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CENTRAL BANK INDEPENDENCE AND MONETARY POLICYMAKING INSTITUTIONS: PAST, PRESENT, AND FUTURE

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Resumen

En el pasado, se esperaba que los bancos centrales —por ley, costumbre, o ambas— usaran sus instrumentos de política para lograr múltiples objetivos, como alto crecimiento y empleo, financiamiento para el Fisco y solución de problemas de balanza de pagos. Hoy gozan de sustancialmente más independencia, de hecho y de derecho, que hace veinte años, y la estabilidad de precios es su objetivo primordial. El artículo analiza los cambios institucionales que han ocurrido en las últimas dos décadas en el área de la autonomía de los bancos centrales e instituciones responsables de la política monetaria en el mundo, con una revisión de la evidencia empírica acumulada respecto de la relación entre la independencia del banco central y el desempeño macroeconómico. Se extraen lecciones de la estabilización de la inflación en conjunto con la mencionada independencia en el contexto más amplio de la elección del ancla nominal. La última parte considera los desafíos futuros que enfrentan los bancos centrales en la era de estabilidad de precios. Una vez conquistada la inflación, se espera de ellos que dediquen más atención a estabilizar la brecha de actividad. También se examinan los riesgos propios de un régimen de metas de inflación, así como temas de rendición de cuentas y transparencia, que cobran importancia en el nuevo régimen. Además se revisan los *tradeoffs* entre la responsabilidad democrática y la autonomía de los bancos centrales que surgen en el contexto de la distribución de las utilidades (o pérdidas) entre el banco central y el gobierno, y la determinación del capital del Banco Central.

Abstract

In the past, central banks were expected—by law, custom, or both—to use their policy instruments to attain a multitude of objectives, such as high levels of growth and employment, provision of funds to the government, and resolution of balance-of-payment problems. Today central banks' legal and actual independence is substantially higher than it was twenty years ago, and price stability has become their primary objective. The paper reviews the institutional changes that occurred over the last two decades in the area of central bank autonomy and related monetary policymaking institutions around the world, providing an overview of accumulated empirical evidence on the relation between central bank independence and macroeconomic performance. Lessons from inflation stabilization are considered in conjunction with central bank independence within the broader context of choice of nominal anchor. The last part considers future challenges facing independent central banks in an era of price stability. Once inflation has been conquered, the bank is naturally expected to devote more attention to the stabilization of the output gap. Risks associated with such a flexible inflation-targeting regime are examined, along with issues of accountability and transparency, which become more important in the new regime. The paper also reviews the tradeoffs between democratic accountability and central bank autonomy that arise in the context of distribution of central bank profits (or losses) between the central bank and the government and the choice of central bank capital.

I. INTRODUCTION

Twenty years ago, most central banks in the world functioned as departments of ministries of finance. In the past, most central banks were expected—by law, custom, or both—to use their policy instruments to achieve a myriad of objectives, such as high levels of growth and employment, provision of funds to the government for financing public expenditures, and the resolution of balance-of-payments problems.¹ They were also expected to maintain financial and price stability, but the price stability objective was one of several objectives in the bank’s charter and had no special status. In some cases, like Spain and Norway, it did not even appear in the charter. Paralleling this state of affairs, economic theory did not attribute particular importance to central bank independence, and the concept of monetary policy credibility was in the early stages of development. Furthermore, a notable legacy of the Keynesian revolution was the belief that a certain amount of inflation is conducive to economic growth.

Although some banks had a reasonable amount of legal autonomy, the level of actual independence was usually lower than indicated in the law, particularly in developing countries. With a few exceptions, central banks did not possess instrument independence, and the responsibility for price stability was held, at least implicitly, by the ministry of finance and other economic branches of government. In a few developed economies with wide capital markets (like Japan, the United Kingdom, the United States, and West Germany), price stability was maintained mainly through the actions of relatively conservative treasury departments or de facto independent central banks.²

Most other countries that enjoyed reasonable levels of price stability achieved this result by pegging their currencies to the currency of a country with sufficiently conservative aggregate nominal policies. Under the Bretton Woods system, most currencies were automatically pegged to the U.S. dollar. Following the breakdown of this system in the 1970s, many countries adopted unilateral pegs and, later, bands. Countries without either of those three commitment devices endured prolonged episodes of high and variable inflation, as exemplified by the cases of

¹ In many developing countries, the central bank often functioned as a development bank that provided subsidized loans to various sectors of the economy.

² The de facto independence of the Federal Reserve was higher than its legal independence, in part because of the deep U.S. capital markets. At the time, West Germany’s Bundesbank was unique in that it enjoyed both de jure and de facto independence.

Argentina, Brazil, Chile, Israel, and Mexico.

The contrast of this state of affairs with current practice and academic consensus on central bank independence cannot be overemphasized. Most central banks today enjoy substantially higher levels of both legal and actual independence than they did twenty years ago. Central bank independence and the accompanying institutional arrangements like inflation targeting have become widely accepted commitment devices. While some contentious issues remain in dispute, the following broad practical consensus, backed by academic work, has emerged. The primary responsibility of a central bank is to ensure price stability and financial stability. Without sacrificing these objectives, the central bank should also support the economic policies of the government. The bank is given instrument independence so it can achieve its main objectives.³ Delegation of authority to a non-elected institution should be accompanied by accountability and transparency. It is noteworthy that those two buzzwords of modern monetary institutions were hardly heard twenty years ago. In the absence of independence, accountability was unnecessary, and governments and finance ministries, as political entities, had no incentive to raise questions about their own transparency in the conduct of monetary policy.

Section 2 quickly reviews the institutional changes that have occurred over the last twenty years in the area of central bank autonomy and related monetary policymaking institutions around the world. It discusses some of the reasons for those developments and provides an overview of accumulated empirical evidence on the relation between central bank independence and economic performance. Section 3 opens with a discussion of some of the lessons from inflation stabilization and proceeds to consider the issue of central bank independence in the broader context of choice of nominal anchor.

Section 4 closes by considering future challenges facing central banks. Price stability is now a permanent fixture of industrial economies and of many developing economies, and central bank independence is a well-established feature of the contemporary monetary order. The discussion thus focuses on issues relating to the conduct of monetary policy by independent central banks in an era of price stability. Under such circumstances, the bank is naturally expected to devote more attention to stabilizing the output gap; the section discusses the risks associated with such a flexible inflation-targeting regime. In the presence of independent central

³ In a few cases, such as the European Central Bank and the Central Bank of Chile, the bank is given some limited goal independence, in the sense that it is free to determine its own inflation target.

banks, issues of accountability and transparency become more important than in the past. A tradeoff between democratic accountability and central bank independence may arise when, for example, the central bank engages in operations that lead to substantial losses in the process of fulfilling its obligation to maintain financial stability. Some closely related issues are the distribution of central bank profits and losses between the central bank and the government and the optimal level of central bank capital. The section reviews this relatively neglected issue.

II. THE EVOLUTION OF CENTRAL BANK INDEPENDENCE OVER THE LAST TWO DECADES: EVIDENCE, REASONS, AND CONSEQUENCES

The most widely available indices of central bank independence refer to the level of independence as specified in the law. Actual independence may often deviate quite substantially from legal independence. Such deviations are more significant in developing than in industrial economies. This is probably due to better law enforcement in the latter group of economies.⁴ Other, more behaviorally oriented, proxies include the actual, as opposed to the legally mandated, turnover of central bank governors (used only for developing countries) and the political vulnerability of the central bank governor. The latter index is defined as the frequency of cases in which the governor is replaced within a short period following a political transition.⁵ None of these indices fully represents the actual independence of the central bank, but taken together, they provide a more complete picture of differences in central bank independence

across countries and over time.

There is mounting evidence showing that the legal independence of most central banks in the world has increased dramatically in the 1990s. This is particularly remarkable in view of the fact that there were hardly any reforms in central bank legislation in the forty years ending in 1989. This statement is based on a number of legal indices, the most comprehensive of which are those in Cukierman (1992, chap. 19) and Cukierman, Webb, and Neyapti (1992), on updates and

⁴ Using data through the end of the 1980s, Cukierman (1992, chap. 19) documents a negative correlation between inflation and legal independence in developed economies, but no significant relation between those two variables in developing countries. More recent evidence (surveyed below) suggests that the difference between actual and legal independence may also vary over time within a given country.

extensions of these indices for subgroups of countries, and on updates of the Grilli, Masciandaro, and Tabellini (1991) index.⁶ Cukierman, Miller, and Neyapti (2002) update the Cukierman, Webb, and Neyapti (1992) index for twenty-six former socialist economies for the 1990s. Jacome and Vazquez (2005) provide an update of this data and a somewhat broader index for twenty-four Latin American and Caribbean countries.⁷ Finally, Arnone, Laurens, and Segalotto (2005) reconstruct the Grilli, Masciandaro, and Tabellini index for a sample of over forty countries for two points in time: 1991 and the end of 2003.

Despite some differences in coverage and definitions, and the fact that not all indices have been updated for all countries, the broad picture that emerges is that legal independence took a quantum leap in the 1990s. This is backed up by evidence in Arnone, Laurens, and Segalotto (2005) for the developed economies and for thirteen developing countries for both 1991 and 2003. In addition, Cukierman, Miller, and Neyapti (2002) compare the legal independence of the central bank in the former socialist economies with that of developed economies in the 1980s; they find a substantially higher level of independence in the former group. Interestingly, table 2 in that paper suggests that in about a third of the former socialist economies, legal independence in the 1990s was higher than the legal independence of the highly independent Bundesbank in the 1980s. In line with the Maastricht Treaty, the legal independence of the Bundesbank has also been upgraded since the 1980s, along with that of all the countries that joined the European Monetary Union.

To illustrate the growth in legal independence in the 1990s, figure 1 shows the evolution of average legal independence in nine Latin American countries during the last fifty years of the

⁵ The turnover variable is introduced in Cukierman (1992, chap. 19) and in Cukierman, Webb, and Neyapti (1992). The index of political vulnerability appears in Cukierman and Webb (1995).

⁶ This index is based on a coding of sixteen different characteristics of Central bank charters that pertain to the allocation of authority over monetary policy, procedures for resolution of conflicts between the Central bank and the government, the relative importance of price stability in Central bank objectives as stated in the law, the seriousness of limitations on lending by the Central bank to the government, and procedures for the appointment and dismissal of the governor of the Central bank. Cukierman, Webb, and Neyapti (1992) present a weighted index of those sixteen characteristics (LVAW); Cukierman (1992) presents an unweighted version of the same characteristics (LVAU). Both indices are based on a sample of over sixty countries. Other indices that appeared through the early 1990s, such as those used by Bade and Parkin (1988), Alesina (1988, 1989), Alesina and Summers (1993), Grilli, Masciandaro, and Tabellini (1991), and Eijffinger and Schaling (1993), can, for the most part, be approximated by subsets of the components of the LVAW (or the LVAU) index.

⁷ The additional features included in the Jacome-Vazquez index involve procedures for appointment and dismissal of the entire Central bank board rather than just the governor, the extent to which the Central bank has a say in exchange rate policy, the central bank's obligations as a lender of last resort, the existence of provisions for

twentieth century. After thirty to forty years of relative immobility in central bank legislation, the level of legal independence in those countries spiked. The trend toward independence in Chile is generally similar to the other countries in the figure, but the level attained over the 1990s is somewhat higher than the average level in the other nine Latin American countries.

[Figure 1 about here.]

A similar picture emerges for the subset of former socialist economies that had separate central banks prior to the downfall of the Soviet Union (figure 2). The legal reforms they instituted, mainly in the early 1990s, represent about a tripling of the LVAW index developed in Cukierman, Webb, and Neyapti (1992). Eight of the former socialist economies had two central bank reforms in the 1990s at intervals of about five years. The levels of independence embedded in the second central bank laws are substantially higher than those of the first central bank laws.⁸

[Figure 2 about here]

Examination of more detailed information in the sources cited above suggests that the trends illustrated by the figures reflect a worldwide trend toward substantially higher levels of central bank independence. Moreover, the fact that the second central bank laws in the former Socialist economies that had two rounds of reforms incorporate a uniformly higher level of independence than the first supports the view that the trend toward legal independence intensified in the 1990s.

Have there also been meaningful changes in the actual level of central bank independence as proxied by the actual turnover of central bank governors and by the index of political vulnerability of the central bank during the 1990s? The picture is not clear-cut, because those data sets have not been systematically updated since the work of Cukierman (1992), Cukierman, Webb, and Neyapti (1992) and Cukierman and Webb (1995). However, casual evidence for Latin American countries in which turnover and the political vulnerability of the central bank were among the highest in the world till the end of the 1980s points to a substantial increase in independence as proxied by those behavioral indices, as well.

Actual independence depends not only on legal status, but also on various formal and informal institutional arrangements like the exchange rate regime, the bank's ability to engage

the preservation of Central bank capital, and the existence of legal provisions relating to the accountability and transparency of the Central bank.

⁸ See figure 1 in Cukierman, Webb, and Neyapti (1992).

effectively in open market operations, the fiscal policy stance, and the existence of explicit institutional arrangements beyond the law that make price stability a recognized objective of the central bank. A prominent example of the latter is the various inflation-targeting methods adopted by about twenty countries since this innovation was pioneered in New-Zealand and Canada in the late 1980s.

Cukierman (2006) constructs a judgmental index of actual independence for the Bank of Israel since its creation in 1954. Comparison of this index of actual independence with its legal counterpart suggests that while legal independence has undergone relatively limited changes, the actual independence of the Bank changed substantially following the stabilization of high inflation in 1985. In particular, actual independence was substantially lower than legal independence prior to and for several years following the 1985 stabilization, but this relation was permanently reversed after the mid-1990s. This case study suggests that substantial changes in the actual independence of a central bank may occur without much change in legal independence. A similar qualitative process occurred in the 1990s at the Bank of England. The Bank started to enjoy more independence in the early 1990s when inflation targets were introduced; the upgrade in legal independence followed in the second half of the 1990s.

In summary, the evidence surveyed above supports the conclusion that the levels of both legal and actual independence experienced a sustained increase worldwide in the 1990s.

2.1 Why did central bank independence increase so much in the 1990s?

The trend toward central bank independence is due to a combination of global and regional factors.⁹ The two main global factors underlying the trend include, first, an increased worldwide quest for price stability triggered by the stagflation of the 1970s and the dismal economic performance of some high-inflation countries, both in Latin America and elsewhere. Contrary to the 1960s and 1970s, the accepted view in the 1980s and 1990s was that inflation and the associated uncertainties retard growth. The relatively good real performance of some low-inflation countries like Germany and Japan until the 1980s supported this view.

The second factor is globalization, which has implied a gradual dismantling of controls on capital flows and a widening of international capital markets. Those processes reinforced the

quest for price stability and raised the importance of central bank independence as a signal of macroeconomic nominal responsibility to domestic and international investors. As argued by Maxfield (1998), this factor was particularly important in developing countries whose political establishments were anxious to facilitate access to international capital markets. The International Monetary Fund (IMF) also embraced the view that a high level of independence is a desirable and actively promoted central bank reform in many developing economies through conditionality and other means.

Several regional motives contributed to increasing independence: i) the breakdown of other institutions designed to safeguard nominal stability, like the European Monetary System (EMS) and the Bretton Woods system, intensified the search for alternative institutions; ii) the good track record of the highly independent Bundesbank demonstrated that central bank independence can function as an effective device for assuring nominal stability; iii) the acceptance of the Maastricht Treaty by the European Economic Community (EEC) implied that many countries in the Community had to upgrade the independence of their central bank as a precondition for membership in the European Monetary Union (EMU). The inclusion of this stipulation in the Treaty is related to the good record of the Bundesbank and the central position of Germany within the Community; iv) after successfully stabilizing inflation, particularly in Latin America, policymakers were looking for institutional arrangements capable of reducing the likelihood of high and persistent inflation in the future. Raising central bank independence seemed a natural way to achieve this objective at the time; v) in the former socialist countries, the upgrading of central bank independence and the creation of Western-style best-practice central banks was part of a more general attempt to create the institutional framework needed for the orderly functioning of a market economy. The fact that many of these new central banks were granted substantial *de jure* independence was no doubt motivated by evidence from the industrial economies suggesting that inflation and legal independence are negatively related and that independence and growth are either positively related or unrelated (see next subsection).

The above discussion leaves open the question as to why many countries chose to raise their commitment to price stability by upgrading central bank independence rather than through other means, such as unilateral pegs. This question is discussed in later in the paper, in the context of the choice of nominal anchor.

⁹ A more extensive but older discussion appears in Cukierman (1998).

2.2 Central bank independence and economic performance

This subsection briefly surveys existing evidence on the relation between central bank independence and economic performance in the areas of inflation, growth, investment, real interest rates, and the accommodation of wage increases.

2.2.1 Inflation

The early evidence in Alesina and Summers (1993), Grilli, Masciandaro, and Tabellini (1991), Cukierman (1992, chap. 19), and Cukierman, Webb, and Neyapti (1992) suggests that inflation and legal independence are negatively related in the industrial economies. In the group of developing countries, neither inflation nor growth is related to legal independence. This is most likely because there was hardly any link between actual and legal independence within this group of countries before the early 1990s. When behavior-oriented proxies of independence (such as the actual turnover of central bank governors and the index of political vulnerability) are used, a negative relation between inflation and independence emerges within the group of developing countries, as well (Cukierman, Webb, and Neyapti, 1992; Cukierman 1992, chap. 19; and Cukierman and Webb, 1995). For example, Cukierman, Webb, and Neyapti (1992, table 8) find that, after they control for time effects for the Bretton Woods system and the inflationary shocks of the 1970s, legal independence has a significant negative impact on the depreciation rate of the real value of money among industrial economies, while the turnover of central bank governors has a significant positive impact on this rate among developing countries.¹⁰

Using data on the legal independence of freshly created central banks in former socialist economies in the 1990s, and controlling for cumulative liberalization, price decontrols, and wars, Cukierman, Miller, and Neyapti (2002) find no relation between inflation and legal independence during the initial stages of liberalization. a negative relation between inflation and legal independence does emerge, however, once the process of privatization and liberalization of domestic prices and foreign trade becomes sufficiently large and sustained. A possible reason is that legal independence is enforced in practice only when the shift to a market economy has

become sufficiently important to induce the authorities to seriously engage in law enforcement.

For the Latin American and Caribbean countries, Jacome and Vazquez (2005) find a negative relation between inflation and legal independence in the 1990s, when controlling for international inflation, banking crises, and the exchange rate regime. For a similar group of countries and time period, Gutierrez (2003) finds that countries that embed the legal independence of the central bank in the constitution have lower inflation than those that do not. The evidence from these different empirical investigations is consistent with the conclusion that inflation and actual central bank independence are negatively related in both developed and developing countries. The extent to which this basic relation is also reflected in a negative relation between inflation and legal independence depends on several other factors, such as the regard for the law and the degree of commitment to central bank independence (as proxied by whether the central bank charter is embedded in the Constitution).

One may argue that the negative relation between independence and inflation stems from reverse causality from inflation to independence rather than from independence to inflation. It is hard to resolve this important issue on the basis of existing evidence. Jacome and Vazquez (2005) do not find evidence to support causality from legal independence to inflation based on data on legal independence for Latin America and the Caribbean in the 1990s. For earlier periods, however, Cukierman (1992, chap. 20, section 7), presents evidence in favor of two-way causality between turnover and inflation, using governors' turnover as a proxy for actual (lack of) independence. My own feeling is that causality often operates in both directions.

2.2.2 Growth and investment

Grilli, Masciandaro, and Tabellini (1991) find that real growth and central bank independence are unrelated in developed economies, which leads them to label central bank independence a “free lunch”. These results are corroborated by Alesina and Summers (1993) and Cukierman, Kalaitzidakis, Summers, and Webb (1993). The last paper finds that although developing economies exhibit no association between legal independence and the growth rate of per capita income, the association between growth and actual independence (as proxied by the political vulnerability of the central bank and related measures of turnover) has a positive impact

¹⁰ These regressions are based on a panel of countries covering the period from 1950 to 1989.

on the growth rate. More precisely, using data from the 1960s to the 1980s and controlling, for initial GDP, the change in the terms of trade, and initial primary and secondary enrollment ratios, the paper finds that high political vulnerability of the central bank governor and related measures of turnover are negatively associated with per capita growth.

For a subset of developing countries, Cukierman, Kalaitzidakis, Summers, and Webb (1993) also find, in some cases, a similar negative impact of turnover on the share of investment in GDP. A possible interpretation of the last two results is that private investment is lower under weak central bankers, reducing the long-run growth rate.

2.2.3 The distribution of nominal and real interest rates

Alesina and Summers (1993) and Cukierman et. al. (1993) find that the variability of both nominal and real rates of interest is negatively associated with legal independence in developed economies. The second paper also reports that the average real return to depositors was higher in developed economies with higher levels of legal independence in the 1980s, while for developing countries, the variability of both nominal and real deposit interest rates is positively associated with the turnover of central bank governors. The broad conclusion from those findings is that the variability of both real and nominal interest rates is lower, and the average real return to depositors is higher, in countries with higher levels of actual independence.

2.2.4 Accommodation of wage increases

Evidence presented in Cukierman, Rodriguez, and Webb (1998) for the period between the 1960s and 1980s suggests that the central banks of industrial economies with higher levels of legal independence accommodate nominal wage increases to a lesser extent than in economies with lower levels of central bank independence. This result is obtained in two stages. First, the authors run a regression of the rate of increase in high-powered money on the rate of increase of nominal wages for each country over time, controlling for the phase of the cycle and several other variables. The t statistics of the coefficients of the wage increase rates from the country regressions are then taken as proxies for the degree of accommodation and cross-sectionally

related to the levels of legal independence.¹¹ This second-stage regression yields a negative association between the significance-adjusted coefficients of accommodation and legal independence. This finding is consistent with Rogoff's (1985) theory that more conservative, or independent, central banks accommodate wage increases to a lesser extent than more flexible central banks.

3 Remarks on disinflation and the changing structure of nominal anchors

3.1 Shock versus gradual stabilization and the role of the central bank

Many high-inflation countries throughout the world stabilized inflation in the last two decades. Some of those countries implemented shock or cold-turkey stabilization, while others took a gradual approach. Some involved the ministry of finance and even the entire government; others were implemented mainly by the central bank. Two regularities emerge from these experiences. First, very high inflation rates of over 100 percent were generally stabilized using the first method, whereas inflation in the two-digit range was stabilized gradually. Second, government involvement in the stabilization of inflation was usually greater with high inflation, while low inflation was stabilized mainly, or solely, by the central bank.

Thus, the industrial countries stabilized their low inflation following the oil shocks of the 1970s gradually and usually with little government involvement. Similarly, Chile has gradually stabilized its low inflation since the early 1990s, mainly through the central bank. Argentina, Bolivia, and Israel, in contrast, implemented a cold-turkey stabilization of their high inflation in the 1980s, with substantial government involvement. Interestingly, Israel went through both types of stabilizations at different times. The government led the 1985 cold-turkey stabilization that permanently reduced inflation from the three-digit range to between 10 and 20 percent per year, to the point that the finance minister and the prime minister were personally involved. The next phase, which took place over the 1990s and reduced inflation to the 0–2 percent range, was carried out mainly by the central bank despite occasional criticism of the bank's restrictive policy

¹¹ The statistics of the coefficients rather than the coefficients are used to reflect the magnitude, as well as the significance, of each coefficient in the second-stage cross-sectional regression.

by the finance minister.

Those regularities are not accidental for two reasons. First, under high and persistent inflation, the public's belief in the seriousness of policymakers' commitment to price stability is likely to be substantially lower than under low inflation. In the terminology of Barro (1986) and Cukierman and Liviatan (1991), the initial "reputation" of policymakers is lower in the second case. Reputation is defined formally in those papers as the probability, β , that the public attributes to the event that the policymakers in office intend to deliver the inflation target that they announce. When β equals one, reputation is perfect; when it is zero, reputation is nonexistent. In most real life situations, β obviously lies strictly between zero and one. The reason reputation is imperfect is that policymaker in office can be either dependable, in that they take the inflation target as a commitment to set the policy instrument in a way that will make inflation as near to the target as possible, or weak, in that they are not really committed to the announced target and are therefore subject to the classic KPBG inflation-bias problem.¹² The two types of policymakers share an identical objective function, which is increasing in unexpected inflation and decreasing in inflation.

Cukierman (2000a) extends these frameworks to allow for imperfect control of inflation by policymakers. An important consequence of imperfect control is that the opportunistic policymaker can engage in short-term discretionary policies without being revealed as weak, with probability one. In such an environment, the public adjusts β gradually using Bayes' rule. Reputation takes a jump, however, when the inflation rate becomes extreme. In particular, policymakers lose all reputation under a sufficiently high inflation rate, and they establish their credentials as being dependable under a sufficiently low inflation rate, with probability one. Both types of policymaker aspire toward a higher reputation since the impact of the preannounced inflation target is higher when reputation is higher, and this raises the value of their objectives. When in office, the dependable policymakers attempt to raise their reputation by announcing and implementing a sufficiently low inflation target to increase the probability that their dependability will subsequently be revealed, with probability one. When in office, the weak policymakers attempt to preserve their existing reputation by mimicking their dependable counterparts in the announcement of the target and by scaling down the target inflation rate to a

¹² The inflation-bias problem is defined by Kydland and Prescott (1977) and Barro and Gordon (1983).

level below the one-period discretionary rate.

Stabilization of inflation provides long-term benefits at the cost of abandoning short-term advantages associated with the creation of unanticipated inflation under discretion. The onset of a drive for stabilization thus represents an increase in policymakers' concern for the future, relative to current objectives. This can be modeled as an increase in the discount factor, δ , which is common to both types. The above framework implies that when a dependable policymaker is in office and δ goes up, raising the incentive to stabilize inflation, the type of stabilization chosen by the dependable policymaker will depend on the initial level of reputation. In particular, a shock treatment is more likely when the initial reputation is very low, and gradual stabilization is more likely when it is high (proposition 6 in Cukierman, 2000a).

The intuition underlying this result is as follows. An increase in the discount factor makes the future more important and induces both types of policymaker, when in office, to inflate at lower rates. When reputation is sufficiently low, the reduction in planned inflation by the dependable policymaker (D) is larger than the reduction in planned inflation by the weak policymaker (W) because, at a low reputation, D stands to gain relatively more from full separation than W stands to lose from it at the margin. Consequently, the probability of a shock treatment after which D is clearly separated from his weak counterpart is higher than the probability of gradual stabilization. When initial reputation is sufficiently high, W stands to lose relatively more than D stands to gain from full separation. Hence, when the future becomes more important, W makes a relatively stronger effort to prevent full separation than D makes to establish his identity beyond any doubt. The probability of gradual stabilization is therefore higher than the probability of a shock treatment.

A second factor that affects the relative desirability of shock versus gradual stabilization under moderate versus high inflation is related to the existence of nominal wage contracts and other temporary nominal rigidities. In particular, the structure of overlapping sticky wages and prices is very compressed under high inflation. The relative price distortions associated with a shock treatment are thus relatively small. Under moderate initial inflation, the structure of overlapping wage contracts and prices is spread out, making the relative price distortions associated with a shock treatment higher and more persistent. Hence, gradual stabilization is relatively more attractive in this case.

Governments tend to be more heavily involved in the stabilization of high inflation,

whereas low inflation is frequently stabilized mainly by the central bank, for several reasons. First, high inflation usually stems from the government's fiscal imbalances and the need to finance them through seigniorage. If the government has limited access to credit markets, such needs often create high inflation (Bolivia in the first half of the 1980s is an example). Since the root of the problem resides in the government's fiscal needs, the solution must involve government.¹³

Second, even when the root cause lies elsewhere, once high inflation has been allowed to develop, the central bank will probably not be able to do the job alone. Without a clear-cut demonstration of fiscal responsibility by the government, the low reputation of policymakers makes it extremely hard for the central bank to convince the public that a change in regime is around the corner. This is reinforced by the fact that during high inflation, the actual independence of the central bank is likely to drop, and fiscal deficits may rise as a result of the Olivera-Tanzi effect on tax collections. In addition, if a shock stabilization is implemented in a context of widespread indexation, as was the case Chile and Israel, some or all of the indexation arrangements have to be temporarily suspended. Clearly, such actions are not within the central bank's arsenal of instruments, but rather require the involvement of the government and other groups, such as labor unions.

3.2 Inflation targets, gradual stabilization, and asymmetric central bank objectives

Over the past decade, much of the academic research dealing with central bank reaction functions has been cast in terms of Taylor rules. These rules generally assume that the central bank's loss function is quadratic in the output gap and in the deviation of inflation from its target.¹⁴ This formulation leads to nice linear reaction functions and implies that the Central bank treats losses from being above or below target with respect to both inflation and output symmetrically. Possible asymmetries in losses do not matter in the absence of uncertainty about

¹³ Empirically, the link between deficits and inflation is often found to be weak. However, much of the existing literature on this question does not incorporate dynamic elements and does not control for the size of the inflation tax base. Recent extensive international evidence in Catao and Terrones (2005) supports the view that developing economies display a significant positive long-run association between inflation and deficits scaled by narrow money. The scaling of deficits by money (as a proxy for the inflation tax base) makes sense from a conceptual viewpoint, since a money-financed deficit requires a higher rate of inflation, resulting in a lower base.

¹⁴ See, for example, Taylor (1999); for Latin America, see Loayza and Schmidt-Hebbel (2002).

future shocks. Real life central banks are uncertain about future shocks when they pick their policy instruments, however, so the shape of the objective function over the entire possible range of losses becomes important.

After a period as vice chairman of the U.S. Federal Reserve, Blinder (1998, pp. 19, 20) suggests that “in most situations the Central bank will take far more political heat when it tightens preemptively to avoid higher inflation than when it eases preemptively to avoid higher unemployment.” Although the U.S. Federal Reserve enjoys a fair amount of actual independence, it is not totally insensitive to the reactions of the political establishment and the public. In making policy decisions, therefore, the U.S. Federal Reserve may weight losses from negative output gaps more heavily than losses (if any) from positive output gaps. Cukierman (2000b) formalizes this asymmetry by postulating that the Central bank is concerned with losses arising from negative output gaps but is indifferent to the size of the gap as long as it is positive. The paper further shows that the inflation bias holds even if the bank aims at achieving potential output on average. Cukierman and Gerlach (2003) use cross-sectional data from industrial economies to support this theory. Ruge-Murcia (2003) applies a more general specification of asymmetric output gap objectives and finds that this specification fits the behavior of U.S. inflation better than the traditional Barro and Gordon (1983) model, which relies on quadratic objectives.

It might seem that there is no reason for asymmetries in losses from discrepancies between inflation and the inflation target (briefly, the inflation gap). In periods of gradual disinflation, however, the Central bank may be more apprehensive of positive than negative inflation gaps if it is anxious to establish a reputation for being committed to the target. The bank may therefore follow policies that raise the likelihood of missing the inflation target from below rather than from above. During Israel’s gradual disinflation in the late 1990s and early 2000s, the central bank missed the target many more times from below than from above.¹⁵ A similar phenomenon occurred in the United Kingdom during the inflation-targeting period.

Asymmetries in losses from inflation and output gaps essentially reflect precautionary motives on the part of the Central bank with respect to those gaps. Such motives generally lead to nonlinear Taylor rules. Cukierman and Muscatelli (2003) incorporate these precautionary

¹⁵ This led some critics to claim that the Bank was aiming at an inflation target that was lower than the target assigned by the government (Sussman, forthcoming).

motives into a new-Keynesian framework of the type suggested by Clarida, Galí, and Gertler (2000); they then test for the existence of nonlinearities in the interest rate reaction functions of Germany, Japan, the United Kingdom, and the United States. They find evidence of nonlinearities and the existence of at least one precautionary motive in all cases except Japan.

The precautionary demand for expansions (or for the avoidance of recessions) may dominate in times of stable inflation, as in the United States since the mid-1980s. In contrast, the precautionary demand for price stability and reputation may dominate in times of inflation stabilization. When both precautionary motives are present, the reaction function may still be linear because the two precautionary motives distort the conventional linear Taylor rule in opposite directions. A precautionary motive for expansion alone tends to make the Taylor rule concave in both gaps, while a precautionary demand for price stability alone tends to make it convex in both gaps. Hence, in the presence of both motives, the Taylor rule will be nonlinear if one motive dominates the other.

Cukierman and Muscatelli (2003) develop a criterion for finding the dominant precautionary motive and apply it to the four countries mentioned above. They find that the identity of the dominant precautionary motive in the United States and the United Kingdom has varied over time. The United States exhibits a dominant precautionary demand for price stability when Volcker's disinflation period is included in the sample. The post-1985 period, however, was characterized by low, relatively stable inflation, and a dominant precautionary demand for expansion emerges for this partial sample. The opposite occurs in the United Kingdom, which stabilized inflation only in the 1990s. The entire sample, from 1980 to 2000, reveals a precautionary demand for expansions. After 1985, the United Kingdom displays a precautionary demand for price stability. In contrast, German monetary policy is consistently characterized by a precautionary demand for price stability throughout the sample. The general lesson from these findings is that the loss functions of central banks are likely to change when the economic environment changes.

3.3 Changes in the transmission process after successful stabilization

Although it is desirable, successful stabilization temporarily complicates the conduct of monetary policy. Stabilization induces changes in the monetary policy transmission process

through a variety of channels. Wages and prices become more sticky, the degrees of informal and formal indexation fall, and the pass-through coefficient and dollarization drop, as well. All these phenomena occurred in Israel following the success of inflation targeting in reducing inflation to the current standards of Europe and the United States. Schmidt-Hebbel (2004) documents similar trends for Chile.

These changes lead to a lengthening in the transmission of monetary impulses to inflation, and the real effects of monetary policy become more persistent. Such developments are desirable since they raise the ability of monetary policy to affect output and employment. On the other hand, the structural changes render pre-disinflation knowledge about the precise magnitudes of the coefficients of the transmission mechanism obsolete and raise the Central bank's uncertainty concerning the structure of the economy. Consequently, for several years after a successful stabilization, monetary policymakers are forced to rely more heavily on various judgmental procedures and on a larger number of relatively partial signals on the impact of monetary policy.

3.4 Central bank independence-cum-inflation targets versus exchange rate anchors

Price stability can be achieved through a variety of anchors. Delegation of authority to an independent and sufficiently conservative Central bank (with or without explicit inflation targeting) is one type of anchor; some level of commitment to a unilateral peg is another. Different countries have used, or are still using, one or the other, or some combination or variation, of these anchors. The last fifteen years have witnessed a substantial reshuffling of nominal anchors.¹⁶ Some countries in Latin America and elsewhere have gradually shifted from an exchange rate anchor to effective central bank independence augmented by explicit inflation targeting.¹⁷ Other countries, including those joining the euro area, strengthened their commitment to permanently fixed pegs. China continues to maintain an implicit fixed peg, as do some countries in the Far East.

An argument often advanced in favor of replacing exchange-rate-based anchors by

¹⁶ The two changes that occurred worldwide in the use of exchange-rate-based anchors in the 1990s are discussed in Fischer (2001).

¹⁷ Corbo (2002) discusses the reasons for these changes in Latin American countries.

central bank independence and explicit or implicit inflation targeting are that this makes it possible to utilize monetary policy for domestic stabilization purposes. However, the flexibility required for stabilization policy can also be achieved through exchange rate bands at the cost of occasional abandoning the band. Cukierman, Spiegel, and Leiderman (2004) discuss some of the factors that determine the choice of bandwidth for a given level of reputation and the associated trade-off between flexibility and credibility. An analogous, though not identical, trade-off arises under an independent Central bank with inflation targets. This trade-off is determined by the bank's degree of targeting flexibility, which depends on how conservative it is. By allowing larger and more sustained deviations of inflation from its target, a less conservative Central bank leaves more flexibility for stabilization policy, which is analogous to a wider exchange rate band.

A second argument against exchange rate anchors is that in the current era of free capital mobility, the level of foreign exchange reserves needed to defend a fixed peg is likely to be prohibitive. This was vividly illustrated by the 1998 currency crises. While flexibility could be maintained by widening the band, many developing economies still peg their currencies to a key currency (Calvo and Reinhart, 2002). Different anchors are appropriate for different countries, as well as for the same country at different times.

Independently of whether countries use an exchange rate anchor, a dirty float, a band, a diagonal peg, or a freely floating exchange rate, most upgraded the legal independence of their central banks in the 1990s. It thus appears that legal independence of the Central bank has come to be considered as desirable even if some type of exchange rate anchor is being used. The likelihood that this legal independence translates into actual independence, however, is higher under a looser exchange rate anchor.

4 Future challenges for an era of price stability

In sharp contrast to the 1980s, large parts of the world currently enjoy price stability, and central banks have become the guardians of this stability. This is a good arrangement, since reasonably independent central banks are in a better position to maintain price stability than to

bring down high rates of inflation.¹⁸

There are several reasons to believe that this era of price stability is here to stay. First, even moderately independent central banks today find it easier than in the past to insist on delivering price stability, because so much of each country's trade is with countries that are also characterized by price stability. This is reinforced by substantially higher freedom in the movement of capital and the associated deeper international capital markets. In this new era, nominal or financial instability within a single country is much more costly than in the past in terms of limitations on access to capital markets. Ministries of finance and governments anxious to maintain unhindered access to borrowing in case of need understand that letting inflation persistently deviate from the world norm will raise the risk premium on their borrowings and generally limit their ability to borrow. They are thus more willing than in the past to allow central banks to focus on price stability. Similar considerations apply to the maintenance of financial stability. Free and deep capital markets reinforce governments' incentives to appoint relatively conservative central bankers and to give them enough latitude to maintain a strong focus on attaining price stability.

4.1 Monetary policy in an era of price stability and flexible inflation targeting

There is a natural tendency to expect that once inflation has been conquered, the central bank will pay more attention to the state of the real economy when choosing its policy instruments than it did during the period of inflation stabilization. In the terminology of Svensson (1997), observers expect the bank to become a flexible inflation targeter, or if the bank was already flexible during stabilization, they expect it to become even more flexible once inflation had been conquered.¹⁹ Such expectations arise because politicians and the public generally expect policymaking institutions to address the current main problem. Once inflation has been eradicated from the system, they take this fact for granted and expect the bank to pay

¹⁸ Cukierman, Miller, and Neyapti (2002) show that high levels of legal independence in the newly created central banks of the former socialist economies did not stop the substantial inflationary impact of price decontrols in the 1990s.

¹⁹ A Central bank is a flexible inflation targeter if its loss function penalizes both output and inflation gaps; it is a strict inflation targeter if it cares only about the inflation gap. There can clearly be only one kind of strict targeter, but many types of flexible targeters are possible, depending on the weight of the output gap relative to the inflation gap in the bank's loss function. The higher this weight, the more flexible, or less conservative, is the bank.

more attention to other pressing problems.

A deeper, welfare-based reason to justify more flexibility (or less conservativeness) on the part of the Central bank is related to the fact, discussed earlier, that the policy trade-off between inflation and economic activity changes after the permanent stabilization of inflation. In particular, a unit change in the policy instrument (for example, the interest rate) has a relatively stronger and more sustained impact on economic activity relative to inflation than prior to the stabilization of inflation. A higher degree of flexibility in monetary policy is indicated under such circumstances: since the policy trade-off between economic activity and inflation has improved, it pays, on welfare grounds, to let monetary policy focus relatively more on stabilizing the output gap than was the case during disinflation.²⁰

Flexible inflation targeting requires an operational measure of the output gap. The output gap is defined as the deviation of actual output from potential output. Central banks have long used various smooth versions of actual output to proxy for potential output, but this procedure may sometimes cause serious policy mistakes. Moreover, it is not grounded in theory. The next subsections briefly review the origins of these problems.

4.2 The perils of output gap stabilization

Nobody knows the time path of potential output. Although part of this uncertainty is resolved with the benefit of hindsight, there is normally substantial uncertainty about the current and near-future expected level of this variable at the time monetary policy choices are made. A major implication of this observation for the choice of monetary policy procedures is that given the poor real-time knowledge on the output gap, flexible inflation targeters condition their policy on a variable that is measured with a substantial amount of error.

Orphanides (2001) shows that during the second half of the 1970s and the early 1980s, the U.S. Federal Reserve systematically overestimated potential output, which led to a substantial overestimation of the magnitude of the recession at that time. Since the Fed behaved as a flexible inflation targeter, those forecast errors induced an excessively loose monetary policy stance and thus contributed to the inflationary bulge of the second half of the 1970s in the United States. The fact that output decreased substantially in the late 1970s is well known and is not

under dispute. What is at issue here is how much of this decrease was due to cyclical elements, over which monetary policy has some temporary impact, versus how much was due to changes in potential output, over which monetary policy has little or no impact.

Forecast errors are sometimes positive and sometimes negative, and they are not normally persistent. One might therefore think that policy errors induced by poor measurement of the output gap would not inject persistent errors into the choice of monetary policy. Unfortunately, this is not the case with the output gap. Cukierman and Lippi (2005) show that errors in forecasting potential output and the output gap are generally serially correlated. Unlike forecasts of variables whose true value becomes known with a lag of one period, the true value of potential output and the output gap is not revealed with certainty, even after the fact. Consequently, the monetary policy errors of flexible inflation targeters become serially correlated, as well. In periods in which potential output does not deviate much from its trend, the measured persistence in policy is small and may not constitute a serious problem for growth targeting. In periods with large deviations of potential output from its trend, however, policy errors may be quite persistent over time. Thus, in the presence of flexible inflation targeting, the inherent unobservability of the output gap is particularly dangerous for nominal stability around and following turning points in the path of potential output.

4.3 A new conception of the output gap

An intriguing recent innovation of new-Keynesian economics is to conceptualize potential output as the level of output that would have been produced in the economy under flexible wages provided that subsidies are in place to offset steady-state distortions stemming from imperfectly competitive markets. Woodford (2003, chap. 6) shows that if these conditions are satisfied, economic welfare is maximized when output is equal to this concept of potential output.²¹ He then suggests that monetary policy should be directed at minimizing the gap between actual output and this new-Keynesian concept of potential output.

²⁰ This point is developed more fully in Cukierman (2004).

²¹ An early formulation of this principle appears in Goodfriend and King (1997) and Rotemberg and Woodford (1997). In those frameworks, inflation (or deflation) reflects the gradual adjustment—via a mechanism along the lines of Calvo (1983)—of sticky prices to changes in marginal costs due to changes in factor costs or productivity (or both).

This notion of potential output has two attractive features: it is welfare based, and it is particularly well-suited as a monetary policy target since it directs attention to the distortion that monetary policy can handle efficiently (namely, temporary distortions in relative prices). Its practical applicability is limited, however, by the fact that there currently are no empirical measures of the flexible price and wage equilibrium.²² In addition, most real-world markets are imperfectly competitive, and existing subsidies are not usually set at levels designed to replicate the production structure in a first-best competitive equilibrium with flexible wages and prices. The level of output that maximizes welfare thus does not necessarily equal the flexible wage and price equilibrium (Benigno and Woodford, 2004; Cukierman, 2005). Furthermore, the flexible price-wage equilibrium is often more volatile than the sticky price-wage equilibrium; this implies that policymakers should aim at making the output level more, rather than less, volatile. In reality, however, most central bankers would resist such a policy even if reliable measures of the flexible price-wage equilibrium were available. Cukierman (2005) provides a partial rationalization for such resistance by showing that in the presence of monopolistic competition in product markets, the sticky price-wage equilibrium may welfare-dominate its flexible counterpart.

4.4 Capital market inflationary expectations as a guide to monetary policy

Since prices are determined by the decentralized decisions of many sellers, the inflation rate is ultimately determined by the aggregation of their decisions. An important insight of new-Keynesian economics is that temporary price and wage stickiness make the aggregate inflation rate dependent on inflationary expectations. The central bank can therefore affect the inflation rate by influencing inflationary expectations. This implies that a current credible change in Central bank policy may affect the inflation rate immediately and not only with a lag, as is the case in backward-looking models.²³

In Chile and Israel, the joint availability of nominal and indexed bonds makes it possible to obtain up-to-date information on inflationary expectations. Such countries can use this

²² To a first approximation, there is no connection between traditional measures of potential output based on various output smoothers and the flexible wage and price equilibrium under perfect competition.

²³ A survey appears in Clarida, Galí, and Gertler (1999).

information as a leading indicator of inflation and partially base monetary policy on it. The Bank of Israel has done precisely that to varying degrees in the last decade with reasonable success. One advantage of using inflationary expectations from the capital market as an indicator of monetary policy is that when unanticipated adverse shocks cause credibility to decline, the bank can act quickly to restore credibility before the decline has a serious impact on inflation. The availability of such an indicator is particularly attractive following the successful stabilization of inflation, when uncertainty about structural economic parameters is high.

Bernanke and Woodford (1997) point out that if conventionally defined rational inflationary expectations are used as the sole policy indicator, the price level may become indeterminate and the inflation rate may diverge. This problem is sometimes referred to figuratively as the monkey in the mirror. No such instability had been recorded in Israel, however, despite occasional substantial reliance on inflationary expectations from the capital market. Possible reasons for this divergence between theory and outcomes is that the Bank of Israel has relied on other indicators, as well, and has generally deviated from precise adherence to the mechanical rule postulated in Bernanke and Woodford. The problem of the monkey in the mirror may become a real possibility under high inflation, but it seems very unlikely to arise in the current environment of generally very low inflation.

4.5 Central bank accountability and transparency

Since central banks are nonelected institutions, they should be held accountable to the democratically elected representatives of the public. There is widespread agreement about this principle, but it is discussed more nowadays than in the past. The reason is simple. Twenty or more years ago, most central banks had little instrument independence, so accountability was automatically ensured. As the delegation of authority over monetary policy conduct became more pronounced, institutions for the explicit safeguarding of accountability had to be devised. Increased delegation of authority over monetary policy thus goes hand in hand with more explicit devices designed to make the Central bank accountable to the public. The institutional design issue of whether this accountability should be “disbursed” only through the government or also

through other impartial bodies is beyond the scope of this paper.²⁴

Transparency is a related feature that has also been highly acclaimed. The consensus view is that it is desirable not only because it enhances the accountability of the Central bank, but also because it affords the bank better control of the public's expectations. This generally raises the efficacy of monetary policy and, in many cases, welfare.²⁵ Nonetheless, central bankers and academics have not reached a consensus on the optimal degree of transparency or the precise procedures for implementing transparency. This is vividly illustrated by an exchange between Willem Buiter (then on the Bank of England's Monetary Policy Council) and Otmar Issing (on the Governing Council of the European Monetary Union) in the early days of the EMU.²⁶ Disagreements involve issues such as the advance publication of Central bank forecasts and the publication of the individual votes of monetary council members. This last issue is related to the question of whether accountability should be collective or individual.

Two issues with respect to transparency remain open. One is how to ensure transparency when monetary policy decisions are made by a council composed of individuals with different loss functions and expectations. Should the bank publish the loss functions and economic forecasts of each council member following (or perhaps prior to) each council meeting? Is such a strategy feasible, and, if so, will it necessarily increase the transparency of the bank's broad policy stance? The answers to those questions are by no means obvious, as the mapping between the level of transparency and particular institutional devices is not always clear-cut.

The second issue is normative. Assuming that the mapping between transparency and institutional devices is known with certainty, should the level of transparency be as high and as immediate as technically feasible? My answer to this question is "obviously not". Suppose, for example, that the Central bank, in its capacity as supervisor of the banking system, becomes aware of solvency problems in a major bank. Full transparency requires immediate dissemination of this information, but that would likely precipitate a run on the banking system, which would make the resolution of the situation substantially more costly from a social perspective. In addition, advance publication of Central bank forecasts, when the bank possesses an information advantage about the economy, is likely to reduce the bank's ability to stabilize the real

²⁴ See Cukierman (2001) for a full discussion.

²⁵ Geraats (2002) presents a survey.

²⁶ Buiter (1999) and Issing (1999) provide details. See also Cukierman (2001) for a summary and evaluation of the controversy.

economy.²⁷

4.6 Central bank capital, distribution of profits, and independence

An institutional aspect of central banking that is relatively neglected in the literature involves Central bank capital, the rules for the distribution of profits, and their impact on the bank's independence. This issue appears to bear strong similarities to such questions for private corporations, in that central banks and private firms are formally incorporated within a similar legal structure and use similar accounting principles. This resemblance in formal procedures hides several important differences, however. Unlike private corporations, Central bank's are set up to achieve aggregate policy objectives rather than to maximize profits. Also unlike private corporations, a negative net worth (or capital) at the Central bank does not imply that the bank will go bankrupt and cease to operate. Finally, the main owner of the Central bank is the government rather than private individuals, which implies that any distribution of profits increases the spending power of the government, while any Central bank losses ultimately translate into revenue losses or additional expenditures for the central government.

When the level of Central bank capital becomes negative and drops below some threshold, the political establishment might be successful in preventing the bank from following policies that lead to additional losses, thereby limiting the independence of the bank through its balance sheet position. In such cases, the more capital a Central bank possesses, the better its ability to conduct policy independently from fiscal authorities. This consideration becomes particularly important when the public interest requires the Central bank to adopt policies that create further losses for the bank. Such situations may arise for a variety of reasons. For example, achieving an inflation target may necessitate contractionary policies; financial stability considerations may require the bank to assume the losses of failed financial institutions in order to reduce the risk of a systemic crisis; or the bank may be forced to launch a costly defense of a peg or band.

The point is not that negative capital always limits the bank's policy options. The Central

²⁷ Cukierman (2001) shows that by reducing the bank's ability to stabilize the economy, the advance publication of Central bank forecasts reduces welfare as conventionally measured through quadratic losses in the output and inflation gaps.

Bank of Chile managed to stabilize inflation despite having negative capital on its balance sheet. In the Chilean case, the negative capital was not a constraint because the government was committed to maintaining a budgetary surplus. In many other cases, however, the central bank's negative capital seriously limited its independence.²⁸

Does that imply that the government should always cover all Central bank losses in order to ensure central bank independence? The answer is not clear-cut, since such an arrangement would allow a nonelected institution (the Central bank) to make fiscal policy decisions. This creates a trade-off between democratic accountability and central bank independence. This trade-off may become particularly important when the occurrence of large economic or political shocks force the Central bank to engage in policies that have substantial adverse fiscal implications. When endowed with sufficient legal independence and positive levels of capital, most Western central banks will probably be able to engage in loss-creating policies as required. In contrast, if the bank has a substantial amount of negative capital at the time those policies are needed, the political establishment will probably have the ability, and often the incentive, to stop, delay, or severely limit their implementation.

This risk is important mainly in developing countries where the association between actual and legal independence is loose. In such cases, the relation between central bank independence and the level of Central bank capital is likely to be discontinuous, in the sense that below a certain threshold of negative capital, the Central bank will be seriously limited by political authorities even if it enjoys a high level of legal independence. Above this threshold, the bank's ability to conduct policy independently will not depend, to a first approximation, on the level of Central bank capital. It follows that the maintenance of a sufficiently high level of capital basically provides (partial) insurance against states of nature in which the bank's ability to resist the pressures of political authorities is weakened.

Similar considerations apply to the rules and regulations for the allocation of Central bank profits to the government. Such rules often are not very transparent and are biased toward large distributions to the government, opening the door for evasion of deficit limits. Clear and transparent rules on profit distribution and the procedures for rebuilding negative levels of central bank capital enhance the bank's independence and its credibility as a guardian of price stability. Stella (2002) offers an enlightening discussion of those issues.

²⁸ Examples are provided in Stella (2002).

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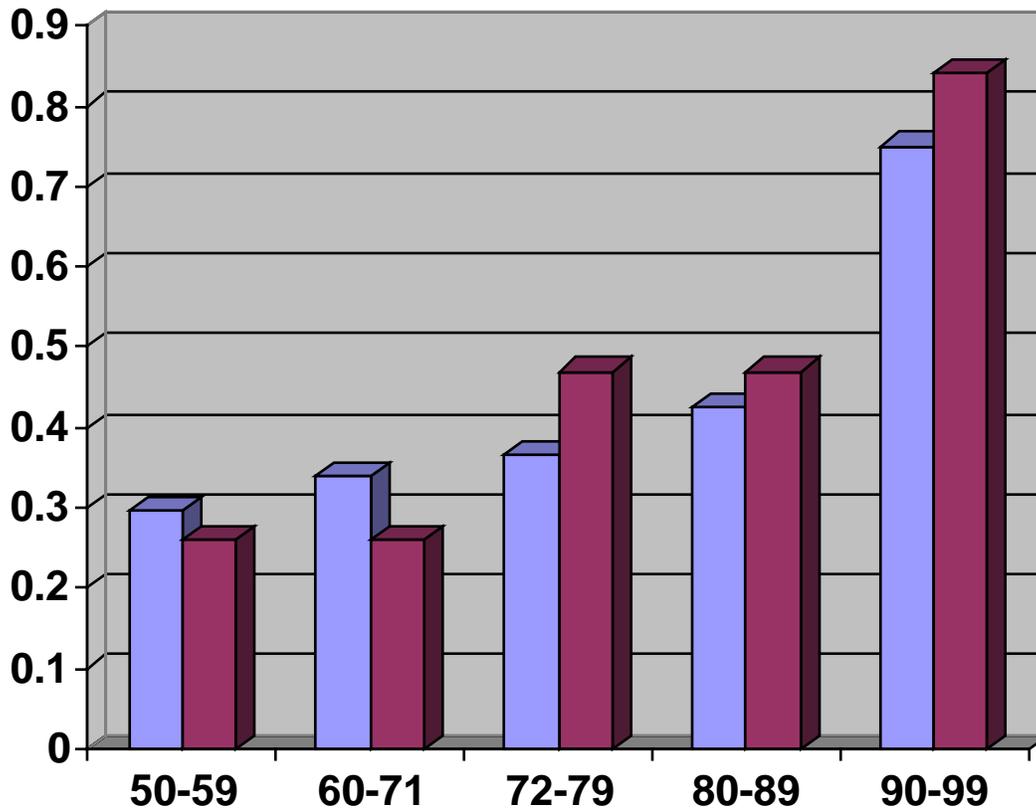
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Figure 1
Average Aggregate Index of Legal Independence, in Chile and Nine Latin American Economies
(indicated periods; 0=dependent, 1=independent)



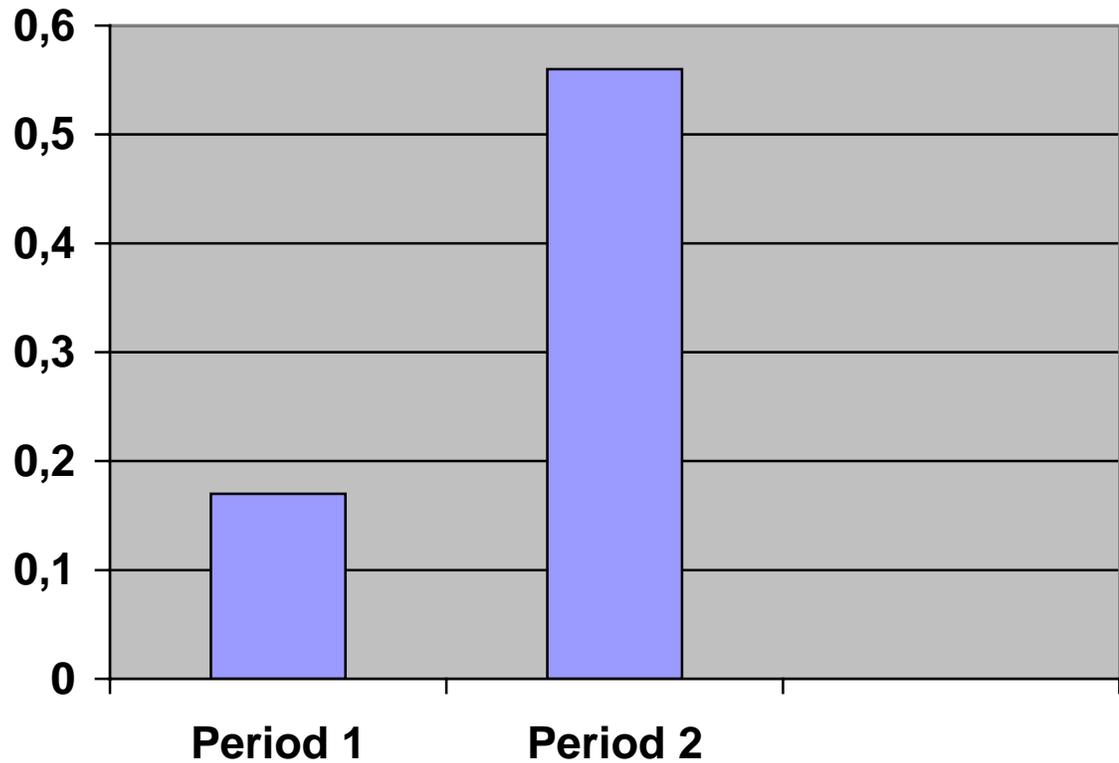
Source: Author's calculations based on data from Cukierman, Webb and Neyapti (1992) and Jacome and Vazquez (2005).

Notes: The figure combines data on the aggregate index of legal independence, LVAW, from table A1 in Cukierman, Webb and Neyapti (1992) for the forty years between 1950 and 1989 with data on the same index for the 1990s from Appendix II in Jacome and Vazquez (2005) for Chile and for nine other Latin American countries, namely Argentina, Bolivia, Colombia, Honduras, Mexico, Nicaragua, Peru, Uruguay and Venezuela.

In the first two periods the number of countries is smaller than nine, either because some of the central banks had not been created yet, or due to lack of data. For some of the countries, Jacome and Vazquez provide a coding for the eighties as well. In those cases, the figures used are averages between their codings and those of Cukierman, Webb and Neyapti for the eighties.

Figure 2

Legal Central Bank Independence in Selected Former Socialist Economies
(before and after reforms)



Source: Adapted from table 1 in Cukierman, Miller and Neyapti (2002).

Notes:

The figure shows the average value of the LVAW index (see remark to figure 1 for details) for six Former Socialist Economies which were not part of the Soviet empire and had, consequently, central bank laws prior to the downfall of the Soviet Union. The countries are Croatia, Hungary, Macedonia, Poland, Romania and Slovenia.

The figure for period 1 reflects the average level of legal independence in those countries prior to the central bank reforms of the nineties. The figure for period 2 reflects the average level of legal independence in those countries after the last central bank reform that those countries had between the early nineties and 1997.

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