



**STABILITY AND ECONOMIC GROWTH:  
THE ROLE OF THE CENTRAL BANK**

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# Central bank independence and policy results: Theory and evidence

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Contemporaneous conventional wisdom is that a sufficiently high level of central bank independence (CBI) is a desirable feature of monetary policymaking institutions. This, rather wide, consensus relies on two pillars. One theoretical and the other empirical. This lecture briefly reviews the standard theoretical case for CBI, some recent extensions, and existing empirical evidence on the relation between CBI and economic performance. It then makes some remarks on the challenges faced by monetary policy in an era of price stability characterized by flexible inflation targeting.

Before plunging into details it is useful to briefly recall what CBI means and how it is measured. In spite of some contentious issues it is fair to say that independence as currently understood involves the following features. The primary responsibility of the central bank (CB) is to assure price stability and financial stability. Without prejudice to these objectives the CB should support the economic policies of government. To achieve its main objective the bank should have instrument independence.<sup>1</sup> The bank is prohibited from lending to government.<sup>2</sup> The bank should have sufficient financial independence. Its high officials should have sufficiently long terms in office, and should not hold other positions in government or in the private sector in order to prevent conflicts of interest. Delegation of authority to a non-elected institution should be accompanied by accountability and transparency. It is noteworthy that those two buzz words of modern monetary institutions were hardly heard twenty years ago or earlier. In the absence of independence, accountability was unnecessary and, as political entities, governments and ministries of finance had

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<sup>1</sup> In a few cases like the ECB and the Banco Central de Chile, the bank is even given some limited goal independence in the sense that it is free to determine its own inflation target.

<sup>2</sup> Although this prohibition legally applies to the bank it really is a device for allowing the bank to resist governmental pressures to help finance budgetary deficits.

no incentives to raise questions about their own transparency in the conduct of monetary policy.

Due to its multi-dimensional nature there is no single compelling measure of CBI. Much of the academic literature of the last twenty years has utilized legal characteristics from CB charters to construct aggregate indices of legal independence. However, since charters normally are highly incomplete contracts, actual independence is also affected by numerous more or less formal arrangements between governments and the CB. As a consequence, there normally are discrepancies between the legal and the actual independence of a CB. The size of those discrepancies varies inversely, across countries, with the general respect for the law. Since law enforcement is generally tighter in developed than in developing countries, legal indices of independence provide better proxies for actual independence in the first than in the second group of countries. In the case of developing countries, behavioral indices of independence are, therefore, relatively more important. Two such indices are the actual, as opposed to the legally mandated, turnover of CB governors and the other known as “the political vulnerability of the CB”. It denotes the frequency of cases in which a political transition is followed within a short period of time by a replacement of the CB governor.

## THE THEORETICAL CASE FOR CBI

### *The standard case*

The, by now, standard case for CBI is based on the notion that there is an inflation bias under discretion. The explanation for this bias is based on a two-ways interaction between policymakers and a rational public within the context of the expectations augmented Phillips curve (Kydland and Prescott, 1977; Barro and Gordon, 1983; KPBG in the sequel). It is based on the notion that monetary policymakers care about both price stability and employment and that their preferred level of employment is higher than the natural level. This is due to either tax distortions (Barro and Gordon, 1983) or to the existence of unions that create excessive unemployment by maintaining the real wage above its market clearing level (Cukierman, 1992, chapter 3). Under discretion, policymakers try to create inflationary surprises in order to push employment above its natural level towards the higher desired level. But individuals understand the temptation of policymakers and correctly forecast inflation, neutralizing any effect of inflation on employment. As a

consequence, employment remains at its natural level but monetary policy is subject to a suboptimal inflationary bias. This is the well-known dynamic inconsistency of monetary policy under discretion. A qualitatively similar mechanism operates in New Keynesian frameworks with staggered sticky prices when policymakers target a level of output that is larger than the potential (Clarida, Gali and Gertler, 1999).

Rogoff (1985) proposed to reduce the bias by delegating authority over the conduct of monetary policy to a CB that is more conservative than society but that is not quite a strict inflation targeter.<sup>3</sup> As a consequence, although smaller some bias remains. Walsh (1995) proposed an optimal contract for central bankers that eliminates the bias entirely, while inducing the bank to stabilize output at exactly the right amount and Svensson (1997a) showed that such a contract can be implemented by means of inflation targeting. Although there are some practical problems of implementation with the optimal contract for central banker's approach, the main lesson from this literature is that delegation of authority to an instrument independent CB whose main long-run concern is price stability in conjunction with a proviso to make the output target equal to potential (or the employment target equal to its natural level) is a desirable institutional arrangement. This still leaves open an important question about what should be done when there is a short-run conflict between achieving price stability and the potential or natural level of output. This question is briefly discussed in the last section.

The rationalization for CBI sketched above is done within the context of an inflation bias that arises due to an employment motive for monetary expansion. This motive is probably the primary motive for monetary expansion in developed economies characterized by wide capital markets in which government can borrow to finance deficits without raising the cost of borrowing too much. However, in developing countries with **limited access to capital markets**, the financing needs of government during deficit periods exert powerful pressures to monetize on the CB. This "revenue motive" for monetary expansion also leads to a socially inefficient inflation bias (Cukierman, 1992, chapter 4).

<sup>3</sup> A strict inflation targeter (or an ultra conservative CB) is a bank that cares only about the stabilization of inflation around its target. Rogoff did not go all the way to proposing strict inflation targeting in order to leave room for stabilization of economic activity.

Strict and well enforced prohibitions on lending by the CB to government—which is one of the components of independence discussed above—reduce or eliminate this bias.<sup>4</sup> Similar considerations apply to nominally denominated government debt. In the absence of sufficient institutional concern for price stability lenders demand an inflation premium which leads to higher nominal rates. In addition, central banks that are less conservative stabilize inflation to a lesser extent.<sup>5</sup> As a consequence, the impact of exogenous shocks on inflation is larger and so is inflation uncertainty. This leads to higher real as well as nominal rates of interest.

As of itself, the employment motive for monetary expansion may lead to moderate, but not to high, inflations. When high inflation occurs it is usually due to the revenue motive for monetary expansion. The monetary financing of government expenditures that triggered the Bolivian hyperinflation during the first part of the eighties is an extreme example of such a case.

*Recent developments in low inflation countries and the effects of prudence on the part of central banks*

The inflation bias result as well as the recommendations for best practice monetary policymaking institutions designed to eliminate it, are invariably made within frameworks in which the loss function of the CB is assumed to be quadratic.<sup>6</sup> It is well known that quadratic loss functions lead to linear CB reaction functions. However, recent empirical work suggests that reaction functions are often non-linear and that the character and magnitude of those non-linearities varies across countries and, over time, even within a given

<sup>4</sup> Unlike the employment motive, which generates a bias that is pure waste from a social point of view, monetization due to the revenue motive is useful in that it provides financing to government through seignorage. But there still is a dynamic inconsistency problem that leads to a socially inferior equilibrium.

<sup>5</sup> Although related independence and conservativeness are not quite the same. Independence refers to the ability of the bank to implement the policies it desires without political interferences. Conservativeness refers to the importance that the bank assigns to price stability in comparison to real objectives like high levels of economic activity and of seignorage. Obviously, effective conservativeness, that determines policy choices, depends both on the bank's conservativeness, as well as on its independence. For simplicity I use the terms conservativeness and independence interchangeably to mean "effective conservativeness".

<sup>6</sup> Examples are Taylor (1999) and Loyaza and Schmidt-Hebbel (2002).

country. In particular, when the CB is more concerned with negative than with positive output gaps its policy reaction to negative gaps is stronger than to positive gaps.<sup>7</sup> In the presence of uncertainty about the state of the economy, this type of reaction leads to an inflation bias even if the CB is instructed to hit potential output on average (Cukierman, 2002, section IV). Essentially, this bias is due to the existence of a precautionary demand for expansions on the part of central banks that are uncertain about the precise state of the economy. Although this bias is smaller than the one created when the CB **also** attempts to hit a level of output above potential, it may become a problem during periods of substantial negative supply shocks. Thus, instructing the CB to aim at potential output on average does not fully eliminate inflationary temptations.<sup>8</sup> Ruge-Murcia (2003) finds that this type of bias fits the history of inflation in the US better than the conventional KPBG story. Using cross-sectional data Cukierman and Gerlach (2003) find evidence of a similar “precautionary” bias for the central banks of OECD countries.

Interestingly, prudence is not always confined to the output gap. During periods of disinflation, when the CB is anxious to build credibility, it may be more sensitive to upward than to downward deviations of inflation from its target. For example, during their periods of disinflation both the Bank of Israel and the Bank of England missed the inflation target more often from below than from above. For a given level of credibility, such a precautionary demand for price stability leads to policies that are overly restrictive on average. As a theoretical matter, the precautionary demand for expansions and the precautionary demand for price stability tend to offset each other. The first creates an average inflation bias while the second creates an average deflation bias. There is evidence that during the stabilization of inflation in both the US and the UK the second bias dominated. However, once inflation had been stabilized for some time, the precautionary demand for expansions became dominant reigniting the risk of an average inflation bias (Cukierman and Muscatelli, 2003).

<sup>7</sup>Blinder (1998, pp. 19, 20) is among the first to provide anecdotal evidence for this. After a period as vice chairman of the FED he writes “... in most situations the CB will take far more political heat when it tightens preemptively to avoid higher inflation than when it eases preemptively to avoid higher unemployment”.

<sup>8</sup>Conventional wisdom appears to be that such instruction should suffice. For example Svensson (2003, p. 426) states that stabilizing inflation around a low average with some concern for stabilizing output around potential is nothing more than the definition of good monetary policy.

**CBI AND ECONOMIC PERFORMANCE**

This subsection briefly surveys existing evidence on the relation between CBI and economic performance in the areas of inflation, growth, investment, real rates, and accommodation.

*Inflation*

The early evidence in Alesina and Summers (1993), Grilli, Masciandaro and Tabellini (1991), Cukierman (1992, ch. 19) and Cukierman, Webb and Neyapti (1992) suggests that, for the industrial economies, inflation and legal independence are negatively related. By contrast, in the group of developing countries, neither inflation, nor growth are related to legal independence. This is most likely due to the fact that, at least until the early nineties, there was hardly any link between actual and legal independence within this group of countries. When behaviorally-oriented proxies of independence like the actual turnover of CB 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, 1992, ch. 19; Cukierman, Webb and Neyapti, 1992; and Cukierman and Webb, 1995).

Using data on the legal independence of freshly created central banks in former socialist economies (FSE) during the nineties, 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. However, once the process of privatization and liberalization of domestic prices and of foreign trade becomes sufficiently large and sustained, a negative relation between inflation and legal independence does emerge. 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 during the nineties, and controlling for international inflation, banking crises and the exchange rate regime, Jacome and Vazquez (2005) find a negative relation between inflation and legal independence. For a similar group of countries and time period, Gutierrez (2003) finds that countries that entrench the legal independence of the CB in the constitution have lower inflation than those that do not.

Is there a general lesson from those different empirical investigations? The evidence is consistent with the conclusion that inflation and **actual** CBI are negatively related in both developed and developing countries. But the extent to which this basic relation is also reflected as a negative relation between inflation and **legal** independence depends on several other factors like regard for the law and the degree of commitment to CBI as proxied, *inter alia*, by whether or not the CB charter is entrenched in the constitution.

One may argue that the negative relation between independence and inflation arises because of reverse causality from inflation to independence rather than from independence to inflation. It is hard to resolve this important question on the basis of existing evidence. Using data on legal independence for the Latin American and Caribbean countries during the nineties Jacome and Vazquez (2005) do not find evidence to support causality from legal independence to inflation. But for earlier periods, Cukierman (1992, ch. 20, section 7), using governors' turnover as a proxy for actual (lack of) independence, finds evidence in favor of two ways causality between turnover and inflation. My own gut feeling is that, in many cases, causality operates in both directions.

### *Growth and investment*

For developed economies Grilli, Masciandaro and Tabellini (1991) found that real growth and CBI are unrelated. This led them to label CBI a "free lunch". Those results are corroborated in studies by Alesina and Summers (1993) and Cukierman, Kalaitzidakis, Summers and Webb (1993).

For developing economies, the last paper finds that, although there is no association between legal independence and the rate of growth of *per capita* income, the association between growth and actual independence as proxied by the political vulnerability of the CB and related measures of turnover has a positive impact on the rate of growth. More precisely, using data from the sixties to the eighties and controlling, *inter alia*, for initial Gross Domestic Product (GDP), the change in terms of trade, initial primary and secondary enrollment ratios, it is found that higher political vulnerability of the CB governor and related measures of turnover are negatively associated with *per capita* growth.

For a subset of developing countries Cukierman *et al.* (1993) also find, in some cases, a similar negative impact of turnover on the share of investment in GDP. A possible joint interpretation of the last two results is that, under de-

pendent central bankers, private investments are lower reducing the long-run rate of growth.

*The distribution of nominal and real rates of interest*

Alesina and Summers (1993) and Cukierman *et al.* (1993) find that, in developed economies the variability of both nominal and real rates of interest is negatively associated with legal independence. The second paper also finds, for the decade of the eighties, that the average real return to depositors was higher in developed economies with higher levels of legal independence.

For developing countries, Cukierman *et al.* (1993) find that the variability of both nominal and real deposit rates of interest is positively associated with the turnover of CB governors.

The broad conclusion from those findings is that the variabilities of both real and nominal rates of interest are lower, and that the average real return to depositors is higher, in countries with higher levels of **actual** independence.

*Accommodation of wage increases*

Evidence presented in Cukierman, Rodriguez and Webb (1998) for the period between the sixties and the eighties suggests that central banks of industrial economies with higher levels of legal independence accommodate nominal wage increases to a lesser extent. This result is obtained in two stages. First, an overtime regression of the rate of increase in high-powered money on the rate of increase of nominal wages, controlling for the phase of the cycle and several other variables, is run for each country. The t statistics of the coefficients of the rates of increase in wages from the country regressions are then taken as proxies for the degree of accommodation and related, cross-sectionally, to the levels of legal independence.<sup>9</sup> 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 effectively conservative, or independent, central banks accommodate wage increases to a lesser extent.

<sup>9</sup>The t statistics of the coefficients rather than the coefficients are utilized in order to reflect the magnitude, **as well as** the significance of each coefficient in the second stage cross sectional regression.

## TWO REMARKS ON THE CONDUCT OF MONETARY POLICY UNDER FLEXIBLE INFLATION TARGETING

Once price stability has been achieved and maintained for a sufficiently long period of time, there is a natural tendency on the part of the public and of policymakers to expect that, in addition to providing a long-run stable nominal anchor, monetary policy will be utilized to stabilize economic activity. In addition to being understandable psychologically, such expectation is pointed in a right direction since, following a sufficiently long period of low and stable inflation, inflationary expectations are likely to be relatively insensitive to temporary deviations of inflation from its target, making the pre-announced target relatively credible. In the extreme case of a perfectly credible target, inflationary expectations are completely insensitive to deviations of inflation from the target leaving substantial leeway for monetary policy to engage in stabilization of the real economy.

Flexible inflation targeting as currently practiced by about two dozen central banks, is an institutional device that cashes in on the benefits associated with high credibility.<sup>14</sup> Under "best practice" flexible inflation targeting as illustrated, *inter alia*, by the recent monetary strategy of the Bank of England, it is explicitly stated that the Bank aims at achieving the inflation target only after two years. The policy freedom afforded by this device is used to stabilize economic activity. A target that is intended to be achieved only within two years is rationalized by the argument that, due to lags between policy and economic outcomes, current policy will affect inflation only after two years from the present. The Bank of England makes substantial efforts to be transparent about the path of inflation on the way to the target as well as about the associated uncertainties by publishing inflation reports that contain inflation projections and fan charts.

Although there are substantial merits to such a systematic and transparent approach to the implementation of monetary policy, it is important to stress that inflation targeting leaves some unresolved issues and that not all the details of the Bank of England inflation targeting framework are appropriate for other countries. Particularly, central banks of countries with a long history of

<sup>14</sup> A flexible inflation targeter is concerned with both the deviation of inflation from its target as well as with the deviation of output from its target. By contrast a strict inflation targeter cares only about the first deviation. This terminology was introduced by Svensson (1997b). Although most central banks do not categorize themselves explicitly as flexible inflation targeters most of them act as if they were flexible rather than strict inflation targeters (Clarida and Gertler, 1997; Clarida, Gali and Gertler, 1998).

high and variable inflation, like many Latin American countries and Israel, cannot safely assume that inflationary expectations will remain insensitive to actual inflationary developments for the same period of time that they remain insensitive to such developments in a country like the UK, that has never experienced high inflation for a substantial period of time. Since price setters react to changes in expectations, it is very likely that, in such countries, monetary policy affects inflation with a lag that is substantially shorter than two years. This lag, most likely, becomes even shorter the more expansionary fiscal policy is. The more general point is that the degree of flexibility in targeting inflation is constrained by the speed with which credibility is lost when inflation is allowed to be above target for some time. This speed depends, in turn, on the long-term memories of nominal instability that the public has.<sup>11</sup> Since those memories vary with the inflationary history of a country, the tradeoff between economic activity differs across countries. Consequently the appropriate degree of flexibility in targeting inflation varies across countries and it may even vary within the same country across broad time periods.<sup>12</sup>

A second open issue concerns the output target. “Best practice” inflation targeters are expected to be transparent.<sup>13</sup> To be transparent, flexible inflation targeters have to be as explicit as possible about their output target. The output target that most well-trained economists would rally around, is potential output. Unfortunately, even for state of the art inflation targeters, there is substantial murkiness about potential output. This is largely due to the fact that economics as a profession has not yet developed a clear and uncontroversial way of measuring potential output. In particular, there appears to be no connection between the smooth approximations of potential output used by many central banks and the conceptualization of potential output as a flexible price and wage equilibrium (Woodford 2003, Chapter 6). Empirical proxies of potential output are smooth versions of actual output, whereas the flexible price and wage equilibrium is often more volatile than actual output, implying that central banks should, in such cases, destabilize rather than stabilize output. It is likely that the set of central banks that subscribe to such policies is currently empty.<sup>14</sup> The more general conclusion is that the current state of economics as a science induces quite a bit of murkiness about potential output.

<sup>11</sup> It also, most likely, depends on the stance of fiscal policy.

<sup>12</sup> An elaboration of this principle appears in Cukierman (2004).

<sup>13</sup> A discussion of the various aspects and benefits of transparency appears in Geraats (2002).

<sup>14</sup> Further detail about this tension between theory and practice appears in Cukierman (2005).

Last but not least, the inherent non-measurability of potential output leads to a related problem when inflation targeting is flexible. During periods of unusually large changes in potential output, even state of the art flexible inflation targeters are led to choose policies that are judged, with the benefit of hindsight, to have led to persistent and substantial policy errors. Orphanides (2001) documents such errors for the US during the seventies, and argues convincingly that a non-negligible part of the inflation of the seventies and its persistence were due to a large and persistent reduction in potential output that was recognized only very gradually later on. Cukierman and Lippi (2005) show theoretically that in the face of large permanent shocks to potential output, even a flexible inflation targeter that utilizes state of the art techniques like optimal filtering and dynamic optimization, cannot avoid large and persistent retrospective policy errors.<sup>15</sup> Given the stochastic structure of shocks and the transmission mechanism, it is possible to find a degree of flexibility in targeting inflation that eliminates any difference between the interest rate chosen by the CB and the one that eliminates *ex post* policy errors. However, since this degree of flexibility does not necessarily correspond to the one desired by society, it is not necessarily socially optimal to adopt it. The weaker, but more general conclusion, is that the degree of flexibility in targeting inflation should **also** take the impact of this parameter on welfare through its impact on the filtering problem solved by the CB.

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<sup>15</sup> From a statistical point of view this is due to the fact that potential output is a latent variable.

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