from the political policymakers. As can be seen from Figure 1, CBI-reforms have continued to be implemented after 1998.

- Figure 1 About Here -

The frequency of CBI-reforms over the sample period for OECD and non-OECD countries are shown in Figures 2 and 3, respectively. In the OECD-countries, CBI-reforms started in 1989 (New Zealand) and reached the highest number in 1998, when ten countries within Europe implemented such institutional reforms. For the members of the ESCB (European System

³For more information on the regime shift in New Zealand and the Reserve Bank Act, see Evans et al. (1996), Silverstone et al. (1996), and Daunfeldt and de Luna (2001).

of Central Banks), this increase may be explained by the outline of the Maastricht Treaty where their national central banks were required to be independent before the ESCB's establishment date. In recent years other prospective members of the European Monetary Union (e.g., Czech Republic and Polen) have also granted their central banks more independence from the politicians.

- Figure 2 About Here -

In Figure 3, the number of CBI-reforms is displayed separately for countries within the more developing non-OECD countries. This figure reveals some interesting geographical patterns. Non-OECD countries were the first to implement CBI-reforms, explaining the increase in CBI in the beginning of the 1990s (Figure 1). Most of this increase in CBI happened in South-America. In 1995, seven non-OECD countries (five countries in South-America, one in Asia, and one in Africa) implemented institutional reforms to increase the independence of their central banks. The sum of CBI-reforms in the non-OECD countries declined after 1995, but a second-wave of CBI-reforms started in 2002. This increase can mostly be attributed to an increase in CBI in Asia and Africa.

- Figure 3 About Here -

In the empirical study the reform year is indicated by one and all previous years with zeros. This is done in order to avoid explaining the period after the CBI reforms. Hence, the individual series ends the same year as the CBI reform. The dependent variable contains a large amount of zeros. The

frequency for the full, OECD and non-OECD samples are displayed in Table 1. The amount of zeros are 96.7, 95.5 and 97.2 percent for the full, OECD and non-OECD samples, respectively.

-Table 1 About Here -

In order to study why countries choose to implement CBI-reforms, we control for both economic characteristics, political factors, and spatial determinants. Definitions and sources of all the variables included in the empirical analysis are displayed in Table 2.

-Table 2 About Here -

Economic characteristics used in the empirical analysis are 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 dollar and the foreign debt ratio from the World Bank's *World Development Indicators*. In addition, the strength of the financial sector is measured by

Political variables that are assumed to influence the decision to delegate power to an independent central bank are obtained from Lundell and Karvonen's (2003) *Comparative Data Set on Political Institutions*.⁴ Variables used in the empirical analysis to capture political determinants of CBI-reforms are political fragmentation in the parliament, whether the country is federation or not, and the level and variation of political freedom in the country.

⁴The 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.

Finally, the number of CBI-reforms in the continent in the previous period is used to control for possible spatial effects (e.g. politicians in neighbouring countries may be influenced by each other) concerning CBI-reforms.

A problem when working with macro-data for the large amount of countries considered in this paper concerns missing data. In Table 3 the number of missing observations in the full, OECD and non-OECD samples are displayed. As can be seen the problem is largest for the non-OECD sample. This in particular concerning the variables corresponding to unemployment, foreign debt, federation and political fragmentation. For the OECD (full) sample the problem is largest concerning the variables liquid assets and foreign debt (foreign debt and unemployment).

-Table 3 About Here -

Since missing data (if not missing at random) can obscure the results mean imputation with an EM-algorithm is used (see e.g. Little and Rubin, 1987). Means and standard deviations for the imputed samples are displayed in Table 4. The variables included are further discussed in Section 4.

- Table 4 About Here -

4 Empirical model

To investigate why policymakers choose to implement central bank independence reforms we define the unobserved latent reform pressure in country $i = 1, 2, \dots, n$ in year $t = 1, 2, \dots, T$ as

$$y_{it}^* = \boldsymbol{\theta}'_j \mathbf{X}_{it} + \boldsymbol{\lambda}'_k \mathbf{Z}_{it} + \varepsilon_{it}.$$

Here \mathbf{X}_{it} and \mathbf{Z}_{it} are vectors of economic respectively political variables that are assumed to affect the central bank independence reform pressure, while $\boldsymbol{\theta}'_j$ and $\boldsymbol{\lambda}'_k$ 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 it is assumed that $\eta_{it} \sim IN(0, \sigma_\eta^2)$.⁵ The CBI-reform pressure can only be observed in dichotomous form, i.e.

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

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

$$\Pr(y_{it} = 1 | \mu_i, \mathbf{X}_{it}, \mathbf{Z}_{it}) = \Pr\left(\frac{\eta_{it}}{\sigma_\eta} > \frac{-\boldsymbol{\theta}'_j \mathbf{X}_{it} - \boldsymbol{\lambda}'_k \mathbf{Z}_{it} - \mu_i}{\sigma_\eta}\right) = \Phi(z_{it}),$$

where

$$z_{it} = -(\boldsymbol{\theta}'_j \mathbf{X}_{it} + \boldsymbol{\lambda}'_k \mathbf{Z}_{it} + \mu_i) / \sigma_\eta,$$

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

The vector of economic explanatory variables, \mathbf{X}_{it} , consist of proxies for economic factors that are assumed to influence the decision to delegate

⁵Estimation results for random effects Logit as well as linear probability models with random effects gave similar results.

authority to an independent central bank. Inflation in country i is included to study whether CBI-reforms are more likely to be implemented in countries with high inflation or in countries that already have achieved a low and stable inflation. In the latter case we expect inflation to be negatively related with the event of a CBI-reform, while inflation should be positively associated with independence reforms if CBI mainly is implemented to make a low inflation policy rule credible and thereby reduce inflation.

The benefits of surprise inflation and the credibility of a low policy inflation rule is in the time-inconsistency model assumed to be determined by the gap between the policymakers unemployment target and the natural rate of unemployment. Therefore, unemployment is included to control whether a relatively high natural rate of unemployment makes surprise inflation more beneficial and thereby reduces the likelihood of a CBI-reform or whether it strenghten the need for an institutional reform that makes the central bank more independence from the political policymakers.⁶

The foreign debt as a percentage of GDP is also included as an explanatory variable. As discussed in Section 2, countries may voluntary or more or less involuntary be forced to implement CBI-reforms in order to signal creditworthiness to foreign investors. Hence, the likelihood of a CBI-reform should be higher in countries with relatively high debt ratios.

\mathbf{Z}_{it} include political factors that are assumed to influence the decision to make the central bank more independent. For example, regime political instability is assumed to reduce the probability that a CBI-reform is imple-

⁶The actual unemployment rate tends to follow the natural rate of unemployment (see e.g., Elmeskov, 1994) and is, therefore, used as a proxy in the empirical analysis.

mented. Regime political instability is approximated with the degree and variation of political freedom in country i based on the annual ratings of political rights and civil liberties reported by *Freedom House*. As discussed in the previous section, we use the data compiled by Lundell and Karvonen (2003) where the number 1 represent the highest degree of freedom and 3 the lowest. As political policymakers in countries with a low level and high variation of political freedom might be concerned with their own survival, it is expected that central bank independence reforms are less likely to be implemented in such countries.

On the other hand, countries with high party political instability are expected to be more eager to implement central bank independence reforms. When the government fear that they soon might be replaced, they have the opportunity to tie the hands of the next government by delegating power to an independent central bank. Party political instability is measured by the degree of political fragmentation in the parliament using Rae's index of party system fractionalization. A value of zero indicate that one party has all the seats in the parliament, whereas a value of 10,000 indicate that each party only has one seat in the parliament. In the latter case, the country is characterized by a very high level of party political instability.

The degree of fiscal federalism is included as a dummy variable taking the value one if country i is a federation. Moser (1994) argues that countries with a high degree of federalism are more likely to have an independent central bank, suggesting that the likelihood of a CBI-reform should be positively related to the degree of fiscal federalism. As noted by Posen (1993) and Hayo (1998), CBI may also be determined by the degree of financial

- and public opposition to inflation. Financial opposition to inflation is approximated with the liquid liabilities in country i ⁷ as percentage of GDP using the database on financial development and structure compiled by Beck et al. (1999). We expect that the financial sector is relatively influential in countries that have a large financial sector, creating a positive correlation between the likelihood of a CBI-reform and liquid liabilities in country i .

5 Results

The results from the estimation of the probit random effect model are presented in Table 5 below. As discussed previously, different factors may influence the decision to implement central bank independence reforms in industrialized and developing countries. Results are, therefore, also presented separately for OECD and non-OECD countries.

Table 5 About Here

As can be seen from Table 5, countries that are characterized by high foreign debt ratios seem more likely to implement CBI-reforms than countries with lower foreign debt ratios. This supports the descriptive results previously presented by Maxfield (1997), indicating that political policymakers choose to give up power to independent central banks in order to signal creditworthiness to foreign investors. Note that this effect is statistically significant at the 5% level for both OECD and non-OECD countries.

⁷Liquid liabilities includes currency, demand and interest-bearing liabilities of banks and other financial intermediaries.

The time-inconsistency theory (Kydland and Prescott, 1977; Barro and Gordon, 1983; Rogoff, 1985) suggest that an central bank independence reform must be implemented in order to improve the credibility of a low inflation goal, suggesting that central bank independence reforms are implement to reduce inflation. On the other hand, Cukierman (1994) and Daunfeldt and de Luna (2002) have argued that central bank autonomy may have been institutionalized at a time when the policymakers have a commitment to low inflation and used as a committing device against subsequent governments. In this case, we expect that central bank independence reforms are implement when inflation is low. The results presented in Table 5 does not support any of these hypotheses as the estimated inflation parameter is negative, but not statistically significantly determined. This suggests that the level of inflation has no influence on the decision whether to grant the central bank with more independence from the political policymakers.

In fact, no other economic determinant of CBI-reforms is statistically significantly determined at any conventional significance level for the full sample. The gross domestic product turns out to be negatively related to the event of a CBI-reform when estimations are performed for the sub-sample of OECD-countries. A possible explanation is that countries with a relatively low GDP per capita among the OECD-countries, i.e., countries such as Hungary, Polen and Turkey, in recent years have implemented CBI-reforms to harmonize their legislation with the more industrialized OECD-countries. Thus, creating a negative relationship between GDP per capita and the likelihood of a CBI-reform. This explanation is supported by Cukeirman et al. (2002), who noted that policymakers in formal socialistic countries

choosed to create central banks with a very high level of CBI when they transformed their legislation.

Turning to the political determinants of CBI-reforms, the results for the full sample indicate that countries characterized by a high degree of political fragmentation are more likely to implement CBI-reforms. This suggests that CBI-reforms are more common when policymakers fear that they soon will be replaced. Hence, CBI-reforms seem to be implemented in order to tie the hands of incoming governments. In addition, in the non-OECD sample, the results indicate that CBI-reforms are more likely in countries that often change their political regime.

The number of central bank independence reforms in period $t - 1$ in Europe and South America also seem to influence the likelihood that policymakers in the region delegate power to independent central banks. It thus seem to exist geographical clustering in time, i.e., countries in the same region seem more likely to give up power to independent central banks if many other countries in the same region recently have implemented CBI-reforms.

6 Conclusions

It is something of a puzzle that politicians in a large number of countries recently have chosen to delegate power to independent central banks, thereby reducing their ability to fine-tune the economy. This paper should be seen as a first attempt to empirically investigate why political policymakers choose to give up power to independent central banks.

The lack of compiled data on the occurrence of CBI-reforms can probably

explain why no previous study has investigated why politicians choose to delegate power to independent central banks. Therefore, we have collected and analyzed data on the possible occurrence of such institutional reforms in 119 countries during the period 1980-2005. The results presented in the paper showed that 81 of these countries (i.e., 68 percent) had implemented an institutional reform that granted the central bank more independence from the political policymakers during the study period. Hence, the launch of institutional reforms that formally increase central bank independence seem to be one of the most significant trends in international politics in recent time. It also illustrates the influence of the time-inconsistency literature on policy outcomes around the world.

To investigate why policymakers implement central bank independence reforms, a random-effects probit regression model was estimated. According to the results presented in the paper, policymakers are more likely to formally grant their central bank with more independence if the foreign debt is relatively high. This supports results previously presented by Maxfield (1997), indicating that policymakers choose to give up power to independent central banks in order to signal creditworthiness to foreign investors. It is, moreover, found that countries that are characterized by a high degree of political fragmentation are more likely to implement central bank independence reforms. This probably indicates that the fear of losing power induces policymakers to delegate power to independent central banks. Finally, the likelihood of a CBI-reform in Europe and South America increases when other countries in the same geographical region recently have granted the central bank more legal independence; implying that there also exist

spatial determinants of CBI-reforms.

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Table 1: Frequencies of dependent variable

| | Full sample | OECD | Non-OECD |
|-------|-------------|------|----------|
| 0 | 2444 | 554 | 1890 |
| 1 | 81 | 26 | 55 |
| Total | 2525 | 580 | 1945 |

Table 2: Number of missing observations for independent variables

| | Full sample | | OECD sample | | Non-OECD sample | |
|--------------------|-------------|---------|-------------|---------|-----------------|---------|
| | Missing | Percent | Missing | Percent | Missing | Percent |
| Inflation | 358 | 14% | 43 | 7% | 315 | 16% |
| GDP | 302 | 12% | 33 | 6% | 269 | 14% |
| Unemployment | 1400 | 55% | 99 | 17% | 1301 | 67% |
| Liquid assets | 824 | 33% | 261 | 45% | 563 | 29% |
| Foreign debt | 1552 | 61% | 245 | 42% | 1307 | 67% |
| Pol fragmentation | 967 | 38% | 50 | 9% | 917 | 47% |
| Federation | 992 | 39% | 0 | 0% | 992 | 51% |
| Freedom | 851 | 34% | 43 | 7% | 808 | 41% |
| Total observations | 2525 | | 580 | | 1945 | |

Table 3: Descriptive statistics

| Variable | Full sample | | OECD sample | | Non-OECD | |
|---------------------|-------------|--------|-------------|-------|----------|--------|
| | Mean | s.d. | Mean | s.d. | Mean | s.d. |
| Inflation | 22.14 | 54.58 | 12.09 | 31.41 | 25.13 | 59.45 |
| GDP | 6086 | 8263 | 17687 | 9071 | 2626 | 3469 |
| Unemployment | 8.17 | 3.82 | 7.14 | 3.90 | 8.48 | 3.74 |
| Liquid liabilities | 0.47 | 0.29 | 0.66 | 0.33 | 0.41 | 0.24 |
| Foreign debt | 68899 | 142620 | 23703 | 62164 | 82377 | 156419 |
| Pol fragmentation | 5624 | 1753 | 6676 | 1252 | 5310 | 1759 |
| Federation | 0.09 | 0.29 | 0.26 | 0.44 | 0.04 | 0.19 |
| Freedom | 1.82 | 0.70 | 1.20 | 0.52 | 2.01 | 0.63 |
| Var. Freedom | 0.15 | 0.22 | 0.07 | 0.21 | 0.18 | 0.22 |
| CBI Africa | 0.07 | 0.31 | - | - | 0.09 | 0.35 |
| CBI Asia | 0.11 | 0.41 | 0.02 | 0.18 | 0.14 | 0.45 |
| CBI Europe | 0.20 | 0.98 | 0.47 | 1.40 | 0.12 | 0.80 |
| CBI So. America | 0.10 | 0.52 | 0.01 | 0.19 | 0.12 | 0.58 |
| CBI Australia | 0.01 | 0.07 | 0.00 | 0.04 | 0.01 | 0.08 |
| Number of obs. | 2525 | | 580 | | 1945 | |
| Number of countries | 118 | | 30 | | 88 | |

Table 4: Probit estimates regarding the determinants of CBI-reforms.

| Variable | All countries | | OECD | | Non-OECD | |
|---------------------|---------------|---------|----------|---------|----------|---------|
| | Estimate | z-value | Estimate | z-value | Estimate | z-value |
| Constant | -2.69 | -6.07 | -2.69 | -2.47 | -2.64 | -4.04 |
| Inflation (L) | -0.016 | -0.94 | -0.17 | -1.51 | -0.016 | -0.88 |
| GDP (L) | 0.009 | 0.99 | -0.046 | -2.23 | 0.017 | 0.78 |
| Unemployment (L) | 0.011 | 0.69 | 0.007 | 0.24 | 0.009 | 0.49 |
| Liquid assets (L) | 0.11 | 0.50 | 0.72 | 1.74 | -0.065 | -0.20 |
| Foreign debt (L) | 0.010 | 2.53 | 0.051 | 2.59 | 0.010 | 2.24 |
| Pol fragmentation | 0.076 | 1.95 | 0.093 | 0.77 | 0.066 | 1.44 |
| Federation (D) | -0.11 | -0.57 | 0.31 | 1.78 | -0.025 | -0.19 |
| Freedom | -0.005 | -0.05 | 0.094 | 0.74 | 0.032 | 0.26 |
| Var. Freedom | 0.44 | 2.12 | -0.14 | -0.22 | 0.49 | 2.14 |
| CBI Africa | 0.22 | 1.42 | | | 0.22 | 1.45 |
| CBI Asia | 0.19 | 1.73 | 0.77 | 0.36 | 0.15 | 1.15 |
| CBI Europe | 0.12 | 3.67 | 0.18 | 3.62 | 0.098 | 1.98 |
| CBI So. America | 0.20 | 3.03 | 0.063 | 0.15 | 0.20 | 2.89 |
| CBI Australia | -6.44 | -0.00 | -5.54 | -0.00 | -6.74 | -0.00 |
| Log L | -312.84 | | -85.07 | | -218.24 | |
| Number of obs. | 2170 | | 490 | | 1680 | |
| Number of countries | 118 | | 30 | | 88 | |

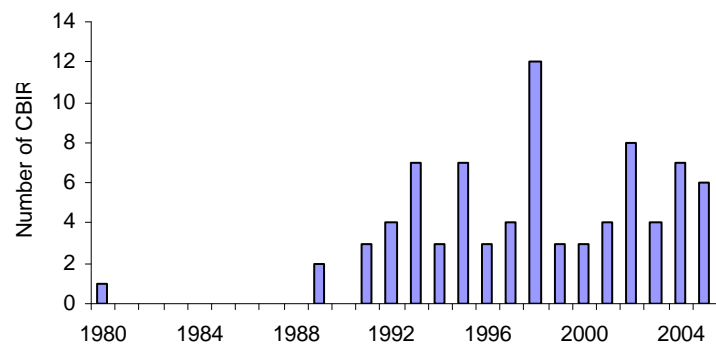


Figure 1: Number of central bank independence reforms for the full sample.

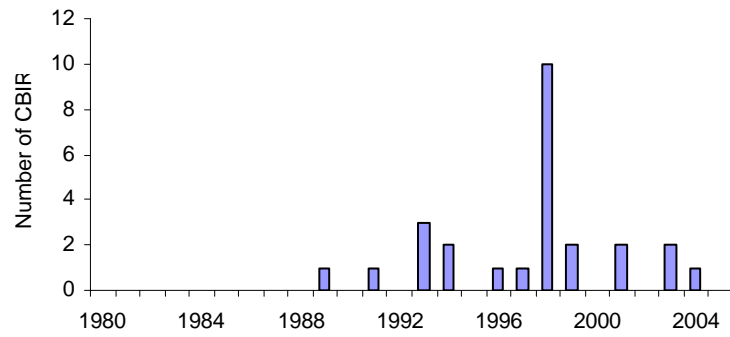


Figure 2: Number of central bank independence reforms in OECD countries.

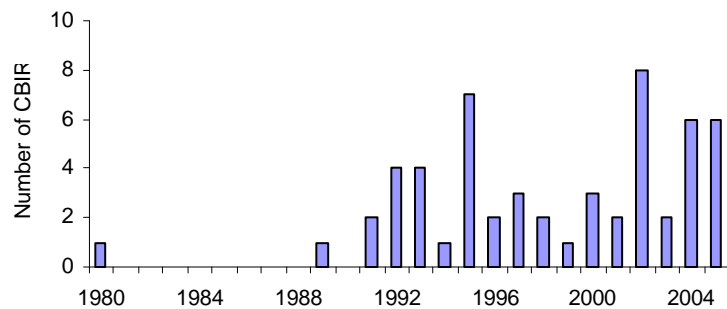


Figure 3: Number of central bank independence reforms in non-OECD countries.