CENTRAL BANKS AND GROWTH

by

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(Under the direction of William D. Lastrapes)

ABSTRACT

This dissertation comprises two essays on central banking. In Chapter 2, I introduce and empirically test the central bank curse hypothesis, a tendency for large central banks to hinder growth. Using cross-sectional and panel evidence over the years 1960-1995, I find some evidence supporting a central bank curse. Yet it is not universal: large central banks harm growth in developing countries, whereas their effect on growth in developed countries is not statistically significant. I also find that the level of corruption, at least partly, explains the central bank curse in developing countries. In Chapter 3, I document and measure the degree of independence, accountability and transparency of the National Bank of Azerbaijan (NBA) using various indexes from the literature. I find that although the most recent law on the NBA has notably raised its degree of legal independence, the actual independence of the NBA leaves much to be desired. I propose a list of policy measures aimed at enhancing actual independence of the NBA.

INDEX WORDS: Central Banks, Economic Growth, Financial Markets, Central Bank Independence, Transition Economies

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To my dearest parents.

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CHAPTER 1

INTRODUCTION

This dissertation is a piece of research on central banking, a field appealing both to the academic community and real-world practitioners. I believe the research questions I address in this work, likewise, concern both sides.

Is central banking an art or a science? The former, some writers argue. Karl Brunner (1981, p.5), for example, writes:

> "Central Banking [has been] traditionally surrounded by a peculiar mystique…The possession of wisdom, perception and relevant knowledge is natural attributed to the management of Central Banks…The relevant knowledge seems automatically obtained with the appointment and could only be manifested to holders of the appropriate position. The mystique thrives on a pervasive impression that Central Banking is an esoteric art. Access to this art and its proper execution is confined to the initiated elite. The esoteric nature of the art is moreover revealed by an inherent impossibility to articulate insights in explicit and intelligible words and sentences."

Indeed, until the near past, a veil of secrecy surrounded the decision-making process at the central banks. This was partly justified by the subtleties inherent in the conduct of central banking, such as uncertainties about the future course of the economy, about the public interpretations of and reactions to monetary policy measures, possible political and social pressures. All these factors contribute to the view that central banking is an art that should be performed by unique individuals equipped with the best knowledge to run the central bank under different circumstances.

On the other hand, Sir Ralph Hawtrey (1932, p.*vi*), among others, argues that despite the uncertainties present in its conduct, central banking should really have a scholarly foundation:

> "But it is a special characteristic of the art of central banking that it deals specifically with the task of an authority directly entrusted with the promotion of human welfare. Human welfare, human motives, human behavior supply material so baffling and elusive that many people are skeptical of the possibility of building a scientific edifice on so shifting a foundation. But however complex the material, and however imperfect the data, there is always an advantage to be gained from systematic thought."

As central bank independence, transparency and accountability issues became essential in the conduct of central banking, the veil of secrecy has disappeared. All central banks today have research departments and one cannot really find central bank management not paying attention to the contributions of the academic research on central banking.

Academic literature on central banking is rapidly growing. An online search on the phrase "central banking", conducted on EconLit, returns 980 references in the 1970s, 1929 in the 1980s, and 4921 in the 1990s (Blinder 2004). The same search on *EconLit* returns 5477 results in June 2009. Moreover, there is even an independent academic journal that deals with the theory and practice of central bank independence – *International Journal of Central Banking*.

The dynamic nature of this literature is reflected not only in the number of published articles and books. Topics of interest are also evolving over time. Perhaps this is because the real-world history of central banking itself has been developing quite notably. Whereas Swedish RiksBank and Bank of England of the late 17th century mostly functioned to finance war expenses of their respective governments, nowadays these central banks, just like their counterparts in many other countries, struggle to maintain the goals of price

stability and stability of the financial sector, among others. Clearly, in-depth investigation of even a few aspects of central banking is beyond the scope of this dissertation. I focus on two: central bank size – economic growth relationship and achieving central bank independence in emerging economies.

This dissertation comprises two essays on central banking. The motivation for the first one, presented in Chapter 2, stems from a path breaking paper by King and Levine (1993). In early 1990s, this paper gave rise to a voluminous literature exploring the link between financial development and economic growth. They empirically showed that the level of financial development is positively associated the rate of economic growth. One of the important findings of their paper is that, relatively, private banks are more efficient than central banks at providing financial intermediation and thereby increasing output and growth. I extend their work by estimating the effect of central bank intermediation on growth in a more precise manner. Specifically, my model allows for scale effects and for the possibility that central bank lending may have a smaller, but positive effect on growth. Most importantly, I introduce the *central bank curse* hypothesis – an argument that large central banks, in general, hinder growth because governments have unlimited access to the monetary printing press and tend to misuse these "windfalls" of revenues, thereby reducing overall output and growth. The idea behind the central bank curse resembles that of the "natural resource curse," a tendency for natural resource abundant countries to suffer from slow growth rates, which has been widely addressed in the literature.

I empirically test the central bank curse hypothesis and find evidence that the curse exists, at least in developing countries. Results are robust to adding control variables and using different econometric techniques. As for the mechanism behind this finding, I use a

simultaneous equations model and show that at least part of the central bank curse is due to corruption.

As for the policy recommendations, I show that it is necessary to make central banks as small as possible without hindering their ability to perform essential monetary policy functions, seek ways for encouraging private financial intermediations, and take measures against corruption.

In Chapter 3, I address the theory and practice of central bank independence within a case study on the National Bank of Azerbaijan. Central banks in emerging economies, especially in the 1990s amid the collapse of the socialist bloc, have drawn attention of the researchers, as these central banks were built from scratch and offered a unique natural experiment on institution building. My interest in investigating the NBA should come as no surprise, since I have witnessed the realities of transition in Azerbaijan back in time. As a central question of my study, I chose documenting and quantifying the degree of central bank independence of the Azerbaijani monetary authority.

Central bank independence has been a key force in the history of central banking with a substantial literature investigating its theoretical and empirical foundations. Many recent studies focus on the issue of central bank independence in the transition economies and analyze their successes and failures at building a Western-type central bank. In Chapter 3, I measure different aspects of the independence of the NBA using well-known indexes from the literature. I complement the index scores with my own interpretations and propose a set of policy recommendations aimed at increasing the independence of the Bank by perhaps amending the legislation.

The very existence of monetary monopolies, which is mostly taken for granted nowadays, has been questioned by a number of economists. Yet, given that central banks do exist, there is a strong need to develop more efficient and practical ways of central banking. I believe this work is my first step in this direction.

CHAPTER 2

CENTRAL BANKS AND GROWTH: AN EMPIRICAL INVESTIGATION

2.1 INTRODUCTION

Do central banks hinder economic growth? If so, why? Does the size of a central bank, as reflected in the amount of assets it operates with, matter? King and Levine (1993, KL henceforth), in their path breaking investigation of the relationship between financial intermediary sector development and economic growth, also explore how central banks and private banks are related to growth. I extend their work and set up an econometric model that allows a more detailed investigation of the link between large central banks and economic growth.

I go beyond traditional studies on the finance-growth relationship by introducing and exploring what we call "central bank curse" – a tendency for the countries with large central banks, in general, to suffer from slow growth rates. "Central bank curse" is simply an analogy to the so-called "natural resource curse," a concept that entails a substantial literature dealing with the paradoxical finding that, at least for some countries, natural resource abundance is associated with slower growth rates (Sachs and Warner 1995, Leite and Weidmann 1999). This literature argues that "manna from heaven" – easy revenues from natural resources – can cause the government, for various reasons, to manage other components of their economies very badly, allowing them to deteriorate. In some respects, a government's having resort to a monetary printing press may be similar to its having access to an oil field, thereby leading to similar growth-retarding consequences.

In fact, the history of the Spanish discoveries of gold and silver mines in the New World hints at even a more explicit connection between the natural resource and central bank curses. Given that the latter curse is associated with money, and that precious metals, such as gold and silver, were at the time performing the medium-of-exchange function, nowadays attributed to fiat money, it is an interesting historical observation that in the 17th century, the overflow of gold and silver from the Spanish colonies in the New World appeared to lead to an inexorable decline in that country's fortune. William Robertson in his *History of America* (1777, pp. 428-29) discusses the Spanish obsession with the discoveries of gold and silver mines in America and emphasizes how adverse consequences in terms of a nation's wealth unlimited access to "money" may entail:

> Such is the spirit that must be formed, wherever the active exertions of any society are chiefly employed in working mines of gold and silver. No spirit is more adverse to such improvements in agriculture and commerce, as render a nation really opulent. If the system of administration in Spanish colonies has been founded upon principles of sound policy, the power and ingenuity of the legislator would have been exerted with as much ardour, in restraining its subjects from such pernicious industry, as is now employed in alluring them towards it...But in the Spanish colonies, government is studious to cherish a spirit which it should have laboured to depress, and, by the sanction of its approbation, augments that inconsiderate credulity, which has turned the active industry of Mexico and Peru into such an improper channel. To this may be imputed the slender progress which Spanish America has made, during two centuries and a half, either in useful manufactures, or in those lucrative branches of cultivation, which furnish the colonies of other nations with their staple commodities.

The goal of this study is to test the hypothesis that there is a central bank curse and, if so, what is behind it. I set up an econometric model which extends the KL model in two ways. First, my model allows a more precise estimation of the link between central bank

intermediation and growth. Second, it allows estimating the *scale effect* of central bank intermediation on growth.

Research agrees that financial intermediation enhances growth (Levine 2004). Central banks are financial intermediaries; therefore, an increase in central bank assets, which is an increase in total financial intermediation, should increase growth. KL explore the *compositional effect* of an increase in central bank assets, which is how growth changes when there is an increase in the ratio of private bank assets to the sum of private and central bank assets. However, their model does not pick up the *scale effect*, which is how growth changes when there is an increase in the central bank size. To clarify the relevance and importance of the scale effect, consider two countries that have identical ratios of private bank assets to total bank assets, but one of the countries has more total bank assets (relative to GDP) than the other. The findings of KL imply that these countries will experience identical growth (ceteris paribus), because their BANK ratios are the same. In contrast, my model can predict different growth for these two countries, depending on the scale of bank lending. Indeed, I find in general that the country with more bank assets grows more slowly than the other because of the additional drag on growth from the central bank.

Also, the KL model restricts the effect of central bank lending on growth to be (roughly) the negative of the effect of private bank lending on growth. This restriction does not allow for the possibility that an increase in central bank intermediation may have a *positive*, but smaller, effect on growth. I suggest two alternative specifications that allow testing the hypothesis of central bank curse in a more precise manner.

My point of departure is that central banks are, in contrast to private banks, not efficient in performing financial intermediation. As KL put it, central banks "simply funnel

credit to the government or state enterprises." In essence, this is because central banks' statutory duties, such as fighting inflation and maintaining stability of the financial sector, override the goal of profit maximization. Moreover, central banks are publicly chartered institutions and their activities are often subject to political pressures.

I find empirical support for the central bank curse hypothesis. There is a significant negative association of central bank assets as a share of GDP with economic growth. More precisely, cross-sectional results indicate that a one-standard deviation increase in central bank credit as a share of GDP would decrease real per capita GDP growth rate over the years 1960-95 by half a percentage point per year. This is a sizable effect considering that countries in the sample grew, on average, at 2.12 percent a year over the years 1960-95.

Yet, I find that the central bank curse is *not* universal: while large central banks hinder growth in developing countries, they enhance growth in developed countries. In the remainder of the study, I aim to identify what features about the developing countries make them suffer from the curse.

As a preliminary procedure, I look into the determinants of central bank lending by running simple regressions of the quantity of central bank assets as a share of GDP on an array of variables from the empirical growth literature. Estimation results draw attention to the corruption being a potential channel through which large central banks hinder growth. This is intuitive, since developing countries are, in general, likely to be more corrupt. Perhaps, large central banks hinder growth by increasing the level of corruption in a country. Yet this inference is incomplete without accounting for the simultaneity problem.

To this end, I construct and estimate a simultaneous equations model in three endogenous variables: central bank size, growth and corruption. Using this model, I test the

hypothesis that large central banks afflict growth through a corruption channel. Estimating the simultaneous equation model reinforces the finding prevailing throughout this work: large central banks exert a significant, negative effect on growth in developing countries. In addition, I find that at least part of this effect works through the corruption channel.

My findings have important policy implications. To avoid the curse, policymakers should reconsider the role of the central bank in the functioning of the economy. Most importantly, central banks should be made as small as possible without hindering their ability to conduct everyday monetary policy. In this respect, monopoly note issuance should be significantly diminished, if not relinquished altogether.[1] Obviously, in the mean time policymakers should take several measures to encourage private financial sector development. Yet, the results of this study suggest that spending more effort avoiding the central bank curse, perhaps by limiting the extent and reach of counterproductive central bank lending, may turn out to be a more effective policy measure.

2.2 LITERATURE REVIEW

This study relates to theoretical and empirical work in three areas. The main area of interest is the relationship between economic growth and financial development. Two others deal with the *natural resource curse* and the corruption-growth relationship.

Does finance cause growth, and if so, how? According to Levine (2004, p.3), who reviews a vast literature on the topic, "we are far from definitive answers to these questions."

Schumpeter (1912) recognized almost a century ago the importance of well-developed financial intermediaries in increasing the rate of technological innovation, capital

[1] Lastrapes and Selgin (2008) argue that the cause of the low productivity of paper money stems from the fact today it is almost exclusively supplied by central banks. They show that private paper money, issued by private banks, promotes economic growth through gains to private intermediation.

accumulation, and economic growth. He argues that well-functioning financial markets, by lowering costs of conducting transactions, ensure capital is allocated to the projects that yield the highest returns, and therefore, exert a positive effect on economic growth.

Theoretically, financial intermediaries help eliminate market frictions by reducing transaction, information and enforcement costs in the financial markets. By providing certain services, financial intermediaries influence incentives and constraints faced by economic agents. The agents change their savings and resource allocation decisions in ways that may alter long-run economic growth. In particular, Levine (2004) highlights five services provided by financial intermediaries:

- Produce information ex ante about possible investments and allocate capital
- Monitor investments and exert corporate governance after providing finance
- Facilitate the trading, diversification and management of risk
- Mobilize and pool savings
- Ease the exchange of goods and services

Financial development occurs when financial intermediaries do a better job at providing these services and, therefore, reduce, though not eliminate completely, the effects of transaction, information and enforcement costs in financial markets.

Greenwood and Jovanovic (1990) model financial development and economic growth as being endogenously determined. Growth makes costly financial structures affordable, and financial development promotes growth by allowing higher rate of return to be earned on capital. In Greenwood and Smith (1997), the date when the financial markets start functioning is determined by gains from specialization, the probability distribution of costs of market formation and the initial wealth of the economy. The higher the expected

gains from specialization and initial wealth and the lower the costs of market formation and lower the uncertainty regarding the costs, the sooner the financial market begins functioning.

Financial intermediation also appears to have different effects on the so-called *sources of growth*: physical capital accumulation, savings and productivity growth. According to Beck, Levine and Loayza (2000), there are two alternative views in development economics on the effect of financial intermediary development on growth. The first view[2] argues that financial intermediation influences growth by affecting the allocation of resources, i.e. leading to higher productivity growth and technological change. An alternative view considers capital accumulation as the primary engine of growth.

Empirical interest in the relationship between finance and growth dates back to the late 1960s. Goldsmith (1969), using data from 35 countries over the period 1860-1963, graphically documents a positive correlation between financial development and the level of economic activity. However, he prefers not to draw causal inferences from the graphical presentations because of the absence of data on financial sector development for a broad range of countries. In the early 1990s a series of papers by King and Levine bring the finance-growth nexus to the forefront of economic literature. KL examine 77 countries over the period 1960-89 and find a statistically significant positive association between the level of financial development and economic growth. They also construct four measures of the financial intermediary sector development, which is another important contribution of the paper. In economic terms, they estimate, for example, that an increase in the value of DEPTH (one of their indicators of financial development. measures the size of the financial sector) from its actual value in the poorest quartile of the countries to that in the highest

[2] KL credit this view to Joseph Schumpeter (1912)

quartile would increase the poorer nations' real per capita GDP growth by almost one percent per year.

KL, however, do not solve the issue of causality: maybe not only does finance foster growth, but also growth leads to financial development. Levine, Loayza and Beck (2000) address this issue by using newly available dynamic panel data techniques. They find that the exogenous component of financial development continues to exert a significant and positive influence on growth.

Most recently the research has dealt with the variation of the finance-growth relationship under different environments. For example, Rousseau and Wachtel (2001) examine what happens to this relationship if the economy experiences high rates of inflation. Rioja and Valev (2004) examine how this relationship varies with different geographic regions and levels of financial development.

La Porta, Lopez de Silanes and Shleifer (2002) conduct a study on government ownership of banks around the world. They point out that while government financing through banks can encourage savings and capital accumulation, the projects the government finances are likely to be inefficient and have an adverse effect on productivity growth.

As mentioned above, the logic behind the "central bank curse" resembles that of the "natural resource curse." Sachs and Warner (1995), in a seminal study, find that natural resource abundant countries grew slower, on average, by one percent per year during the period 1970-89. Later studies mostly focus on the channels of causation from natural resource abundance to slower growth. These studies feature such channels as Dutch disease, increased ethnic conflicts, volatility in commodity prices and corruption. Here, I test

whether corruption channel is important, as well, for the link between large central banks and slower growth.

I also benefit from a substantial literature that explores the link between corruption and economic growth. Corruption takes on many forms and it is important to identify the type of corruption that concerns this study. Since central banks are publicly chartered institutions, my focus is on corruption in the public sector. Jain (2001) divides corruption into two categories:

- *Bureaucratic corruption*: corrupt acts of the appointed bureaucrats in their dealings with either their superiors (political elite) or with the public. Among examples of bureaucratic corruption are outright thefts by tax officials or the collusion of tax inspectors with taxpayers resulting in smaller amounts of tax collection, bribes in return for administrative approval of investment projects or for the issuance of licenses. Thus, there is a dichotomy between the corruptible agents employed and the benevolent principal (i.e., government) that designs the institutional framework within which these agents operate (Aidt 2003).

- *Grand corruption*: acts of the political elites by which they exploit their power to make economic policies. Here, there is no benevolent principle and *all* agents – bureaucrats as well as policymakers – are corruptible. An important repercussion is that institutions and policies are likely to be designed in a highly inefficient way. As a result of these policies, public funds can be diverted to large infrastructure projects with better opportunities to extract illegal income (Tanzi and Davoodi 1997). More precisely, corruption is likely to increase the number of projects undertaken in a country, and to change the design of these projects by increasing their *size* and complexity.

Corruption appears to hinder growth. North (1990) emphasizes the need for honest institutions to defend property rights and reduce transaction costs. Murphy, Shleifer and Vishny (1991) find that corrupted societies create incentives that stimulate the most talented people to earn their income more through bribes rather than production. Boycko, Shleifer and Vishny (1996) find that agreements that are produced by corrupted practices are inherently unenforceable and this produces an uncertainty that is disadvantageous to the economic process. Mauro (1995), in a pioneering empirical study, finds that corruption negatively affects investment and, through this channel, economic growth. As a basic mechanism behind this finding, Mauro (1998) claims that corruption, when understood as an institution that raises revenues for the administration, has more distortionary effects than taxation because of its illegal character. Economic agents spend substantial efforts to avoid detection and punishment.

Corruption also affects the ways policymakers make decisions; it is not limited to the private sector. Krueger (1993) argues that incompetent policies are not always the result of the lack of knowledge, but rather the outcome of decision makers' efforts to capture personal rents. With high level of corruption, resources are allocated to activities with high potential for bribes to be collected, as opposed to welfare enhancing activities. Tanzi and Davoodi (1997) find that corrupted government officials direct public investment toward large projects, possibly at the expense of expenditures on health and education.

Unfortunately, there are few papers that bring issues of corruption, central bank size and growth together. Lambsdorff and Schinke (2002) model corruption *at* central banks. They show that corruption at central banks distorts policies and, eventually, leads to higher levels of inflation. Huang and Wei (2006) and Hefeker (2008) consider the role of

corruption in the design of monetary policies and/or choice of an exchange rate regime in a simple monetary policy game in a Barro-Gordon-type model.

2.3 PRIVATE vs. CENTRAL BANK LENDING

In this section I compare and contrast the nature, efficiency and consequences of the loans offered by a private bank and a central bank. Prior intuition is that central banks are less efficient than private banks in performing financial intermediary functions. The cause of the inefficiency most likely lies in the conflict of duties of the central bank: the goals of preventing inflation and the rendering of last resort aid to private banks often run counter to the goal of maximizing the value of their capital.

Central banks are publicly chartered institutions with profit maximization not being their primary mission. On the other hand, most central bank laws, if not all, list "maintaining stability of the financial system" among objectives of the central bank. As emphasized in the classic doctrine of the *lender of last resort* elaborated by Walter Bagehot (1873), the central bank should lend to "illiquid but solvent" institutions to help them meet their short-term obligations. Moreover, central banks must lend whenever not lending could trigger a systemic crisis. Indeed, central bank lending throughout history has been a prominent part of regulatory assistance to troubled financial institutions. The recent 2008 recession is a case in point – central banks worldwide mobilized resources to restore the stability of the financial system, albeit the extent and direction of the loans have been subject to severe criticisms.

The lender-of-last-resort role of the central bank has been challenged on different grounds. Many researchers criticize the last-resort lending for provoking moral hazard on the private banks' side. Moreover, Goodfriend and King (1988) argue that the lender of last resort doctrine was elaborated at times when the financial markets were underdeveloped.

Nowadays, with sophisticated interbank markets, the last-resort lending by the central bank has become redundant. Open market operations can provide sufficient liquidity which is then allocated by the interbank market.

Drawing on the theory of financial contracts, Goodfriend and Lacker (1999) compare and contrast central bank lending and private bank lending. They note that the fundamental similarity is the advancement of large amounts of funds on a short notice. They treat central bank lending as a "publicly provided line-of-credit service." The difference between these two types of lending, according to the authors, stems from the fact that while private credit lines are explicit contractual commitments, a central bank's commitment to lend is a matter of policy choice. Consequently, a central bank's line of credit has the potential to shift losses from uninsured creditors to the deposit insurance fund or general taxpayers.

There are three main concerns about inefficiency of central bank lending relative to private bank lending. First, as mentioned above, the very nature of the central bank lending exacerbates the problem of *moral hazard* on the part of the borrowers; i.e. the banks (or their managers) have incentives to take on more risks since they regard potential central bank lending at times of trouble as granted. This problem is also relevant for private lending, yet on a substantially smaller level. In fact, potential fear that "the central bank will not lend" could trigger a systemic crisis, severe capital reversals, and flights to safety. Second, unlike private bank lending, the lending reach of the central bank includes a broad range of institutions; some of which hardly qualify as credible borrowers. Private banks have a freedom of choice, as they can make explicit case-by-case decisions to lend based on the borrower's ex post creditworthiness. Central banks hardly enjoy this luxury; there are often legislative and regulatory policies delimiting the set of institutions that have access to central

bank credit. The cause of the first two issues is that central banks lack explicit institutional arrangements to credibly pre-commit to refuse lending or, at least, limit the lending extent and reach. This takes us to the third issue with the central bank lending – the commitment problem. Just like nowadays most central banks have the reputation for maintaining low inflation, market participants also recognize the central bank's "reputation" to lend whenever there is a risk of systemic crisis. As, for instance, the history of Federal Reserve shows, the question of "lend or not to lend" in the majority of the cases was resolved in favor of the former option. The legislative mandate for protecting the financial system forces the central bank officials to interpret a risk to the system as a signal to lend. Also, it is hard to prove the counterfactual; i.e. that not rescuing the troubled financial institution would not have seriously affected the markets.

To sum up the lessons from Goodfriend and Lacker (1999), the institutional incentives for a central bank to limit lending are relatively weak and the critical policy problem is to how limit central bank lending to socially appropriate circumstances. The authors believe that reputation building is the best solution to this problem.

It is not only the duties associated with the lender-of-last-resort role of the central bank that lead to inefficient lending. Most central banks, if not all, are legally bound to pursue the goal of price stability. This overriding goal may often run counter to the goal of maximizing the value of its capital, thereby leading to inefficient lending.

The last, but not least source of inefficiency lies in central bank lending to government by buying T-bills which is hardly an investment triggered by a profit motive.

2.4 DATA

For cross-sectional estimation, I use Levine, Loayza and Beck's (2000) data set, which includes observations from 71 countries averaged over the years 1960-95. Another data set with observations from 106 countries averaged over the 1980-95 period is used for sensitivity checks. For panel estimations, I use a data set with observations from 74 countries over the years 1960-95, again from Levine, Loayza and Beck (2000). All data sets are available online at the World Bank's Research data base.

GROWTH equals the rate of real per capita GDP growth over the years 1960-95. CBY equals the ratio of central bank assets to GDP. The assets include claims on the whole nonfinancial real sector, including government, public enterprises and the private sector. Thus, they include loans to the Treasury (t-bills) and loans to banks (discount loans). DBY equals the ratio of private (deposit) bank credit to GDP. TBY equals the sum of CBY and DBY. BANK measures the relative importance of specific financial institutions and equals the ratio of DBY to TBY. This variable measures the degree to which private banks versus the central bank allocate society's savings. KL mention that BANK's weakness is that it is not a direct measure of the quality and quantity of financial services provided by banks. DEPTH, PRIVATE and PRIVY variables are three alternative measures of financial intermediary sector development from KL's work. DEPTH measures the size of the financial sector and equals the ratio of liquid liabilities of the financial system to GDP. Liquid liabilities include currency held outside the banking system plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries. The remaining two financial development indicators measure domestic asset distribution. PRIVATE equals the ratio of claims on the nonfinancial private sector by financial intermediaries to total

domestic credit, while PRIVY equals the ratio of claims on the nonfinancial private sector by financial intermediaries to GDP.

I also control for other growth determinants. INCOME60 equals the logarithm of real per capita GDP in 1960. This variable controls for convergence. SCHOOL60 equals the logarithm of the average years of secondary schooling of the working-age population in 1960 and indicates the human capital stock in the economy. I also include PI, the inflation rate, and GOV, the ratio of government expenditures to GDP, as indicators of macroeconomic stability. TRADE, the sum of exports and imports as a share of GDP, is used to capture the degree of openness of an economy.

Table 2.1 lists the countries in the cross-sectional data set averaged over the 1960-95 period, one observation per country, with information on GROWTH, CBY and DBY. Table 2.2 presents descriptive statistics. The descriptive statistics are in percentages except for INCOME60 and SCHOOL60, which are expressed in logs.

There is considerable variation across countries in the data set. For example, CBY is less than 1% of GDP in Austria, Netherlands, Taiwan and Fiji, while greater than 20% of GDP in Syria, Liberia, Bolivia and Haiti. Growth rate differences are also huge. East Asian economies like Korea, Malta, Taiwan, and Cyprus experienced growth rates greater than 5% per year, while Zaire, Niger, Ghana, Venezuela, Haiti and El Salvador all suffered growth rates of less than negative 0.5% per year from 1960 to 1995.

Table 2.3 presents the correlations between the major variables used in the cross-sectional estimation. CBY is inversely correlated to growth, and DBY has a positive correlation value of 0.53. Figure 2.1 shows the relationship between CBY and the average growth rate of real per-capita GDP over the 1960-95 period. One can notice a negative

association between CBY and GROWTH. No influential observations which could significantly affect this conclusion exist.

Tables 2.4 and 2.5 report descriptive statistics and correlations for the panel data set. Figure 2.2 illustrates CBY-growth relationship in the 74-country panel data set. Using panel data also increases the variability of the data. For instance, the within country standard deviation of CBY in the panel data set is 6.43%. It is added to the between country standard deviation of 5.43%. Again, one can notice a negative association between CBY and GROWTH.

I also break down the summary statistics across the developing and developed countries. Tables 2.6 and 2.7 report statistics for the developing countries, and Tables 2.8 and 2.9 do so for the developed countries. One can see that there is a negative association between CBY and GROWTH for developing countries and a positive one for developed countries. I want to examine whether this *prima facie* evidence for the central bank curse hypothesis holds up in the regression analysis using control variables.

2.5 ECONOMETRIC FRAMEWORK

In this section I formally show the restrictions inherent in the KL model. Briefly, this model restricts the scale effect to be zero and also rules out a possibility that the esimtate on central bank lending may have a positive effect on growth. Instead, I propose two alternative models that relax these restrictions and allow a more precise testing of the central bank curse hypothesis. Finally, I conduct a purely cross-sectional and a panel data estimation using the 1960-95 data. I begin with replicating the KL results and then estimate my two models.

2.5.1 Model Specification

KL estimate the effect of financial development on economic growth using the following equation:

$$Y_i = \beta_0 + \beta_1 BANK_i + \gamma' X_i + \varepsilon_i \qquad (1),$$

where KL assume that the conditional mean of growth is linear in BANK and X_i is the vector of controls. Given that by definition BANK equals $\frac{DBY}{TBY}$, KL are interested in how growth changes when the relative magnitudes of CBY and DBY change but not the overall scale. This is because equal proportional changes in CBY and DBY would leave BANK unchanged. Thus, in their model the *compositional* effect applies as opposed to the *scale* effect of an increase in central bank size. Equation (1) implies that a one unit change in BANK causes growth to change by β_1. We also get the following partial effects of CBY and DBY on economic growth:

$$\frac{\partial Y}{\partial DBY} = \beta_1 \left(\frac{1 - BANK}{TBY}\right) \qquad (1a)$$

$$\frac{\partial Y}{\partial CBY} = -\beta_1 \left(\frac{BANK}{TBY}\right) \qquad (1b)$$

These multipliers indicate that growth is non-linear in DBY and CBY. If there is a proportional change in both DBY and CBY there is no change in growth because a proportional change in these variables leaves BANK unchanged. This essentially means that the KL model restricts the scale effect to be zero, as argued above. Also note that (1b) roughly equals the negative of (1a). This forces us to possibly mistakenly infer that if BANK has a positive effect on growth, CBY will necessarily have a negative effect. This restriction

rules out the possibility of CBY having a *positive*, but smaller effect on growth. The following specification relaxes this restriction:

$$Y_i = \alpha_0 + \alpha_1 CBY_i + \alpha_2 DBY_i + \gamma' X_i + \varepsilon_i \qquad (2)$$

In this equation, I assume that the conditional mean of growth is linear in CBY and DBY.

$$\frac{\partial Y}{\partial CBY} = \alpha_1 \qquad (2a)$$

$$\frac{\partial Y}{\partial DBY} = \alpha_2 \qquad (2b)$$

The effect of a simultaneous equal change in both DBY and CBY would be $\alpha_1+\alpha_2$, and the effect of an equal proportional change in DBY and CBY would be[3]

$$\left.\frac{\partial Y}{\partial DBY}\right|_{=\%} = \alpha_1 CBY + \alpha_2 DBY \qquad (2c)$$

This multiplier measures the scale effect since equal proportional changes in DBY and CBY do not affect the ratio. The compositional effect, i.e. the change in the relative magnitudes of DBY and CBY, is

$$\left.\frac{\partial Y}{\partial DBY}\right|_{dDBY=-dCBY} = \alpha_1 - \alpha_2 \qquad (2d)$$

However, there is no clarity as to how to nest the KL model in equation (2). Ultimately, we would want a model that "generalizes" the KL equation to be able to compare the statistical fit. The following specification serves this purpose:

[3] To get this multiplier, take the total differential of (2c) and note that dx/x is a percentage change.

$$Y_i = c_0 + c_1 BANK_i + c_2 TBY_i + \gamma' X_i + \varepsilon_i \qquad (3)$$

where growth is linear both in compositional effects and scale effects. So c_1 measures the effect on growth of a change in composition (holding scale fixed), while c_2 measures the effect on growth of a change in scale that comes about holding BANK fixed. Note also how equation (1), i.e. the KL equation, is nested in equation (3) for c_2=0. The multipliers are

$$\frac{\partial Y}{\partial CBY} = -c_1\left(\frac{BANK}{TBY}\right) + c_2 \qquad (3a)$$

$$\frac{\partial Y}{\partial DBY} = c_1\left(\frac{1-BANK}{TBY}\right) + c_2 \qquad (3b)$$

Note that multipliers contain both compositional effects and scale effects. The first term is the compositional effect, and the second the scale.

Consider the inference about the effect of CBY on growth from equation (3). The intuition is that (3a) is negative while (3b) is positive. If both c_1 and c_2 come out positive, our intuition proves correct. The negative growth effect depends on the relative magnitudes of these coefficients (for given values of BANK and TBY): if c_1 is sufficiently large, CBY will have a negative effect on growth.

Overall, the advantage of equation (2) is that it allows for the possibility that CBY has a positive effect on growth while the KL model is overly restrictive in that sense. The multiplier (1b), which gives us the effect of CBY on growth in their model, is roughly the negative of (1a) which measures the effect of DBY and is positive in light of KL's results. This essentially means that if the coefficient estimate on BANK in equation (1) is positive, most probably we would mistakenly infer that the effect of CBY on growth is *necessarily* negative. My model, as laid out in equation (2) and corresponding multipliers (2a) and (2b),

relaxes this implicit restriction. Thus, equation (2) allows estimating the effect of CBY on growth in a more precise way. The disadvantage of equation (2) is that there is no simple way to nest the KL model, so we can't easily compare the fit in a statistical sense. This disadvantage is taken care of in equation (3). The potential weakness here, however, is that the partial effect of CBY on growth is non-linear. This forces us to choose values of BANK and TBY (for example, sample means) to compute the effect.

2.5.2 Cross Section

The pure cross-sectional, OLS analysis uses data averaged over 1960-95, so that there is one observation per country. The base-line regression takes the form

$$GROWTH_i = \alpha + \beta X_i + \gamma' Z_i + \varepsilon_i \qquad (4),$$

where X is either CBY, BANK and/or TBY variable, and Z_i is a vector of controls.

2.5.3 Panel Data

I also exploit generalized method of moments (GMM) dynamic panel data techniques, which can deal with the possible simultaneity between CBY and economic growth, and can extract the effect of the exogenous component of CBY on economic growth. Unlike past work, the GMM panel data estimator exploits the time series dimension of the data, controls for unobserved country-specific effects, allows for the inclusion of lagged dependent variables as explanatory variables, and controls for endogeneity of all explanatory variables, including CBY. The data are averaged over non-overlapping, five-year periods, so that data permitting there are seven observations per country (1961-65; 1966-70; etc.). The subscript "t" designates one of these five-year averages. Consider the following regression equation

$$y_{it} - y_{i,t-1} = (\alpha - 1) y_{i,t-1} + \beta X_{i,t} + \eta_i + \varepsilon_{it} \quad (5),$$

where y is real per capita GDP over 1960-95 period, X represents the set of explanatory variables (other than lagged per capita GDP), η_i is an unobserved country-specific effect, $\varepsilon_{i,t}$ is the error term, and the subscripts i and t represent country and time period, respectively. Specifically, X includes CBY as well as other possible growth determinants. We can rewrite equation (5) as

$$y_{it} = \alpha y_{i,t-1} + \beta X_{it} + \eta_i + \varepsilon_{it} \quad (6)$$

To eliminate the country-specific effect, I take first-differences of equation (6)

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta(x_{i,t} - x_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (7)$$

The use of instruments is required to deal with (1) the endogeneity of the explanatory variables, and (2) the problem that by construction the new error term $\varepsilon_{i,t} - \varepsilon_{i,t-1}$ is correlated with the lagged dependent variable $y_{i,t-1} - y_{i,t-2}$. Under the assumptions that (a) the error term is not serially correlated, and (b) the explanatory variables are weakly exogenous (i.e., the explanatory variables are uncorrelated with future realizations of the error term), the GMM dynamic panel estimator uses the following moment conditions.

$$E\left[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1}) \right] = 0 \text{ for } s \geq 2; t = 3, ..., T \quad (8)$$

$$E\left[X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1}) \right] = 0 \text{ for } s \geq 2; t = 3, ..., T \quad (9)$$

Arellano and Bond (1991) refer to the GMM estimator based on conditions (8) and (9) as the *difference* estimator.

2.5.4 Developed vs. Developing Economies

I also want to examine whether the CBY-growth link varies with different economic conditions. I differentiate the CBY and DBY effects according to the developed economy status using a method by Rioja and Valev (2004).[4] To do that, I include two interaction terms in my base-line regression: one between CBY and the Less Developed Countries (LDC) dummy and another one between DBY and the LDC dummy. The dummy variable equals 1 if the country is a developing country and 0 otherwise. The estimating equation is as follows

$$Y_i = \alpha_0 + \alpha_1 CBY_i + \alpha_2 DBY_i + \alpha_3 \left[CBY * LDC\right]_i + \alpha_4 \left[DBY * LDC\right]_i + \alpha_5 X_i + \varepsilon_i \qquad (10),$$

where vector X_i contains other determinants of growth, namely, INCOME60, SCHOOL60, GOV, PI and TRADE. All variables are as defined previously. Estimating this equation, which is a slight modification of equation (4), allows obtaining the differential effects of CBY and DBY on growth according to the developed economy status. Specifically, the precise effect is obtained by differentiating equation (10) with respect to CBY and DBY so that

$$\frac{\partial Y}{\partial CBY} = \alpha_1 + \alpha_3 * LDC \qquad (10a)$$

$$\frac{\partial Y}{\partial DBY} = \alpha_2 + \alpha_4 * LDC \qquad (10b)$$

[4] According to the World Bank Country Classification, countries are divided into 4 groups: low income, lower middle income, upper middle income and high income. I divide the sample into two groups, developed countries and developing countries, using a cut-off point of $3,706 GNI per capita (upper limit for a country to be counted as lower middle income).

For developing countries, the CBY effect is given by $\alpha_1 + \alpha_3$, and the DBY effect by $\alpha_2 + \alpha_4$. For developed countries, CBY and DBY effects equal α_1 and α_2, respectively.

I also use an alternative specification to examine whether the CBY and DBY effects on growth are more pronounced in developed or developing countries. I estimate the following equation

$$Y_i = \beta_0 + \beta_1 CBY_i + \beta_2 DBY_i + \beta_3 \left[CBY * INCOME60\right]_i + \beta_4 \left[DBY * INCOME60\right]_i + \beta_5 Z_i + \theta_i \quad (11),$$

where Z_i is a vector of control variables, and both CBY and DBY are interacted with INCOME60.

2.5.5 Sources of Growth

In this sub-section, I investigate the effect of CBY on the so-called sources of growth: physical capital accumulation, savings and productivity growth. Beck, Levine and Loayza (2000) mention two views in development economics on the effect of financial intermediary development on growth. The first view argues that financial intermediation influences growth by affecting the allocation of resources, i.e. leading to higher productivity growth and technological change. According to the second view, capital accumulation is the primary engine of growth. This view argues that financial intermediation influences growth by raising domestic savings rate and attracting foreign capital. Although many researchers agree on the positive effect of financial development on growth, there is no clarity on the channels of causation. Beck, Levine and Loayza (2000) find empirical support for the first view; their estimation results indicate a positive link between financial intermediary

development and productivity growth, whereas the link between the former and physical capital accumulation and savings is ambiguous.

I estimate separately the effects of central bank size on productivity growth and physical capital accumulation. I consider five determinants of growth as dependent variables in my regressions:[5]

- CAPGROLS equals the growth rate of the per capita physical capital stock.
- PSR measures private saving rates and is calculated as the ratio of gross private saving to gross private disposable income.
- PROD1, PROD2 and PROD 3 measure productivity growth. First measure is adjusted for capital accumulation, the second and third measures are adjusted for the growth of human capital.

The estimated equation is as follows:

$$SOURCE_i = \alpha_0 + \alpha_1 CBY_i + \alpha_2 DBY_i + \alpha_3 \left[CBY * LDC\right]_i + \alpha_4 Z_i + \varepsilon_i \qquad (12)$$

where SOURCE is one of the five determinants of growth, as defined above, and Z_i is a vector of control variables. The interaction term accounts for the differentiated CBY effect across developed and developing countries.

2.5.6 Financial Development

Does central bank lending speed up financial development? Do larger central banks encourage subsequent development of lending to the private sector? La Porta et al. (2002) in their study on government ownership of banks highlight two views in development economics on the government participation in financial sector: the development view and the political view. The development view argues that, in some countries, the government

[5] These data are from Beck, Levine and Loayza (2000).

should step in and jump start both financial and economic development (Gerschenkron 1962, p. 19). Applied to our case, the development view implies that an increase in central bank lending will be associated with better financial intermediary sector development. The central bank will be pressured to allocate funds to the strategic needs of the financial sector, or may simply subsidize private banks. On the other hand, the political view implies that larger central bank lending would slow down financial development because the allocation of the funds would be politicized and, thus, inefficient.

I test the empirical validity of both views by estimating the effect of central bank size on overall financial sector development. I use two financial sector development indicators, LLY and PRIVY, as dependent variables in the regressions. LLY represents the ratio of liquid liabilities to GDP, where liquid liabilities consist of currency held outside the banking system plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries. Thus, LLY is a typical measure of financial depth since it reflects the size of the financial intermediary sector. It does not, however, distinguish between the allocation of capital to the private sector and to various governmental and quasi-governmental agencies. On the other hand, PRIVY performs this task; it equals the ratio of claims by financial intermediaries on the private sector to GDP. The estimated equation is as follows:

$$FIN_i = \alpha_0 + \alpha_1 INCOME60_i + \alpha_2 CBY_i + \alpha_3 CBY_i * LDC_i + \alpha_4 DBY_i + \alpha_5 FIN60_i + \varepsilon_i \qquad (13),$$

where FIN is either LLY or PRIVY.

2.6 RESULTS

2.6.1 Cross Section

Table 2.10 presents the cross-sectional estimates. INCOME60 enters all equations with an expected negative sign, thus supporting real convergence. SCHOOL60, a proxy for

human capital investment, also enters all equations with an expected positive sign. The coefficient estimate on BANK, reported in column (1), turns out to be 0.035, which is very close to 0.032, the coefficient estimate from Table VII in KL.[6] It is statistically significant at the 1% level. The coefficient estimate on CBY in equation (2) is negative and statistically significant at the 5% level, and the coefficient estimate on DBY is positive and statistically significant at the 1% level. To assess the economic importance of the results, suppose there is a one-standard deviation increase in CBY averaged over the years 1960-95. Under the KL model, this exogenous increase in CBY would have resulted in a 0.4-percentage point decrease in the rate of real per capita GDP growth per year over the period 1960-95.[7] On the other hand, under the unrestricted model in equation (2), the same one-standard deviation increase in CBY would have decreased real per capita GDP growth rate by approximately half a percentage point a year over the period 1960-95.[8] This is large given that countries in the sample over this period grew, on average, at 2.12 percent a year.

As to the estimation results for equation (3), BANK and TBY have statistically significant effects on growth, with respective coefficients of 0.047 and 0.023. This implies that the partial effect of CBY on growth is -0.058.[9] Similarly, the partial effect of DBY on growth is 0.046.[10] To gauge the magnitude of the estimated coefficients, suppose what would have happened to the annual growth rate if there had been a one-standard deviation increase in CBY. It turns out that such an increase in CBY would have decreased growth by 0.38 percentage points a year.

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[6] The reason I get a slightly different estimate is that my sample covers 71 countries over the years 1960-1995, while theirs covers 80 countries over the years 1960-1989.
[7] To get this, I multiply the CBY multiplier in equation (1b) by standard deviation of CBY.
[8] To get this, I multiply the estimated coefficient on CBY by its standard deviation: 0.075*6.68=0.501
[9] -0.047 (BANK/ TBY) + 0.023 = -0.058, where BANK and TBY are replaced with respective sample means.

[10] 0.047 [(1-BNK)/ TBY] + 0.023 = 0.046, where BANK and TBY are replaced with respective sample means.

Now suppose there is a 1% increase in both CBY and DBY. This equal proportional change can be interpreted as an increase in the scale of total financial intermediation in the economy. Under the KL model, this increase will have no effect on growth since the ratio of DBY to CBY does not change. In other words, the scale effect is zero. In contrast, the scale effect on growth turns out to equal 0.006 and 0.023 percentage points under the unrestricted models in equations (2) and (3), respectively.[11]

2.6.2 Panel

Table 2.11 presents the panel estimates. BANK, once again, has a significant positive effect on growth, as shown in column (1). The coefficient estimate on CBY is negative and significant. Its magnitude is even larger than that in the cross-sectional estimation. A 1% increase in CBY would decrease growth by 0.087 percentage points. For equation (3), I get a significant positive estimated coefficient on BANK and an insignificant coefficient estimate on TBY. To compute the effects of CBY and DBY on growth in the panel data set, I plug the coefficient estimates and the respective sample means into the multiplier formulas (3a) and (3b), respectively. This yields a CBY multiplier of -0.14 and a DBY multiplier of 0.04.

To assess the economic significance of the results, consider what happens to the real per capita GDP growth rate if there is a one-standard deviation increase in CBY. For equation (2), this hypothetical increase would have resulted in a 0.7-percentage point drop in real per-capita GDP growth.

[11] See pages 20-21 for the multipliers I use to compute these effects.

2.6.3 Developed vs. Developing Economies

I report the estimates for equations (10) and (11) in Table 2.12. For equation (10), I find that the effect of CBY on growth for developing countries is statistically significant and negative, whereas the same effect for developed countries is positive.[12] Note that the negative effect of CBY on growth for developing countries is larger than the overall negative effect for the full sample (compare to Table 2.10, Column 2). Economically, a one-standard deviation increase in CBY for a developing country would bring about a 0.72-percentage point[13] *fall* in the GDP growth rate, while for a developed country, the CBY effect turns out insignificant. On the other hand, DBY exerts a positive significant effect on growth in developed countries and a negative, but negligibly small effect in developing countries. Economically, a one-standard deviation increase in DBY would bring about a 0.69-point increase in growth for developed countries and a 0.09-percentage point fall for developing countries.

For equation (11), I find that the CBY effect on growth is negative and its magnitude decreases with a higher initial level of income. Yet, estimated coefficients on both CBY and the interaction term between CBY and INCOME60 are not statistically significant. On the other hand, the overall DBY effect is positive and significant. The negative sign of the DBY-INCOME60 interaction term implies that the growth-enhancing effect of private bank lending is more pronounced in developing countries.

Overall, results in this sub-section indicate that the central bank curse hypothesis is not universal: while CBY estimate is negative for developing countries, it is positive, if

[12] To get the effect for developing countries, I add up the estimated coefficients for the interaction term and CBY: -0.123+0.015= -0.108.
[13] To get this, I multiply -0.108 by 6.68, which is the standard deviation of CBY for the full cross-sectional sample.

significant, for developed countries. Perhaps there are structural characteristics specific to these countries that make large central banks hinder growth.

2.6.4 Sources of Growth

Table 2.13 reports the estimates for equation (12). In general, I find that the central bank size negatively affects the determinants of growth. This result, however, is more robust for the regressions with the growth rate of productivity as a dependent variable. Adding the interaction term between CBY and the LDC dummy to the right-hand side of equation (12) brings up the picture prevailing so far in this work: the estimated coefficient on CBY effect is statistically and economically significant and negative for developing countries, whereas it is positive for developed countries.

More precisely, for full-sample regressions CBY has a negative and statistically significant effect on all three productivity growth measures, and a negative and insignificant effect on the rate of capital accumulation, as reported through columns (5)-(8). In magnitude, the coefficient estimates on CBY are lower than those in base growth regressions reported in Table 2.10. Looking at columns (1)-(4), one can see that the estimated coefficient on CBY for developed countries is positive and insignificant across all four regressions. On the other hand, one can see that CBY exerts a significant and negative effect on capital accumulation and all three measures of productivity growth for developing countries. To assess the economic importance of the results, consider what happens to savings and productivity growth in developing countries if there is a one-standard deviation increase in CBY. It turns out that such an increase would decrease the rate of per capita capital accumulation and the rate of productivity growth (PROD1) over the years 1960-95 by approximately 0.53 and 0.67 percentage points, respectively.

Overall, evidence strongly supports the hypothesis that CBY has a negative influence on both growth and its determinants in developing countries, while this effect is reversed, albeit not statistically valid, in developed countries.

2.6.5 Financial Development

Table 2.14 reports the estimation results for equation (13). Regressions with PRIVY as a financial development indicator yield both statistically and economically significant results, as shown in columns (1-3). Larger CBY exerts a negative, significant effect on the financial intermediary sector development. This result holds even when controlling for the initial level of financial development. Economically, a one-standard deviation increase in the CBY value would result in a 3.33-percentage point decrease in the level of financial development, as measured by PRIVY. Note that this result is valid for both developing and developed countries: adding the interaction term between CBY and the LDC dummy does not alter the previous conclusion. Also, the estimated coefficient on the initial level of financial development is positive and significant implying that countries with developed financial markets enjoy subsequent improvements in the financial intermediation: there is no "convergence" in the rate of financial development.

On the other hand, one cannot arrive at the same conclusion when LLY is used as a proxy for financial development. The estimated coefficient on CBY in columns (4-6) is statistically insignificant.

Overall, evidence, at least for regressions with PRIVY as a dependent variable, lends support for the political view in development economics. Larger central bank lending does not improve financial intermediation, probably because the allocation of the funds is politicized.

2.7 SENSITIVITY ANALYSIS

I estimate equations (1)-(3) using the alternative sample of 106 countries over the 1980-95 period. The estimation results are, qualitatively, in line with those I have obtained using the 1960-95 data. The coefficient estimate on BANK in equation (1) is both statistically and economically significant and enters with a positive sign. The coefficient estimate on CBY is negative and statistically significant and the coefficient estimate on DBY is positive and statistically significant.

Table 2.16 reports the estimation results for equation (10) using the 1980-95 data set. Guyana is an outlier for this sample set as shown in Figure 2.3. Note that column (1) shows full-sample results and column (2) results of the regression after Guyana is removed. Results support my previous findings. The effect of CBY on growth is positive for the developed countries and negative for the developing countries.

I also add some variables from the empirical growth literature to equation (10) for sensitivity purposes. Table 2.17 reports the estimation results. Coefficient estimates on CBY and the interaction term retain their statistical significance. The signs of the coefficients do not change either: the estimated coefficient on CBY is positive and that on the interaction term is negative. In absolute value, the latter is larger, implying a positive effect of central banking for developed countries and a negative effect for developing countries.

2.8 WHERE DOES THE CURSE COME FROM?

Thus far, my estimation results support the central bank curse hypothesis, i.e. the sign of the estimated coefficient on CBY is negative and statistically significant across cross-sectional and panel regressions. In this section I take my empirical findings a step further by exploring specific circumstances that give rise to the curse.

I follow two procedures. First, I look at the potential determinants of CBY. Second, I construct a *tri-variate* simultaneous equations model in growth, corruption and central bank size to allow for simultaneous interaction between these variables.

2.8.1 Determinants of CBY

What are the characteristics of countries that have large central banks? In this sub-section, I attempt to answer this question by examining an array of variables from empirical growth literature that are potentially associated with CBY. Following La Porta et al. (2002), I group the variables into several broad categories, such as initial level of development, measures of government intervention, government efficiency, property rights, initial level of financial development and crisis and instability. I run simple cross-sectional regressions of CBY as shown below

$$CBY_i = \alpha + \beta X_i + \gamma INCOME60_i + \varepsilon_i \qquad (14),$$

where X represents an independent variable of interest. I include INCOME60 to account for the possibility that poor countries have higher CBY.

I report the estimation results for government efficiency, government intervention and the initial level of development categories in Table 2.18. Poor countries indeed tend to have large central banks. The estimated coefficient on INCOME60 is negative and significant. Although the sign of the estimated coefficient on GOV, a measure of the government size, is positive, confirming prior intuition that countries with bigger governments have larger CBY, it is not statistically significant. However, BUREAU, the index of bureaucratic efficiency, enters with an unexpected positive sign. Normally, one would expect large central banks to exist in backward and statist countries with less efficient bureaucracies. Yet, the estimated coefficient is not statistically significant, as shown in

column (3). Significant and negative sign on the estimated coefficient on CORRUPT (whereby higher values actually mean less corruption) implies that higher degree of corruption is common to countries with large central banks. This is consistent with the "grand corruption" view claiming that in corrupt societies with non-benevolent governments, policymakers will make decisions entailing more rent-seeking opportunities. Creating a large central bank, thus, can be common to countries suffering from grand corruption. Finally, countries with higher black market premium, BMP, have larger CBY. This result is statistically significant at 1% level. BMP is considered a proxy for macroeconomic instability by some authors (Barro and Sala-i Martin 1995) and for the more interventionist government by others (La Porta et al. 2002). Hence, larger CBY is characteristic of countries experiencing higher macroeconomic volatility and more interventionist governments.

The coefficient estimates reported in Table 2.19 are not statistically significant. Yet the estimates suggest that the countries which are poor at maintaining the rule of law and securing property rights have larger CBY. A possible explanation is that the availability of large central bank funds, especially in developing countries, gives larger opportunities for rent-seeking for politically powerful elites. Thus, they have fewer incentives to establish strong property rights and the rule of law.

To measure the level of financial intermediary development I use PRIVY and LLY. I find no significant association between the initial level of financial development and CBY, as reported in Table 2.20. However, all measures of initial financial development enter the regressions with negative signs, supporting the intuition that countries with less developed financial sectors would have larger central banks.

In Table 2.20, I also show whether larger CBY is associated with economic and political instability, as measured by inflation and the number of political assassinations and coups. Coefficient estimates are robust for these measures. Recalling the positive link between BMP and CBY, reported in Table 2.18, I conclude that countries with larger CBY are prone to higher economic and political instability. This finding is of particular interest since providing price stability, as well as the stability of the whole financial system, are among major goals of the central bank. The data show that achieving these goals with large CBY might be troublesome.

In sum, the results in this sub-section indicate that the countries that are generally poorer, more corrupt, suffer from greater macroeconomic volatility and have more interventionist governments tend to have large central banks.

2.8.2 Simultaneous Equations Model

In this sub-section, I test the central bank curse hypothesis using a simultaneous equation model with the special interest in the role of corruption. The analysis so far is doomed to be imperfect without addressing the simultaneity issue, as there are important two-way links between growth, central bank size and corruption with no clarity on the direction of causality.

There exists theoretical and empirical work that addresses the simultaneous links between economic growth and financial development (Greenwood and Jovanovic 1990, Levine, Loayza and Beck 2000). Since central bank lending is a part of financial intermediation, it is important to account for the simultaneity between CBY and growth. Moreover, there are simultaneous links between corruption and growth, since "institutions and economic variables evolve jointly" (Mauro 1995, p.682). Finally, the direction of

causality between central bank size and corruption remains a question. In the case of a benevolent government, there may exist corrupted bureaucrats that inefficiently handle public funds; that is, larger central banks may lead to increased corruption, as there are now more rents available for appropriation by those bureaucrats. On the other hand, in the case of a non-benevolent government, policymakers may design policies that could result in inefficient lending; that is, corruption may lead to larger central banks (Aidt 2003).

I construct a system of equations that allows for simultaneous determination of the three endogenous variables: growth, corruption and central bank size. I estimate the system using the three-stage least squares (3SLS) method.

The equation that is the most important and central to my investigation is the growth equation, equation (10) from my cross-sectional estimations above, only with CORRUPT added as an independent variable:

$$Y_i = \alpha_0 + \alpha_1 CBY_i + \alpha_2 DBY_i + \alpha_3 CORRUPT_i + \alpha_4 \left[CBY * LDC\right]_i + \alpha_5 X_i + \varepsilon_i \qquad (15),$$

where Y_i is real per capita GDP growth over 1960-95, CORRUPT measures corruption index (whereby higher value implies lower corruption), and the vector X_i includes INCOME60, SCHOOL60, GOV, TRADE and PI.

Clearly, it is not sufficient to estimate only the growth equation given the aforementioned links between growth, corruption and central bank size. I also want to see whether central bank size affects growth through corruption, or vice-versa. To complete the model and account for these links, I also estimate equations for corruption and central bank size.

The corruption equation is slightly modified equation from Leite and Weidmann (1999, LW henceforth). The reason I choose the LW model out of many analyzing the

corruption-growth link is its focus on natural resource abundance as a potential determinant of the level of corruption. The authors argue that natural resource abundance creates strong incentives for rent-seeking and corruption. I believe this line of reasoning is similarly applicable to my investigation. As mentioned previously, natural resource abundance and large central banks have fundamental similarities: both lead to large amounts of funds flowing through public channels and create opportunities for rent-seeking. The LW model yields two main propositions: (1) the level of corruption is positively related to the incidence of high rent activities and negatively related to monitoring efforts, and (2) corruption lowers the steady state income level, thereby reducing the economy's growth rate. The corruption equation takes the following form:

$$CORRUPT_i = \beta_0 + \beta_1 GROWTH_i + \beta_2 CBY_i + \beta_3 DBY_i + \beta_4 \left[CBY * LDC\right]_i + \beta_5 Z_i + \omega_i \qquad (16),$$

where vector Z_i includes REVC, which measures the number of revolutions and is a proxy for political instability, LAW, the rule of law index measuring institutional quality; ENG, GER and SCAN, which are the legal origin variables. For sensitivity purposes, I also replace legal origins with AVELF, an index of ethnic fractionalization; and the remaining variables are as defined previously. In terms of the LW model, CBY is a proxy for rent-seeking activities and LAW is a proxy monitoring efforts against corruption.

Finally, central bank size equation is as follows:

$$CBY_i = \tau_0 + \tau_1 GROWTH_i + \tau_2 CORRUPT_i + \tau_3 BMP_i + \tau_4 GOV_i + \tau_4 LLY60_i + \delta_i \qquad (17),$$

where LLY60 is a proxy for initial level of financial development, GOV is a proxy for the government size and BMP is the black market premium variable, a measure of macroeconomic instability. For sensitivity purposes, I also replace BMP with PI60, the rate

of inflation at the beginning of the sample period, another measure of macroeconomic instability.

I include the BMP variable to account for the observation that developing and emerging countries are generally characterized with lower macroeconomic stability; the fluctuations in major macroeconomic indicators are more frequent. Presumably, central banks in these countries tend to take more active roles in protecting and developing strategic sectors of their economies. Moreover, according to the above-mentioned "development view" in development economics, countries with underdeveloped economies, and financial markets, will have bigger governments and, presumably, bigger central banks, to jump start financial and economic development. This is the rationale for including LLY60.

The measure of the institutional quality is included only in the corruption equation, since while low institutional quality (poor monitoring efforts) increases corruption; it does not necessarily have direct effect on growth or central bank size except through the channel of corruption itself. I also assume that the legal origin has its effect on growth or central bank size through corruption, since it determines the framework to protect investors and creditors, and, thus, is negatively correlated with the level of corruption, while it is not necessarily correlated to growth or the central bank size. Likewise, ethnolinguistic fractionalization is highly correlated with corruption. Yet it can be assumed to be exogenous both to economic growth and the central bank size (Mauro 1995).

The measures of schooling, inflation and trade are included in the growth equation alone since all would directly affect growth, while no such clear relationship can be drawn with respect to corruption or central bank size. As long as growth enters the other two

equations, the determinants of growth can be assumed to influence corruption and central bank size through the route of growth itself.

In the case of macroeconomic instability, the government, in general, and the central bank, in particular, will take more active stand in the stabilization of the economy. I assume that macroeconomic stability can affect corruption or growth only through channels of bigger central bank or bigger government. On the other hand, presumably, initial level of financial development will affect growth or corruption only by leading to a bigger central bank, as the latter may be necessary to jump start the financial development.

Table 2.21 reports the estimation results. I find that higher levels of corruption are associated with slower growth. The estimated coefficient on GROWTH in the corruption equation, however, is not statistically significant. Both results are consistent with those found in the corruption-growth literature.

Estimates imply that the central bank curse hypothesis is valid for developing countries. To assess the economic significance of this result, consider what would happen to the real per capita GDP growth over the years 1960-95 in developing countries if there was a one-standard deviation increase in CBY. The coefficient estimate on CBY in equation (17) implies that in such case economic growth would decrease by approximately 1.07 percentage points.[14] The hypothesis, once again, does not hold for developed countries.

I find no significant evidence that growth itself affects central bank size, as shown in column (3).

Estimation results for the CBY-corruption link are not as straightforward. I find that central bank size leads to higher corruption levels for developing countries, whereas this

[14] To get this, I multiply the sum of the slope coefficients on CBY and its interaction term with the LDC dummy in growth equation by its standard deviation: [0.04+(-0.20]*6.68=1.07

result does not hold for developed countries. As for the economic relevance of the results, consider what happens to CORRUPT (higher values of which imply less corruption and vice-versa) if there is a one-standard deviation increase in CBY for developing countries. It turns out that such an increase would lead to an approximately 1-point[15] decrease in CORRUPT, which is a sizable change given that this variable is measured on a 10-point scale. This estimate supports the hypothesis that at least part of the counterproductive central banking effect goes through the corruption channel.

Estimates for the central bank size equation indicate a two-way interaction between CBY and CORRUPT. Estimated coefficient on CORRUPT is negative and significant implying that higher levels of corruption lead to higher levels of central bank lending. This is consistent with the view of *grand* corruption (Jain 2001), i.e. both policymakers and bureaucrats are corruptible. In such an environment, existence of a large central bank financing inefficient governmental or quasi-governmental activities should come as no surprise. To gauge the economic relevance of the results, consider what happens to CBY value when there is a one-standard deviation decrease in CORRUPT (i.e. increase in the level of corruption). Such a decrease would result in a 4.81 percentage point rise in CBY averaged over the 1960-95 period.[16] Moreover, estimation shows that higher government spending as a share of GDP leads to a higher level of CBY. It is intuitive that government spending is, to some extent, financed by central banks, which, during most of our sample period, functioned as departments of ministries of finance (Cukierman 2008).

[15] To get this, I multiply the sum of the slope coefficients on CBY and its interaction term with the LDC dummy in corruption equation by its standard deviation: [(-0.01)+(-0.14]*6.68=1.002

[16] To get this, I multiply the estimated slope coefficient on CORRUPT in equation (19) by its standard deviation: (-1.77)*2.72=4.81

Findings in Table 2.21 are robust to changes in the identifying assumptions. For example, I replace the legal origin variables with an index of ethnic fractionalization variable, which has also been used as an instrument for corruption in the literature. Columns (4)-(6) report the estimation results. They are consistent with the previous ones: just like larger central banks lead to higher degrees of corruption, the corrupted environment itself results in larger amounts of central bank lending. Including additional control variables in the central bank size equation does not materially alter my estimates.

Overall, estimation results show that the central bank curse hypothesis survives even accounting for simultaneous links among growth, central bank size and corruption. As for the underlying causes, corruption appears to play an important role in the negative link between central bank size and growth.

2.9 CONCLUSION AND POLICY RECOMMENDATIONS

The research to date has not precisely addressed the effect of central bank intermediation on economic growth. I fill this void by extending a path breaking study by KL. I set up an econometric model that allows a more precise estimation of both compositional and scale effects of central bank intermediation on growth in a cross section and a panel of countries over the 1960-95 period. I also introduce and empirically test the *central bank curse*, a hypothesis that large central banks hinder growth, since they breed rent-seeking and corruption among government officials, which in turn lead to unproductive resource allocation and thereby reduce overall output and growth.

I empirically show that there is a central bank curse. Yet it is not universal: while developing countries suffer from the curse, developed countries do not.

I also attempt to identify the circumstances that give rise to the curse. I construct a simultaneous equations system to test the hypothesis that large central banks inhibit growth through increasing the level of corruption. I find that the central bank curse hypothesis continues to hold even when accounting for the simultaneity bias, and that, at least part of, the negative central banking effect is realized through the corruption channel.

Results of this study have important policy implications. First, they call for reducing the size of the central bank. An extreme measure would be to completely relinquish monopoly note issuance by the central bank. This, of course, should be done without preventing central banks from performing their monetary policy duties. Most importantly, policymakers may achieve better outcomes in terms of increasing output and growth, if they spend more effort fighting central bank curse rather than encouraging private bank intermediation. This should not be interpreted, however, as if fighting central bank curse and encouraging private bank intermediation are competing objectives. Private financial sector development should also be encouraged in several ways, one of which could be granting private banks the right to develop and issue central bank currency substitutes.

Table 2.1
GROWTH, CBY and DBY
Cross Section, 1960-1995

Code	Country Name	GROWTH	CBY	DBY
ARG	Argentina	0.18	6.23	17.87
AUS	Australia	2.06	3.78	47.80
AUT	Austria	3.01	1.29	81.36
BGD	Bangladesh*	1.26	3.53	22.38
BRB	Barbados	3.64	3.89	43.88
BEL	Belgium	2.93	5.05	58.12
BOL	Bolivia*	1.23	23.41	10.81
BRA	Brazil	2.73	11.06	17.80
CAN	Canada	2.87	5.24	42.35
CHL	Chile	1.36	24.71	27.65
COL	Colombia*	2.24	3.40	13.76
CRI	Costa Rica	1.71	7.68	20.57
CYP	Cyprus	4.71	4.33	55.12
DNK	Denmark	2.41	6.74	49.87
DOM	Dominican Republic*	1.98	5.96	16.38
ECU	Ecuador*	2.11	8.26	13.57
SLV	El Salvador*	0.82	9.15	23.58
FJI	Fiji	2.14	0.92	29.06
FIN	Finland	3.26	1.52	53.25
FRA	France	2.90	2.24	62.50
DEU	Germany	2.60	2.21	88.89
GHA	Ghana*	0.03	13.52	8.93
GRC	Greece	3.91	11.28	32.70
GTM	Guatemala*	0.83	4.36	13.20
GUY	Guyana*	-1.26	26.83	37.08
HTI	Haiti*	-0.35	23.51	7.31
HND	Honduras*	0.94	6.33	20.66
ISL	Iceland	3.30	4.57	36.76
IND	India*	1.67	12.95	22.71
IRL	Ireland	3.43	2.05	36.77
ISR	Israel	3.28	11.91	63.87
ITA	Italy	3.36	10.19	73.13
JAM	Jamaica*	1.20	8.00	28.51
JPN	Japan	5.26	3.36	98.94

*I designate these countries as *developing* according to the scheme described in the text on page 27.

Table 2.1 (continued)

Code	Country Name	GROWTH	CBY	DBY
KEN	Kenya*	1.08	4.93	21.41
KOR	Korea, Republic of	6.66	8.08	42.24
LBR	Liberia*	0.36	23.11	14.11
MYS	Malaysia	4.28	1.58	42.88
MLT	Malta	5.43	3.47	43.19
MUS	Mauritius	2.38	7.10	32.83
MEX	Mexico	2.40	6.22	14.10
NPL	Nepal*	1.63	7.81	10.72
NLD	Netherlands	2.54	1.38	70.88
NZL	New Zealand	1.23	6.51	30.55
NER	Niger*	-0.18	2.88	14.97
NOR	Norway	3.26	6.35	57.31
PAK	Pakistan*	2.61	14.01	29.62
PAN	Panama*	2.02	16.56	42.51
PNG	Papua New Guinea*	0.48	3.07	25.13
PRY	Paraguay*	1.97	5.46	10.26
PER	Peru*	0.27	2.31	14.26
PHL	Philippines*	1.47	5.92	25.93
PRT	Portugal	4.62	8.00	74.85
SEN	Senegal*	0.30	5.36	29.31
SLE	Sierra Leone*	0.09	8.28	8.13
ZAF	South Africa	1.31	3.14	56.91
ESP	Spain	3.74	5.86	74.81
LKA	Sri Lanka*	1.70	14.68	20.11
SWE	Sweden	2.22	6.15	49.43
CHE	Switzerland	1.87	1.36	133.08
SYR	Syrian Arab Rep.*	3.02	32.62	28.85
TWN	Taiwan, China	6.20	2.94	65.77
THA	Thailand*	4.45	7.71	42.52
TGO	Togo*	1.86	4.92	22.51
TTO	Trinidad and Tobago	1.07	2.41	26.71
GBR	United Kingdom	2.20	10.78	54.78
USA	United States	2.00	5.21	70.42
URY	Uruguay	0.49	16.81	24.43
VEN	Venezuela	-0.15	2.08	20.79
ZAR	Zaire*	-0.49	13.68	5.47
ZWE	Zimbabwe*	0.59	7.45	23.34

*developing countries

Table 2.2
Summary Statistics
Cross Section, 1960-1995

Variable	Obs.	Mean	Std.Dev.	Min	Max
GROWTH	71	2.12	1.60	-1.26	6.66
INCOME60	71	7.66	0.84	5.91	9.20
SCHOOL60	71	1.43	0.59	0.07	2.40
CBY	71	7.97	6.68	0.92	32.62
DBY	71	37.36	24.78	5.47	133.08
LDC*CBY	71	4.71	7.39	0.00	32.62
BANK	71	78.16	18.26	23.72	98.99
TBY	71	45.32	23.52	15.71	134.44
LLY	71	43.44	25.61	9.73	143.43
PRIVATE	71	38.22	28.71	4.08	141.29
GOV	64	14.79	5.19	6.68	31.37
PI	71	15.28	17.35	3.63	90.78
TRADE	66	59.13	35.90	14.05	231.69

Table 2.3
Correlations
Cross-section, 1960-1995

	GROWTH	INC60	SCH60	DBY	CBY	GOV	PI	TBY	BANK	LLY	PRIVY	PRIVATE
GROWTH	1											
INCOME60	0.15	1										
SCHOOL60	0.38	0.84	1									
DBY	0.53	0.57	0.55	1								
CBY	-0.32	-0.29	-0.16	-0.34	1							
GOV	0.17	0.33	0.4	0.37	-0.09	1						
PI	-0.29	-0.07	-0.06	-0.38	0.32	-0.24	1					
TBY	0.47	0.53	0.54	0.97	-0.11	0.37	-0	1				
BANK	0.51	0.51	0.45	0.66	-0.81	0.38	-0	0.49	1			
LLY	0.6	0.39	0.45	0.81	-0.32	0.3	-0	0.78	0.58	1		
PRIVY	0.51	0.59	0.57	0.89	-0.41	0.3	-0	0.84	0.64	0.77	1	
PRIVATE	0.54	0.53	0.52	0.97	-0.37	0.3	-0	0.93	0.64	0.8	0.92	1

Table 2.4
Summary Statistics
Panel, 1960-1995

Variable	Obs	Mean	Std.Dev	Min	Max
GROWTH	499	0.02	0.03	-0.10	0.11
INCOME60	498	7.44	1.35	4.68	9.91
SCHOOL60	510	1.53	0.58	0.15	2.56
CBY	483	0.08	0.08	0.00	0.54
DBY	483	0.37	0.29	0.00	1.78
TBY	480	0.45	0.28	0.01	1.79
GOV	500	0.15	0.06	0.04	0.45
PI	488	0.16	0.33	-0.03	3.45
TRADE	503	0.55	0.31	0.09	2.00

Table 2.5
Correlations
Panel, 1960-1995

	GROWTH	INCOME60	SCHOOL60	CBY	DBY	TBY	GOV	PI	TRADE
GROWTH	1								
INCOME60	0.19	1							
SCHOOL60	0.27	0.83	1						
CBY	-0.2	-0.28	-0.2	1					
DBY	0.17	0.69	0.56	-0.18	1				
TBY	0.11	0.61	0.5	0.11	0.96	1			
GOV	-0.01	0.38	0.3	0.01	0.29	0.3	1		
PI	-0.26	-0.08	-0.02	0.19	-0.19	-0.14	-0.03	1	
TRADE	0.08	-0.03	0.03	-0.1	0.14	0.11	0.2	-0.19	1

Table 2.6
Summary Statistics
Developing Countries Sub-Sample, 1960-1995

Variable	Obs	Mean	Std.Dev.	Min	Max
GROWTH	41	1.33	1.21	-1.26	4.45
INCOME60	41	7.21	0.60	5.91	8.75
SCHOOL60	41	1.11	0.50	0.07	1.82
CBY	41	9.62	7.55	0.92	32.62
DBY	41	22.41	11.02	5.47	56.91
TBY	41	32.03	13.32	15.72	63.91
GOV	36	12.62	4.72	6.68	31.37
PI	41	19.87	20.97	3.79	90.78
TRADE	38	59.05	36.78	14.05	231.69

Table 2.7
Correlations
Developing Countries Sub-Sample, 1960-1995

	GROWTH	INCOME60	SCHOOL60	CBY	DBY	TBY	GOV	PI	TRADE
GROWTH	1								
INCOME60	-0.03	1							
SCHOOL60	0.24	0.72	1						
CBY	-0.25	-0.03	0.18	1					
DBY	0.35	0.16	0.32	-0.06	1				
TBY	0.18	0.13	0.37	0.48	0.85	1			
GOV	-0.15	-0.15	-0.06	0.06	0.38	0.36	1		
PI	-0.19	0.33	0.31	0.2	-0.36	-0.21	-0.23	1	
TRADE	-0.11	0.01	0.09	0.23	0.44	0.51	0.51	-0.39	1

Table 2.8
Summary Statistics
Developed Countries Sub-Sample, 1960-1995

Variable	Obs	Mean	Std. Dev	Min	Max
GROWTH	29	3.31	1.36	1.07	6.66
INCOME60	29	8.35	0.64	6.81	9.20
SCHOOL60	29	1.91	0.32	1.08	2.40
CBY	29	5.11	3.11	1.29	11.91
DBY	29	59.29	22.73	26.71	133.08
TBY	29	64.40	22.18	29.12	134.44
GOV	28	17.58	4.43	10.13	30.63
PI	29	9.08	7.12	3.63	39.53
TRADE	28	59.22	35.35	15.77	199.26

Table 2.9
Correlations
Developed Countries Sub-Sample, 1960-1995

	GROWTH	INCOME60	SCHOOL60	CBY	DBY	TBY	GOV	PI	TRADE
GROWTH	1								
INCOME60	-0.92	1							
SCHOOL60	-0.59	0.69	1						
CBY	0.1	-0.19	-0.05	1					
DBY	0.03	0.15	-0.08	-0.26	1				
TBY	0.05	0.13	-0.09	-0.12	0.99	1			
GOV	-0.21	0.25	0.44	0.28	-0.2	-0.17	1		
PI	0.04	-0.14	-0.07	0.54	-0.2	-0.13	0.38	1	
TRADE	0.3	-0.38	-0.1	-0.19	-0.2	-0.23	0.14	-0.08	1

Table 2.10
Cross Section, 1960-1995
Dependent variable: Real per capita GDP Growth Rate

Variable	(1)	(2)	(3)	(4)	(5)
	GROWTH	GROWTH	GROWTH	GROWTH	GROWTH
INCOME60	-1.607***	-1.754***	-1.755***	-1.621***	-1.632***
	0.00	0.00	0.00	0.00	0.00
SCHOOL60	2.195***	2.535***	2.341***	2.360***	2.182***
	0.00	0.00	0.00	0.00	0.00
BANK	0.035***		0.047***		0.039**
	(0.01)		0.00		(0.01)
LLY	0.027**			0.026**	0.027**
	(0.02)			(0.04)	(0.03)
PRIVATE	-0.006			-0.007	-0.005
	(0.68)			(0.65)	(0.72)
PRIVY	0.008			-0.007	-0.005
	(0.68)			(0.86)	(0.89)
GOV	-0.018	-0.021	-0.04	-0.008	-0.022
	(0.58)	(0.54)	(0.25)	(0.82)	(0.52)
PI	-0.002	-0.006	-0.002	-0.006	-0.002
	(0.83)	(0.54)	(0.81)	(0.53)	(0.84)
TRADE	-0.009*	-0.002	-0.004	-0.009	-0.010*
	(0.09)	(0.64)	(0.37)	(0.14)	(0.09)
CBY		-0.075**		-0.066**	
		(0.01)		(0.03)	
DBY		0.031***		0.021	
		0.00		(0.45)	
TBY			0.023***		0.01
			(0.01)		(0.64)
Constant	8.119***	11.813***	8.316***	10.880***	8.022***
	0.00	0.00	0.00	0.00	0.00
Observations	64	64	64	64	64
R-squared	0.59	0.54	0.55	0.57	0.59
p values in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Table 2.11
Panel, 1960-1995
Dependent variable: Real per-capita GDP Growth Rate

Variable	(1)	(2)	(3)
LD.GROWTH	-0.350***	-0.352***	-0.365***
	0.00	0.00	0.00
D.INCOME60	-0.096***	-0.094***	-0.095***
	0.00	0.00	0.00
D.SCHOOL60	-0.036***	-0.032**	-0.030**
	(0.01)	(0.02)	(0.02)
D.CBY		-0.087***	
		0.00	
D.DBY		0.013	
		(0.29)	
D.GOV	-0.047	-0.072	-0.07
	(0.36)	(0.22)	(0.17)
D.PI	-0.016***	-0.018***	-0.015***
	0.00	0.00	0.00
D.TRADE	0.013	0.019	0.013
	(0.37)	(0.17)	(0.36)
D.LLY	0.024		
	(0.14)		
D.PRIVY	-0.012		
	(0.48)		
D.PRIVATE	-0.004		
	(0.87)		
D.BANK	0.081***		0.083***
	0.00		0.00
D.TBY			-0.0002
			(0.98)
Constant	0.006***	0.005***	0.005***
	0.00	0.00	0.00
Observations	320	321	321
Number of countries	74	74	74
Sargan test (p-value)	0.57	0.51	0.5
Serial correlation test (p-value)	0.00	0.00	0.00
p values in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

LD. Denotes lagged differences and D. denotes first differences of the variables

Table 2.12
Split Sample Results, Cross Section, 1960-1995
Dependent variable: Real per-capita GDP Growth Rate

Variable	(1)	(2)
	GROWTH	GROWTH
INCOME60	-2.288***	-0.216
	0.00	(0.69)
SCHOOL60	2.441***	1.917***
	0.00	0.00
CBY	0.015	0.059
	(0.68)	(0.84)
DBY	0.028***	0.321***
	0.00	0.00
CBY*LDC	-0.123***	
	0.00	
DBY*LDC	-0.032**	
	(0.01)	
GOV	-0.032	-0.018
	(0.25)	(0.55)
PI	-0.020**	-0.005
	(0.02)	(0.56)
TRADE	0.001	-0.005
	(0.80)	(0.19)
CBY*INCOME60		-0.016
		(0.68)
DBY*INCOME60		-0.035***
		0.00
Constant	16.539***	0.533
	0.00	(0.89)
Observations	64	64
R-squared	0.7	0.67
p values in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 2.13
CBY and Sources of Growth
Dependent Variables: Rate of Capital Accumulation (Columns 1, 5), Rate of Productivity Growth 1 (Columns 2, 6), Rate of Productivity Growth 2 (Columns 3, 7), Rate of Productivity Growth 3 (Columns 4, 8)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	capgrols	prod1	prod2	prod3	capgrols	prod1	prod2	prod3
INCOME60	-2.40***	-1.55***	-1.53***	-2.15***	-2.16***	-1.29***	-1.29***	-1.81***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCHOOL60	2.79***	2.21***	3.24***	3.29***	2.95***	2.39***	3.40***	3.52***
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CBY	0.05	0.04	0.03	0.05	-0.05	-0.06**	-0.06*	-0.08**
	(0.47)	(0.30)	(0.41)	(0.29)	(0.33)	(0.04)	(0.05)	(0.05)
DBY	0.03**	0.01	0.01	0.01	0.03**	0.02*	0.01	0.02
	(0.03)	(0.10)	(0.26)	(0.15)	(0.02)	(0.07)	(0.18)	(0.11)
GOV	-0.07	-0.02	-0.02	-0.01	-0.05	-0.01	0	0.01
	(0.23)	(0.54)	(0.61)	(0.86)	(0.34)	(0.86)	(0.89)	(0.84)
PI	-0.03	-0.01	-0.01	-0.02	-0.02	0	0	0
	(0.12)	(0.18)	(0.27)	(0.17)	(0.31)	(0.78)	(0.86)	(0.75)
TRADE	-0.01	0.01**	0.01**	0.01**	-0.01	0.01	0.01	0.01
	(0.43)	(0.04)	(0.04)	(0.05)	(0.30)	(0.14)	(0.13)	(0.17)
LDC*CBY	-0.13**	-0.14***	-0.13***	-0.19***				
	(0.05)	0.00	0.00	0.00				
Constant	18.32***	9.38***	6.89***	11.90***	16.12***	7.04***	4.69*	8.78***
	0.00	0.00	0.00	0.00	0.00	0.00	(0.05)	(0.01)
Observations	64	64	64	64	64	64	64	64
R-squared	0.36	0.56	0.65	0.58	0.32	0.44	0.58	0.47
p values in parentheses								

Table 2.14
CBY and Financial Development
Panel, 1960-1995
Dependent Variables: PRIVATE CREDIT (Columns 1-3) and
LIQUID LIABILITES (Columns 4-6)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	PRIVY	PRIVY	PRIVY	LLY	LLY	LLY
CBY	-0.498**	-0.522**	-0.647*	-0.202	-0.042	0.151
	(0.04)	(0.02)	(0.06)	(0.47)	(0.86)	(0.73)
LDC*CBY			0.17			-0.225
			(0.62)			(0.59)
DBY	0.924***	0.628***	0.629***	0.892***	0.531***	0.534***
	0.00	0.00	0.00	0.00	0.00	0.00
INCOME60	3.63	1.193	1.81	-2.98	-5.435**	-6.096**
	(0.10)	(0.60)	(0.49)	(0.26)	(0.02)	(0.02)
PRIVATE60		0.533***	0.529***			
		0.00	0.00			
LLY60					0.658***	0.655***
					0.00	0.00
Constant	-20.15	-2.681	-7.168	34.540*	45.266**	49.941**
	(0.21)	(0.88)	(0.71)	(0.08)	(0.01)	(0.01)
Observations	71	60	60	71	58	58
R-squared	0.83	0.89	0.89	0.68	0.86	0.86
p values in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 2.15
Cross Section, 1980-1995
Dependent variable: Real per-capita GDP growth rate

Variable	(1)	(2)	(3)
INCOME60	-0.623	-0.521	-0.48
	(0.18)	(0.24)	(0.3)
SCHOOL60	1.26*	1.219	0.96
	(0.09)	(0.09)	(0.19)
CBY		-0.042***	
		(0.01)	
DBY		0.025***	
		(0.01)	
LLY	0.012		
	(0.39)		
PRIVATE	0.001		
	(0.97)		
PRIVY	-0.001		
	(0.96)		
GOV	-0.11**	-0.11***	-0.11**
	(0.02)	(0.02)	(0.02)
PI	-0.011	-0.01***	-0.02***
	(0.13)	(0.01)	(0.01)
TRADE	0	0.002	-0.002
	(0.98)	(0.67)	(0.64)
BANK	0.035**		0.051***
	(0.04)		(0.01)
TBY			0.005
			(0.49)
Constant	2.674	4.01	3.303
	(0.33)	(0.15)	(0.21)
Observations	79	79	79
R-squared	0.32	0.29	0.34
p values in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table 2.16
Cross Section, 1980-1995
Dependent variable: Real per-capita GDP growth rate

Variable	(1)	(2)
INCOME60	-0.666	-0.681
	(0.13)	(0.12)
SCHOOL60	1.147*	1.286*
	(0.10)	(0.07)
CBY	0.111*	0.125*
	(0.08)	(0.05)
DBY	0.022**	0.024**
	(0.02)	(0.02)
CBY*LDC	-0.154**	-0.147**
	(0.01)	(0.02)
GOV	-0.117***	-0.121***
	(0.01)	(0.01)
PI	-0.018***	-0.017***
	(0.01)	(0.01)
TRADE	0.006	0.008
	(0.40)	(0.26)
Constant	5.218*	4.785*
	(0.06)	(0.08)
Observations	79	78
R-squared	0.49	0.45
p values in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 2.17
Cross Section, 1960-1995
Dependent variable: Real per capita GDP Growth Rate

Variable	(1)
INCOME60	-1.603***
	0.00
SCHOOL60	1.661***
	0.00
CBY	0.169***
	0.00
DBY	0.02***
	(0.01)
LDC*CBY	-0.219***
	0.00
GOV	-0.095***
	(0.01)
PI	0
	(0.75)
TRADE	0.01
	(0.20)
REVC	-0.23
	(0.77)
ASSASS	-0.22
	(0.47)
CORRUPT	0.11
	(0.29)
BMP	-0.007**
	(0.05)
Constant	11.663***
	0.00
Observations	61
R-squared	0.71
p values in parentheses	
*** p<0.01, ** p<0.05, *p<0.1	

Table 2.18
Cross Section, 1960-1995
Initial Level of Development, Government Intervention and Government Efficiency
Dependent Variable: CBY

Variable	(1)	(2)	(3)	(4)	(5)
INCOME60	-2.333**	-2.088**	-2.578*	1.258	-1.465
	(0.01)	(0.03)	(0.09)	(0.37)	(0.11)
GOV		0.016			
		(0.92)			
BUREAU			0.24		
			(0.69)		
CORRUPT				-1.499***	
				0.00	
BMP					0.053***
					0.00
Constant	25.841***	23.492***	25.543***	7.468	17.977**
	0.00	0.00	(0.01)	(0.41)	(0.01)
Observations	71	64	38	66	67
R-squared	0.09	0.09	0.13	0.24	0.23
p values in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Table 2.19
Cross Section, 1960-1995
CBY and Property Rights
Dependent Variable: CBY

Variable	(1)	(2)	(3)	(4)
INCOME60	-1.078	-0.36	-0.221	-1.381
	(0.41)	(0.79)	(0.87)	(0.18)
f_prop97	-1.523			
	(0.15)			
RULELAW		-0.577		
		(0.18)		
ENFORCE			-0.794	
			(0.13)	
CREDITOR				0.591
				(0.47)
Constant	21.842***	13.709	14.408*	18.096**
	(0.01)	(0.13)	(0.09)	(0.03)
Observations	66	42	42	41
R-squared	0.12	0.12	0.13	0.09
p values in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 2.20
Cross Section, 1960-1995
CBY, Initial Level of Financial Development and Crisis
Dependent Variable: CBY

Variable	(1)	(2)	(3)	(4)	(5)	(6)
INCOME60	-2.205	-2.828**	-0.656	-2.191**	-1.469	-2.333**
	(0.1)	(0.01)	(0.47)	(0.02)	(0.12)	(0.01)
PRIVATE60	-0.054					
	(0.3)					
LLY60		-0.048				
		(0.19)				
BANK60			-0.17***			
			(0.00)			
PI				13.17**		
				(0.03)		
REVC					9.05**	
					(0.01)	
ASSASS						0.227
						(0.89)
Constant	26.79***	31.84***	25.71***	23.004***	17.694**	25.79***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	60	58	65	71	71	71
R-squared	0.15	0.2	0.33	0.15	0.17	0.09
p values in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 2.21
Simultaneous Equations System
Dependent Variables: Real Per Capita GDP Growth, Corruption and Central Bank Size

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	GROWTH	CORRUPT	CBY	GROWTH	CORRUPT	CBY
GROWTH		0.07	0.67		0.1	0.49
		(0.66)	(0.25)		(0.61)	(0.39)
CBY	0.04	-0.01		0	0.06	
	(0.38)	(0.82)		(0.99)	(0.46)	
LDC*CBY	-0.20***	-0.14***		-0.17***	-0.05	
	0.00	0.00		0.00	(0.46)	
DBY	0.01**	0.01		0.01*	0.01	
	(0.03)	(0.22)		(0.08)	(0.55)	
LAW		0.40***			0.57***	
		0.00			0.00	
REVC		-0.46			-1.35	
		(0.56)			(0.15)	
ENG		1.15***				
		0.00				
SCAND		1.64***				
		0.00				
GER		0.34				
		(0.62)				
CORRUPT	0.49***		-1.77***	0.57***		-1.63***
	0.00		0.00	0.00		0.00
INCOME60	-2.27***			-2.39***		
	0.00			0.00		
SCHOOL60	0.21			0.35		
	(0.66)			(0.47)		

Table 2.21 (continued)

TRADE	-0.004			-0.004		
	(0.45)			(0.41)		
PI	-0.02**			-0.01*		
	(0.02)			(0.07)		
GOV			0.47***			0.49***
			0.00			0.00
PI60			0.20**			0.18**
			(0.02)			(0.03)
LLY60			0.02			0.01
			(0.50)			(0.70)
AVELF					-0.37	
					(0.74)	
Constant	16.89***	3.60***	8.75***	17.39***	2.70**	8.32***
	0.00	0.00	0.00	0.00	(0.02)	0.00
Observations	36.00	36.00	36.00	36.00	36.00	36.00
R-squared	0.73	0.87	0.41	0.67	0.78	0.41
p values in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Figure 2.1
Scatter Diagram
Cross Section, 1960-1995

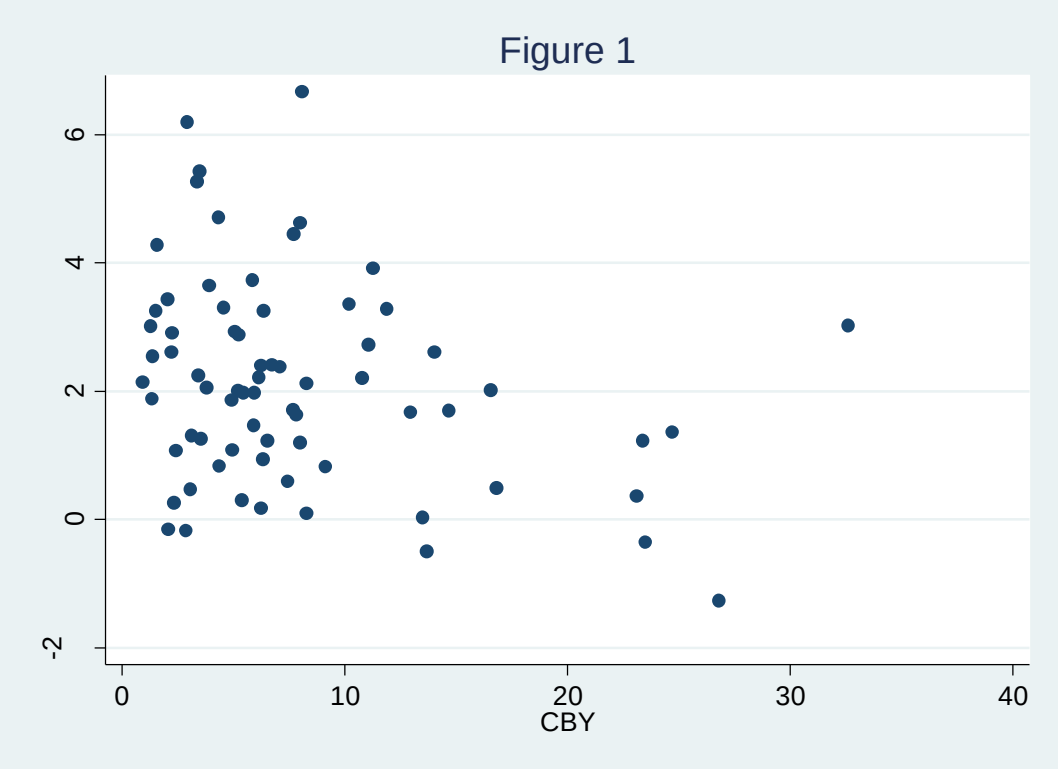


Figure 2.2
Scatter Diagram
Panel, 1960-1995

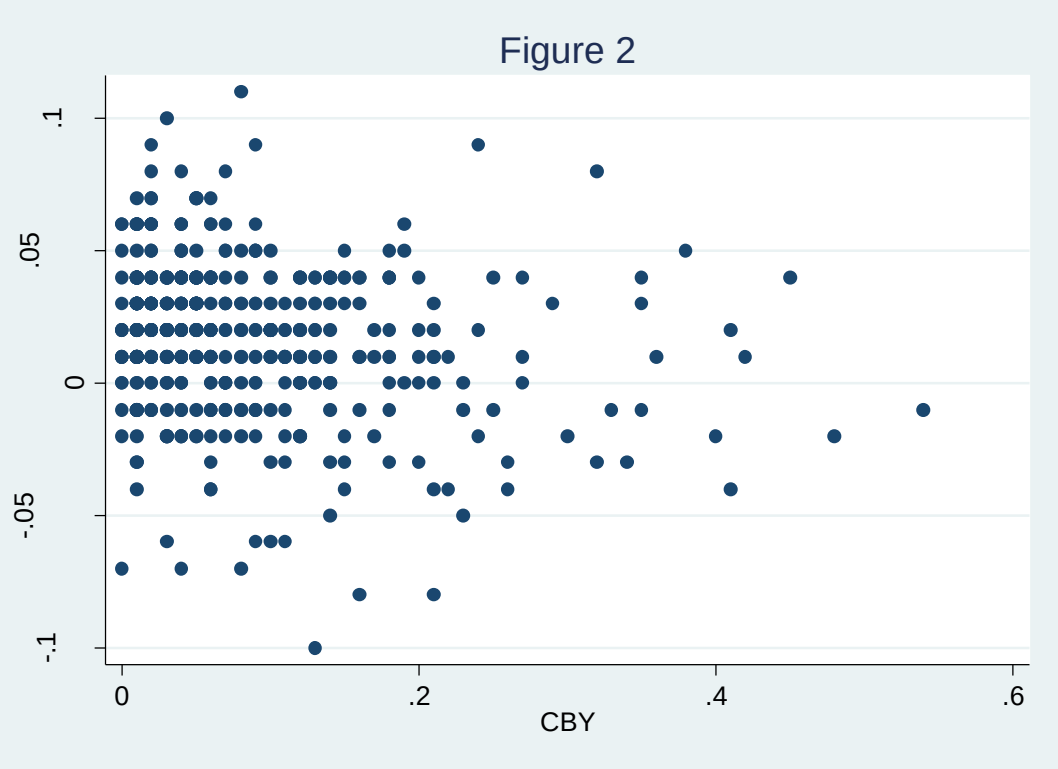
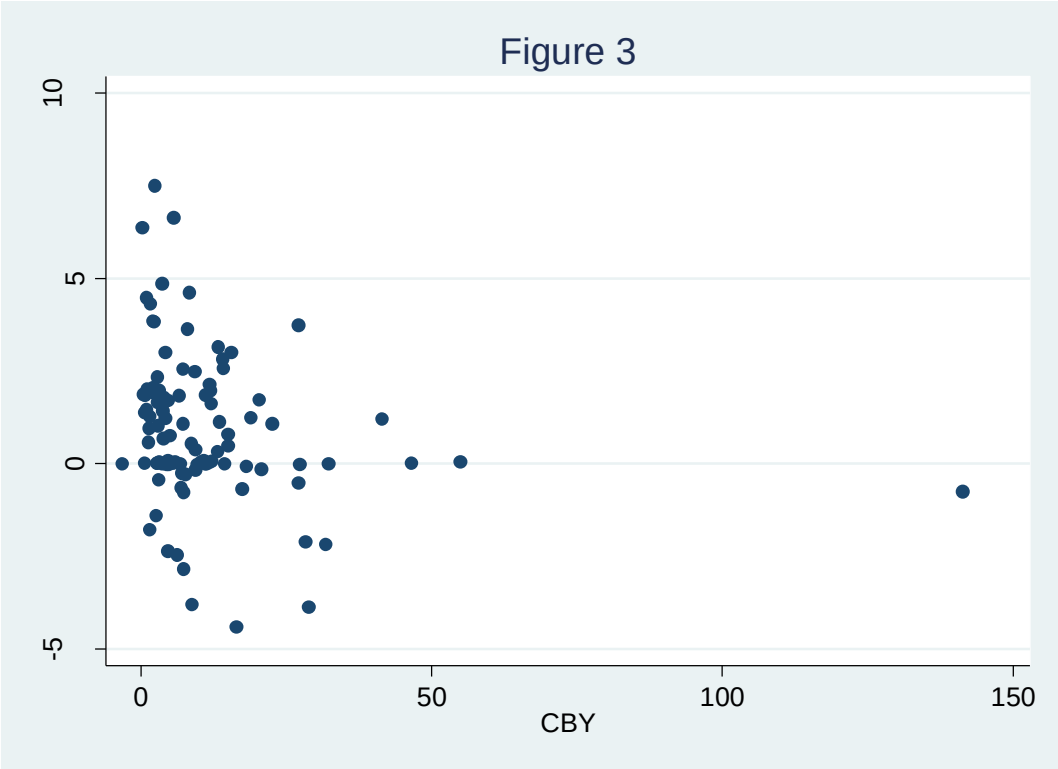


Figure 2.3
Scatter Diagram
Cross Section, 1980-1995



CHAPTER 3

CENTRAL BANK INDEPENDENCE IN NATURAL RESOURCE ABUNDANT TRANSITION ECONOMIES: THE CASE OF AZERBAIJAN

3.1 INTRODUCTION

Some twenty years ago there was no Azerbaijan on the world map. Some twenty years ago central banks mostly had no independence. They functioned practically as departments of ministries of finance (Cukierman 2008). Likewise, economic research was not much interested in exploring the concept of central bank independence. Today the picture is radically different. Central bank independence is a norm rather than an exception. There exists a large body of academic work on the theory and practice of central bank independence. Moreover, it is regarded as a "stamp of economic respectability" for *transition economies* such as Azerbaijan. In the literature, the term "transition economies" refers to former socialist countries, which include 15 former USSR republics and other Central and Eastern European countries.

In this work I address the theory and practice of central bank independence, and to some extent accountability and transparency within a case study on Azerbaijani monetary authority. In particular, I discuss the history, development and legal status of the National Bank of Azerbaijan. Drawing on the central bank independence research, which recently has increasingly focused on the transition countries, I make an attempt to document and quantify the degree of independence of the National Bank of Azerbaijan. To achieve this goal, I use different central bank independence indexes developed in previous studies supplemented

with my own interpretation. I analyze the changes in the National Bank's independence over time and compare those with the performance of other transition economies. Based on the findings I propose a list of measures for policymakers aimed at enhancing the current levels of both legal and actual independence of the National Bank of Azerbaijan.

The concept of central bank independence broadly refers to the degree of success of the central bank in resisting undue influences from government, industry and other interests. There is a substantial and growing body of scholarly work that regards central bank independence, together with accountability and transparency, as the best way to achieve and maintain price stability, which in turn is conducive to sustainable real growth.[17]

What makes a case study on the monetary authority in Azerbaijan different from a similar study on any other developing country? I believe that Azerbaijan is a unique country for economic research because it provides a natural experiment for at least two strands of the literature.

First, alongside other former socialist countries, Azerbaijan has been undergoing radical restructuring as part of the transition from centrally planned to market economy. The experience of transition economies offers a unique opportunity to study institution building. In this regard, establishment and further development of a Western-type central bank are considered key reforms. The National Bank of Azerbaijan was established in 1991 and within a period of 12 years has been subject to three new laws. Transition to a market economy did not happen to follow a smooth path for Azerbaijan. The country experienced a huge output decline during its first years of independence. In addition, the process of decontrol of domestic prices produced sizable temporary non-monetary jumps in the rate of inflation. The rise in prices often reached hyperinflationary levels. However, by 1998,

[17] See Arnone, Laurens and Segalotto (2006) for the most recent detailed literature review on the issue.

Azerbaijan, just like the majority of transition economies, managed to bring the inflation rates down to single digits (Fischer and Sahay 2000). Inflation stabilization is regarded as one of the major successes of the transition process. Exploring the central bank independence in depth at the same time allows assessing the central banking reforms in Azerbaijan, especially success of these reforms in reducing inflation.

Azerbaijan is a natural resource abundant country. Over the forthcoming two decades, the country is expected to benefit from a substantial, but short-lived, oil and gas related revenue boom.[18] However, this "manna from heaven" may turn into economic disaster if not properly managed. A so-called "natural resource curse" concept entails a substantial literature dealing with a rather paradoxical tendency for a majority of natural resource rich countries to suffer from slow average long-run growth rates (Sachs and Warner 1995). This literature argues that the negative effect of natural resource abundance on growth mainly stems from the lack of strong institutions and problems with governance. Indeed, currently Azerbaijan faces a serious threat of falling under the curse as unprecedented revenues from oil exports start flowing in and the country still suffers from high levels of corruption and bureaucratic inefficiency. In addition, some studies argue that oil abundance inevitably leads to an accommodative stance of monetary policy (Da Costa and Olivo 2008). Central banks in oil economies are under pressure by the government to pursue accommodative monetary policy, which is also referred to as the *oil dominance of monetary* policy. The government, at some instances, may demand the central bank to undertake purchases of large amounts of foreign exchange coming from oil exports. This is indeed what happened in 2006 when the National Bank of Azerbaijan bought about 2 billion

[18] While Azerbaijan was producing 0.4 million barrels of oil per day in 2004, the production is expected to rise up to 1.4 million barrels per day in 2010. However, subsequent rapid decline is projected to finish the oil reserves by 2025 (IMF 2007)

dollars and sterilized only a fraction leading to an approximately 133% increase in the monetary base (see Table 3.7). Central bank independence in this respect gains utmost importance, as it is considered by many a strong shield against such government pressures.

Despite their obvious weaknesses, indexes measuring central bank independence have proven useful for cross-country comparability and for keeping track of the development of central banking reforms in a particular country. In this work, I mainly use three indexes. The first two, which are from Cukierman (1992), measure the legal and actual independence of the National Bank of Azerbaijan. The last one, from Grilli, Masciandro and Tabellini (1991),[19] measures the political and economic independence of the bank.

I analyze the Law of 2004 and conclude that it grants a considerably higher level of legal independence to the National Bank of Azerbaijan. However, the increasing rate of inflation in the country, which picked up in 2005 and even reached double digits in 2007, raises a question as to how successful the National Bank has been at translating legal independence into the actual one. I argue that the National Bank has partly failed to withstand pressures from the government and pursuing accommodative policy has undermined its commitment to price stability. I conclude with two set of policy recommendations to ensure the legal and actual independence of the National Bank. The first set consists of recommendations that require changes in the legislation, while the second one can be implemented immediately without having to change the law.

3.2 FOUNDATIONS OF CENTRAL BANK INDEPENDENCE

Although central banking practice today is often subject to comments and criticisms, economists generally agree on the important role of the monetary authority within an

[19] In fact, I use a modified version of this index following Maliszewski (2000), to be able to compare the results with those of other transition countries.

economic system as a whole. Efficient central banking should be conducted only within a proper intellectual framework, which is based on a dynamic optimization. This means that each year there should be a selected plan for now and for the future that will provide the best available time-path for output and inflation (Blinder 1998).

3.2.1 Theoretical Arguments

Many researchers consider central bank independence to be a costless solution to the time-inconsistency problem of monetary policy. For instance, Grilli et al. (1991) describe central bank independence as a "free lunch" with important benefits and no apparent costs. Is it really the case? In this section I discuss the emergence and evolution of the concept of central bank independence and lay out arguments for and against the central bank independence.

The concept of central bank independence is an integral part of the perception of modern central banking. The simplest theoretical argument for the central bank independence is that independent central banks have fewer incentives to inflate. Blinder (1998) explains this using simple reasoning. Monetary policy by definition requires a long-time prospect and there are lags in its effects on output and inflation. Furthermore, disinflation resembles investment: it costs something now but pays back gradually in the long run. However, politicians, media, and the public are not patient and tolerant, nor do they have an idea about the lags problem in monetary policy. Central bank independence helps to escape making monetary policy dependent on short-term gains at the expense of the long-term failures.

The concept of central bank independence is closely linked to the discussions of the time-inconsistency problem of monetary policy. More precisely, granting independence to

the central bank is viewed among solutions to this problem. The time-inconsistency problem is based on the notion that the central bank creates an "inflation bias" under discretion, since policymakers cannot resist a temptation to deviate from its long-run inflation target once nominal contracts have been negotiated by wage and price setters, and the central bank engineers surprise inflation to push employment above its natural level towards the higher desired level (Kydland and Prescott 1977, Barro and Gordon 1983). But rational agents understand the incentives of policymakers and adjust prices and wages accordingly, neutralizing any effect of inflation on employment in the long run. Consequently, employment remains at its natural level but monetary policy is subject to a suboptimal inflationary bias. This scenario is characteristic of developed economies and is triggered by an *employment* motive.

Besides increasing output, unanticipated inflation results in such benefits to the public sector as receipts from non-distortionary inflation tax on money holdings and reduced value of the government debt. Thus, the *revenue motive* also leads to a short-run monetary expansion that eventually brings about a higher long-run inflation rate. This case is more applicable to developing countries with limited access to capital markets where the central banks are under strong political pressure to monetize the government debt.

The time-inconsistency discussion itself is a continuation of the age-old rules-versus-discretion debates of the monetary economics. Blinder (1998) in his *Central Banking in Theory and Practice* groups those debates into two different periods. The old debates focus on whether monetary policy should be conducted according to a simple rule, such as Milton Friedman's k% growth rate rule for the nominal supply of money, or whether central banks should act under discretion. As Walsh (1995) argues, it is clearly better to let the central

bank decide what type of monetary policy to pursue. After all, discretion entails choosing a simple rule in those cases for which the central bank considers it optimal. Thus one could do no worse under discretion, and one might do even better. However, the rational expectations boom, as well as the rising popularity of game-theoretic modeling in economic theory, gives rise to a new wave of rules-versus-discretion research. A seminal contribution by Kydland and Prescott (1977) introduces the time inconsistency problem of monetary policy. The main point of this new wave of literature is that reduction of the central bank's discretion and the adherence of monetary policy to a strict rule can overcome the time inconsistency problem. Moreover, the model established in Barro and Gordon (1983) focuses on the strategic interaction of the central bank's action and public's formation of expectations using a simple, but rich game-theoretic framework. They show that the central bank could actually be worse off under discretion, thus supporting the point made by Kydland and Prescott (1977) that central banks should commit to a rule.

A number of studies deal with the issue of solving the time-inconsistency problem. They put forward numerous solutions. The most important ones are related to building up reputation and credibility (Barro 1986) and influencing the central bankers using incentive-compatible principal-agent schemes (Walsh 1995, Persson and Tabellini 1993). In turn Rogoff (1985) argues that the time-inconsistency problem can be overcome by the appointment of a "conservative central banker," who has a stronger apathy for inflation than the ordinary voter does. His is the first paper to explicitly examine the issue of the optimal preferences of the central banker. He claims that the benefit of such an independent central banker is a lower average inflation, while the cost depends on the realization of the aggregate supply shock. Thus, Rogoff's solution does not consider central bank

independence a "free lunch." On the contrary, Alesina and Summers (1993) show empirically that, at least for industrialized countries, while higher central bank independence is associated with lower inflation rates, it does not appear to be correlated with the variance of real output.

McCallum (1995) asserts that although the conservativeness of the central bank may be credible, its independence from political influence may not be. He also criticizes Walsh's (1995) incentive-compatibility solution to the time inconsistency problem. He stresses that the contractual solution does not solve the problem; it merely transfers the problem to the authority that the central bank is accountable to. Likewise, Mishkin (1999) argues that the source of time inconsistency is more likely to be found in the political process than in the central bank. Maloney and others (2003) stress that politicians' temptation to exploit short-run trade-off between output and inflations is particularly pronounced up to elections, creating election cycles. Once politicians have been committed to the price stability goal by legislating it as a central bank mandate, it becomes rather difficult for them to pressure on the central bank to pursue short-run expansionary policy that is inconsistent with its price-stability goal.

To summarize, the independence of the central bank is viewed as part of the solution to the time-inconsistency problem. When isolated from political interference, the central bank is more credible and more successful in the pursuit of its ultimate goal of price stability.

The main criticism of making central banks independent rests upon political rather than economic arguments. Assigning the control over the goal formulation and conduct of the monetary policy to non-elected officials is considered a violation of basic democratic

principles. However, one should distinguish between independence and accountability. Even the most independent central bank has to report in some or other form to the legislature. I will return to this issue later in the section on central bank independence and democracy.

These theoretical foundations have been tied to an extensive empirical research, which has established, at least for industrialized countries, a negative relationship between the degree of independence and inflation. Prior to looking at the empirical research, one must be aware of the different classifications of central bank independence.

3.2.2 Types of Central Bank Independence

There are several types of central bank independence categorized according to different criteria. Despite being interrelated to some extent, it is worthwhile going over each classification.

3.2.2.1 Legal vs. Actual Independence

This classification is by Cukierman (1992). Legal independence refers to the level of independence as specified in the law. Schwödiauer, Komarov and Akimova (2006) divide legal independence into three levels: independence established by international treaty (European Central Bank), constitutional independence (Switzerland) and independence established by national legislation acts. There are several indexes in the literature that attempt to document and quantify legal central bank independence. They are important for several reasons. First, these indexes hint at the degree of independence that legislators *meant* to grant to the central bank. This aspect is of particular importance for transition economies with newly established central banks. I will clarify this under the discussion of central bank independence in transition economies. Second, legal independence indexes are essential components of the actual independence, especially in industrialized countries.

Actual independence, as the name suggests, depends on how the law is interpreted and implemented. It may often deviate quite substantially from the degree of legal independence. Such deviations are more evident in developing than in developed economies. The reason, most probably, is poor law enforcement in developing countries. Cukierman (1992) lists a number of factors that may influence actual independence, such as informal arrangements between the central bank and other parts of government, the quality of the central bank's research department, and the personality of key individuals in the central bank and the rest of the government.

Overall, this distinction is important since sometimes the text of the law may be very convincing but its implementation is not; and the other way around: the law provisions may be not as strong and impressive as the actual level of independence.

3.2.2.2 Goal vs. Instrument Independence

This classification is by Debelle and Fischer (1994). Goal independence is the broadest degree of independence and authority for the central bank. It gives the central bank authority to determine its primary goal among several goals included in the central bank law or, rarely, to determine the goal if there is no clearly defined one. A case in point is the Federal Reserve System in the United States, which includes both full employment and price stability among several potentially competing objectives. Instrument independence is characterized by powers to define and employ independently the instruments for achieving externally set numerical target. The regime is not selected by the central bank, but either solely by the government or in cooperation with it. Although instrument independence may be perceived as a weaker degree of independence, in many cases it has proven sufficient to provide the general public with assurances that the implementation of monetary policy will

not be manipulated by the government, which may be sufficient to address the time-inconsistency problem.

The question whether the central bank should be given both goal and instrument independence is related to the issues of accountability and transparency. Economists generally believe that central banks should not be granted goal independence (Mishkin 2007). I touch upon this issue later under the discussion of the relationship between central bank independence and democracy.

3.2.2.3 Political vs. Economic Independence

This classification is by Grilli, Masciandaro and Tabellini (1991). They define political independence as the ability of the central bank to choose the *final* goal of monetary policy, such as the rate of inflation or the level of economic activity, while economic independence is the capacity to choose the *instruments* to pursue those goals without interference from the government.

Political independence is related to three aspects of a monetary regime: (i) the procedures regarding the appointment of board members; (ii) the relationship between the central bank and the government; (iii) the formal duties of the central bank. On the other hand, economic independence is determined by the following two aspects: (i) the influence of the government on central bank lending; (ii) the nature of the monetary instruments under the control of the central bank.

3.2.2.4 Independence from Financial Markets

Blinder (1998) also discusses central bank independence from the financial markets. In a literal sense, independence from the financial markets is both impossible and undesirable because monetary policy works through them. However, central banks should

resist the temptation to follow the markets and deliver the interest rate path that the markets have embedded in asset prices. According to the author, following the markets may produce poor monetary policy outcomes. The point, in fact, is that delivering the policies following markets' expectations and/or demands might end in very poor policy.

3.2.2.5 Financial and Personnel Independence

Lybek and Morris (2004) and Schwodiauer, Komarov and Akimova (2006), among others, touch upon the issues of personnel and financial autonomy. They consider these types of autonomy essential to safeguard goal and/or instrument independence of the bank.

Personnel autonomy entails some important conditions to be guaranteed by the legislation. In particular:

- The governor and board members should comply with certain qualification requirements.
- The nomination and appointment of the governor and board members should be carried out by separate arms of the government.
- The term of board members should be longer than the election cycle of the body with the principal role in selecting the member. Terms should be staggered to ensure continuity and facilitate accountability.
- The governor and ideally board members should be dismissed only for breaches of qualification requirements or gross misconduct, and preferably with the approval of the legislative body.

Financial independence is achieved when the profit distribution of the central bank is not decided under government pressure. According to Schwodiauer et al. (2006) optimal profit distribution mechanisms should exhibit at least two properties:

- Either a rule or the central bank should decide on the distribution of the excess profits over capital coverage requirements.
- There is a need to decouple profits distribution from current profit generation; i.e. distributed profits should average current and past earnings.

3.2.3 Central Bank Independence and Inflation

Empirical support for central bank independence is mostly based on the studies that investigate the relationship between central bank independence and major macroeconomic indicators. Many scholars stress the importance of central bank independence for containing inflation and show that there is a negative correlation between those (Alesina 1988, 1989, Grilli et al. 1991, Cukierman, Webb and Neyapti 1992, Alesina and Summers 1993, and others), while some other papers find no negative correlation between central bank independence and output (Alesina and Summers 1993, Eiffinger, Van Rooij and Schalling 1996, De Haan and Kooi 1997). Others, to some extent, question this argument (Posen 1995, Hayo 1998, and others).[20] More recently researchers focus on the robustness of the statistical relationship between central bank independence, inflation and growth. These studies use different measures of central bank independence, different data sets, and control variables. Despite many papers confirming the robustness of this statistical relationship, there are some opposing viewpoints as well.

Jacome and Vasquez (2005) find strong support for the negative relationship between central bank independence and inflation in a sample of 24 countries in Latin America and the Caribbean during the 1990s. They use panel data estimation techniques and control for international inflation, banking crises, and exchange rate regimes. Their results

[20] For a detailed overview of all concepts on relationship between central bank independence and inflation see Berger, de Haan and Eijffinger (2000).

are also robust to the inclusion of an index of broader structural reforms that may have affected inflation in those countries during the 1990s.

On the other hand, Cargill (1995) shows that the statistical significance of the negative effect of central bank independence on inflation may vary with the sample selected even among industrialized countries. Moreover, Jenkins (1996) finds that the statistical significance goes away when variables that proxy for the structure of the labor market are added to the equation. Similarly, Campillo and Miron (1997) and Fuhrer (1997) show that the negative effect of central bank independence is no longer statistically significant when the degree of openness in the business environment, political stability, the history of inflation and the debt burden are included as additional control variables.

Mangano (1998) shows that all legal indicators are heavily dependent not only upon criteria contained in the index but also upon the assessment of laws regarding each individual criterion, and the way in which these assessments are combined, including the weights assigned to each criterion. Other studies indicate that this relationship is not absolutely "flawless" with respect to the control variables and the countries chosen (Cukierman 1992, Posen 1995). The negative empirical relationship between central bank independence and inflation usually breaks when developing countries are added to the sample (Cukierman 1992). It does not even hold for some OECD countries (e.g. Japan). Moreover, in the case of transition countries, the higher the degree of independence, the higher is the rate of inflation (Hillman 1999). A possible explanation for this, according to Cukierman et al. (2002), is the extreme reliance on legal measures of independence, while law enforcement is poorer in less developed countries.

Hayo and Hefeker (2002) argue that central bank independence is neither necessary, nor sufficient for price stability, and it should not be treated as an exogenous variable. They use a two-stage model to explain the existence of central bank independence. The model suggests that in the first stage societies have to decide on their policy priorities (not necessary price stability). In the second stage, a decision must be made about the monetary policy delegation arrangements necessary to bring about the corresponding choice, taking into consideration the current political, legal and economic framework. The choice in the first stage may depend on either the "inflation culture" of the society or the political decision-making process, which represents the interest of economic actors and their ability to influence the goals of a monetary policy. It can be argued that societies' preferences for the establishment of monetary institutions are an independent variable in this causality and a country's inflation culture determines the level of central bank independence. In the same way one can explain the different relative inflation aversions using cultural considerations, namely the extent to which an unequal distribution of power is accepted or the degree of uncertainty avoidance, which help to explain the different inflation records among countries (Hillman 1999).

Posen (1993) argues that the central bank independence-inflation relation is also confounded by political factors, and, like Hayo and Hefeker (2002), thinks that the central bank independence is an endogenous variable. He thinks that the economic policy reflects the struggle of interest groups attempting to influence policy in a way that they consider favorable, and thus it is inappropriate to ignore them. From an institutional point of view, central bank independence is supposed to offer protection from inflation through three mechanisms - increasing the credibility of commitments to price stability, assuring a higher

priority on inflation fighting in the net preference of the public sector, and putting up barriers to the monetization of government expenditure. However, it appears that none of these are observed in developed countries. What really matters is that the differences in the levels of central bank independence and reputation cannot account for the inflation differences among developed countries.

Posen (1993)'s main claim is that financial intermediaries are harmed by inflation and they undertake political activities to lower the inflation level. Central bank independence and low rates of inflation should occur together without a causal link since both are the result of effective financial sector opposition to inflation.

However, there are some problems with this approach. First, it is not so straightforward to think that the financial sector is always interested in maintaining low inflation. Second, empirical studies find little or no support for the idea that the financial sector is averse to inflation (De Haan and Van't Hag 1995). Finally, the empirical evidence available, although scarce, does not suggest a close interrelation between the fluctuation of inflation rates and the exercise of financial sector lobbying power.

Exploring the central bank independence-inflation relation in transition economies offers important advantages to the researchers. Most importantly, the time dimension is added to the analysis. Most of these countries have been subject to two to four central bank laws during the transition period.

Loungani and Sheets (1997) empirically show that legal independence is associated with lower inflation in 12 transition countries. Maliszewski (2000) modifies the GMT index to measure legal independence in 20 transition countries. He also finds a negative correlation between his measure and the rate of inflation. Lybek (1999) estimates the effect

of both legal and actual central bank independence on inflation in the 15 former Soviet states. His evidence shows a significant negative correlation between legal independence and inflation in these countries, while the degree of actual independence seems to be irrelevant.

Using data on the legal independence of freshly created central banks in 26 former socialist economies during the nineties, and controlling for cumulative liberalization, price decontrols and wars, Cukierman, Miller and Neyapti (2002) find no relation between central bank independence and inflation during the early stages of liberalization. However, under sufficiently high and sustained levels of liberalization, a negative relation between legal independence and inflation 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 authorities to seriously engage in law enforcement.

Overall, Cukierman(1994) summarizes the empirical findings of the base literature as follows:

- Among industrial countries, there is a strong negative relationship between legal central bank independence and inflation (Berger, de Haan and Eijfinger, 2000; Grilli et al. 1991), while the same measures of independence do not appear to harm average real growth (Alesina and Summers 1993). This may be because growth has underlying causes that are too complex and varied for a regression on a measure of central bank independence to provide significant results;
- Actual central bank independence does not seem to have any significance in explaining economic performance in developed countries, since in those countries the transparency of monetary decisions is high and practices adhere more closely to the

law. However, measures of actual independence have proven to be useful for analyzing inflation performance in developing and transition countries (Cukierman, Miller and Neyapti 2002, Maliszewski 2000, Lybek 1999, and Loungani and Sheets 1997).

- In the case of developing countries, actual measures of central bank independence prove to be good proxies in explaining economic growth performance, even when additional control variables are added.

3.2.4 Central Bank Independence in Transition Economies

It is a noteworthy observation by Cukierman et al. (2002) that transition countries have created central banks with a higher average level of legal independence than in developed economies. However, one should be careful interpreting these results, since a high level of legal independence in transition economies in most cases does not imply a high level of *actual* independence of the central bank. As Cukierman et al. (2002) point out:

> "Since it is likely that the average level of compliance with the law in the former socialist economies is lower than compliance with it in Western democracies the discrepancy in actual independence may not be as large as appears to be the case from this comparison."

In fact the central banks are independent but not free in many transition countries.[21] This might have something to do with political regime or, in Hillman's (1999) terms, the "political culture." This determines the way central bank independence is applied. Where politicians' motives are to serve public interests, empirical evidence shows that central bank independence also yields more responsible policies. Such policies are impossible where

[21] Case in point is Belarus where central bank has been given a high degree of independence. There the governor of the central bank was jailed and replaced by the finance minister, whose policies had generated the high inflation that caused failure of the governor.

rent-seeking behavior and personal self-enrichment are the norms of political life. In the latter case we have developed political opportunism in a form of "selective income and wealth redistribution, influenced by special interests that benefit from policies that are disadvantageous for the population at large" (Hillman 1999).

There can be also an "institutional explanation" for the problem of legal independence that has not transformed into actual independence in the transition countries. One reason could be the weakness or even the absence of democratic and free market institutions and "traditions" in newly created democracies.

A natural question arises as to why transition countries have chosen to grant strong legal independence to their central banks. Cukierman et al. (2002) think that one reason is that policymakers realize that central bank independence can increase their *ex ante* small chances for access to the international capital markets, since independence is a "stamp of economic respectability" and for some even a prerequisite for access to those markets. It also can be explained by a desire to follow the West and emulate its success (especially in the case of European Union candidate countries). In this regard, the paper points out that countries with high central bank independence are geographically or culturally close to Western Europe and Germany in particular (Estonia, Czech Republic and Lithuania), or have a very recent law (Georgia, Lithuania, Armenia and Moldova). In the latter case there have been two laws on central banking and, consequently, two reforms. The latest law granted in general more independence than the previous one. Another possibility is that the formal preconditions for joining the European Monetary Union might make the countries-candidates grant their central banks higher legal independence to meet the requirements. The

international financial institutions also have played a role through financial aid conditionality (Hillman 1999).

3.3 Central Bank Independence and Credibility of Monetary Policy

How credible can central bank independence be? Just granting central bank independence does not imply a solution for the credibility problem but shifts it to another level, since the status of the central bank can be changed or revoked and thus not much is achieved in terms of monetary policy credibility. Such a line of reasoning entails the demand for constitutional status for central bank independence (McCallum 1995).

In fact, full credibility can never be achieved, as governments have the power to, and may sometimes want to, override central bank decisions, especially in the case of large negative shocks to the economy (e.g. hyperinflation, bank failures, unemployment, etc). Although two central banks can appear similar in terms of their degree of independence, they may differ depending on the costs the governments incur when trying to override their decisions. These costs depend on the political institutions; i.e. the policymaker has to overcome some procedural rules to override a central bank decision (Lohmann 1992).

Nevertheless, there is strong belief in the "credibility argument." Blinder (1998) lists four explanations for this argument. First, many central bankers believe in the credibility hypothesis regardless of whether it reduces disinflation costs. Second, central bankers want to be believed. Third, central bankers may want to be able to change their short-run tactics without fearing to be thought of as having simultaneously changed their long-term path. Fourth, credibility may be very helpful during crises when central bankers may be forced to take extraordinary and unpopular measures.

Farvaque (2000) analyzes the design of the political system and its effect on the central bank independence. He finds that:

- countries which have a bicameral system may not have much need to delegate monetary policy and thus have less independent central banks;
- more federal countries exhibit higher level of central bank independence;
- the further away politicians are from voters, the higher independence is;
- the longer governments stay in power, the higher independence is.

3.2.5 Central Bank Independence and Democracy

Goal independence is perceived as the strongest degree of legal independence. Nevertheless it also raises the question as to why central bankers, who are non-elected officials, should have the authority to determine the path of monetary policy. In a way, some argue that granting goal independence to the central bank creates a so-called *democratic deficit*. In democratic societies the public must be able to control the actions of a government; hence the goals of monetary policy must be set by the elected government. Thus central bank should be instrument but not goal independent. Moreover, the institutional commitment of price stability should come from the government in the form of an explicit, legislated mandate for the central bank to pursue price stability as its overriding long-run goal. This leads to other important benefits of goal dependence: time inconsistency is less likely in this case and there is better alignment of monetary and fiscal policies (Mishkin 2007).

Blinder (1998) argues that the central bank can be rationalized with democracy in the following ways:

- even in democracies, there are decisions that we do not want to revisit often and should therefore be hard to reverse; the same applies to monetary policy;
- the central bank's basic goals are chosen by elected politicians;
- the public has a right to demand honesty from its central bankers and the central bank owes this to the politicians in return for its broad grant of power;
- the people at the top of the central bank should be politically appointed;
- central bank decisions should be reversible by the political authorities but only under extreme circumstances;
- in a democratic society, the central bank's freedom to act implies an obligation to explain to the public what it is doing, why, and what it expects to accomplish.

Offering a full and coherent explanation of its actions, the central bank can remove much of the secrecy that surrounds its monetary policy, enabling interested parties to appraise its decisions and judge its success. According to Alesina (1989) the society may simply not want to give up democratic control over monetary policy. It, for example, may want to be confident that the goals of the central bank do not deviate from the social objectives. Thus, a completely independent central bank may appear impossible or even undesirable.

Most of the above-mentioned arguments support high independence of the central bank, aimed at isolating the central bank from partisan politics. Thus, an argument for central bank independence is to avoid political business cycles generated by governments trying to improve their reelection chances. This, however, may not work as a solution to the problem because although central banks are formally independent, actual independence is a function of both the behavior of the government in the appointment procedure and the

behavior of the central bankers after their appointment. Thus central bank governing boards have longer terms of office that go beyond the government's, and at any time the central bank may both help and obstruct the work of the current government (Berger and Woitek 1997).

According to Alesina (1989) the "conventional wisdom" is that independent central banks are desirable because they are less subject to political pressure. He argues that it is very difficult, if not impossible, to eliminate completely indirect and informal political pressure over central bankers.

3.2.6 Central Bank Independence and Fiscal Dominance of Monetary Policy

As argued above, having a goal independent central bank, besides harming the democratic principles, can also cause uncoordinated monetary and fiscal policies. The unhealthy relationship between fiscal and monetary policies, reflected in the pressures on the central bank to monetize the government debt, deserves special attention. The research has come to the conclusion that central bank independence increases the likelihood of breaking the *fiscal dominance of monetary policy* and enhances the government fiscal responsibility.

To better understand the degree of interdependence between fiscal and monetary policy, consider two polar cases. First, the fiscal authority fully backs the government debt with future taxes and there is fiscal accommodation to monetary policy in the following sense: any increase in public debt held by private sector must be followed by higher current or future levels of the primary surplus. While the fiscal authority raises the primary surplus to back the principal and interest payments on the newly issued debt, the monetary authority does not respond. This case is referred to as one of no fiscal dominance or complete central bank independence.

In the second case, one of complete *fiscal dominance of monetary policy*, the monetary authority fully backs the government debt. If a budget deficit is financed with new debt, the monetary policy pursues accommodative strategy by increasing current and/or future seignorage revenues to back principal and interest payments on this new debt.

Sargent and Wallace (1981) are the first ones to analyze the fiscal dominance of the monetary policy. They assert that the inflation rate depends on whether monetary or fiscal authority is dominant. Under the regime of fiscal dominance, the fiscal authority determines the path of primary surplus and any newly issued debt is financed by seignorage revenues. In the short run, an actual inflation rate, which is above the expected inflation rate, reduces the real government debt at the cost of rising inflation expectations and nominal interest rates. Higher interest rates, however, raise the interest payments on the government debt, and require expansionary monetary policy to generate further seignorage revenues. Rational agents anticipate the future increase in money creation and bid up the price level today. This is Sargent and Wallace's *unpleasant monetary arithmetic*.

Sargent and Wallace offer a solution to the problem of fiscal dominance. If monetary policy is dominant, i.e. the central bank is independent and does not yield to the demands of the Treasury, the fiscal policy will be forced to reduce the deficit. Thus the fiscal authority also commits to price stability. Ultimately, there is a better alignment between the two branches of the government.

Aiyagari and Gertler (1985) is another early work on the interconnections between fiscal and monetary policy and institutions. In line with Sargent and Wallace, this work points out that the theories that ignore the relevance of fiscal policy in determination of the price level are incomplete. Both papers, however, retain the belief that price level is

determined mainly by monetary policy. On the other hand, following studies, such as Leeper (1991), Sims (1994, 1997) and Woodford (1994, 1995), take a more radical stand by giving fiscal policy *at least* a co-equal role with monetary policy in determining prices.

Leeper (1991) theoretically shows that the presence of "passive" central banks leads to higher average inflation. Further, Woodford (1995) introduces the *fiscal theory of the price level*, claiming that inflation is not solely a monetary phenomenon and, thus, independent central bank is not sufficient to guarantee price stability without appropriate fiscal policy. Basically, this theory denies the claim of Sargent and Wallace and others that if the central bank is tough, the fiscal authority will be compelled to adopt appropriate fiscal policy. Quite the contrary, it says that unless steps are taken to ensure appropriate fiscal policies, the goal of price stability may remain elusive no matter how tough and independent the central bank is.

However, there are important critics of the fiscal theory of the price level. For instance, Buiter (1999) regards this theory as a mere fallacy and sees its source in an economic misspecification. He stresses that the advocates of the fiscal theory of the price level are fundamentally wrong by requiring the government's intertemporal budget constraint to be satisfied only in the *equilibrium*.

More recent studies analyze the relation between monetary and fiscal policy in transition economies. Given that even relatively independent Western central banks at times complied with pressures to monetize the government debt, it should not be surprising that less independent central banks in transition economies are often incapable of resisting the pressures from fiscal authority for a longer term.

Fiscal dominance of monetary policy is also found to be common for oil economies. Strong external position of oil economies, caused by the revenues from natural resource exports, affects monetary policy in that nominal appreciation is not desired and real appreciation pressures are realized through higher inflation.

Da Costa and Olivo (2008) analyze monetary policy in oil economies in the case study of Venezuela. They note that the central banks in oil economies are inclined to maintain a *de facto* peg of the currency, which may have similar effects as monetizing the debt. In this case, however, the expansion in monetary base is accompanied by an increase in net international reserves, instead of net credit to the government. Central banks intervene in the foreign exchange markets to avoid fluctuations in the exchange rate associated with oil exports, even if the officially announced exchange rate system is floating or some variation of it. Central bank independence is seen as the safeguard against fiscal dominance in the oil economies as well.

3.2.7 Central Bank Accountability and Transparency

These two important concepts of modern monetary institutions were hardly heard twenty years ago. In the absence of independence, accountability was not necessary and, as political entities, governments and ministries of finance had no incentives to raise questions about their own transparency in the conduct of monetary policy.

Central bank accountability nowadays is considered a natural corollary of central bank independence in democratic societies (Blinder 2004). Both academicians and practitioners in the area of central banking agree that central banks should be subject to government and public scrutiny. Mishkin (2007) argues that two arrangements can ensure accountability of the central bank:

1) Central bank law can be changed at any time.
2) Periodic reports should be submitted to the government.

Accountability, in turn, requires transparency. In fact, central bank transparency enhances *de facto* accountability. In addition to aligning the central bank with democratic principles by increasing de facto accountability, better transparency also reduces uncertainty of the public about the monetary policy and builds up the credibility of the central bank.

The IMF *Code of Good Practices on Transparency in Monetary and Financial Policies* defines transparency as an environment in which the objectives of monetary policy, its legal, institutional and policy framework, monetary policy decisions and their rationale, data and information related to monetary policies, and the terms of accountability are provided to the public on an understandable, accessible and timely basis (IMF 2000).

However, there are debates over the extent to which the central bank should be transparent. Svensson (2002) argues that central banks should not only announce their projections of the future policy path, but announce their objective function; that is, the relative weight they put on output versus inflation fluctuations. On the other hand, Mishkin (2007), among others, states that central bank transparency in this case can go too far, as it may confuse the public. If the public is not aware that the policy path is conditional on events in the economy, it may see a deviation from this path as a central bank failure.

Blinder (2004) lists three main categories of information that a transparent central bank should communicate to the public: information about the central bank's goals, information about methods of analysis and information about its decision-making process. More precisely, those categories imply timely publication of statistical forecasts and data as

well as of minutes of the discussion of monetary policy and being more open with the press and media.

3.3 MEASURING CENTRAL BANK INDEPENDENCE

There is no single compelling measure of central bank independence because of its multi-dimensional nature. The academic literature highlights a number of methods to measure central bank independence. In particular, there are several indexes aimed at quantifying the degree of various types of central bank independence.

Bade and Parkin (1980) are the first to construct an index that measures central bank independence. Their index measures political independence of central banks for twelve countries. They define political independence as the ability of the central bank to implements its policy without government influence. Grilli et al.'s (1991) index (GMT index henceforth) measures political and economic independence of the central bank. In fact, the GMT index measures legal, not actual, aspects of political and economic independence. This index is not as deeply structured as the Cukierman index.

The political independence sub-index includes nine items related to appointment procedures of the central bank's board members and the government, as well as formal responsibilities of the central bank. The economic independence sub-index includes seven items on central bank lending to the government and the nature of monetary instruments. Each item is measured through a binary system using an asterisk. Such a generalized method leaves little space for subjectivity, since it does not involve more precise measurements. The aggregated GMT index score equals the unweighted sum of the scores on political and economic independence sub-indexes.

Alesina and Summers (1993) construct a new index that combines different elements of indexes developed earlier by Bade and Parkin (1985) and Grilli et al. (1991).

The most comprehensive index, however, is the one constructed in Cukierman (1992) – the Legal Variables Weighted (LVAW) index. It is a strictly legal index based on the careful study of different central bank charters. It provides a quantitative measure of central banks' legal independence by assigning numerical weights to each question.

The Cukierman index consists of 16 variables that are grouped into the following four sets of items:[22]

1) variables on the status of the chief executive officer (CEO), which include term of office (too), appointment (app) and dismissal procedures (diss) and incompatibility clauses (off);

2) the policy formulation variables (PF), namely, regulations on the competence to frame monetary policy (monpol), the central bank's potential participation in the budget process (adv) and regulations on potential conflicts between the central bank and the government (conf);

3) central bank objectives set by legislation (OBJ);

4) regulations on limitation of lending (LL) in the form of advances (lla) or purchases of government securities (lls) as well as terms of lending (ldec), circle of potential borrowers (lwidth), limits on direct credit to the government (ltype) and its maximum maturity (lmat), level of interest rates (lint) and lending in the primary market (lprm).

LVAW is an overall weighted index, while the Legal Variables Unweighed (LVAU) index is an unweighted one. There are also two narrower indexes which are variations of

[22] See Table 3.1 for further details.

LVAW. The first one, LVES, assigns positive weights only to the allocation of authority for monetary policy, the procedures of resolution of conflicts between government and the central bank, and the degree of relative focus on price stability prescribed by the law.[23] The second one, LVESX, is a weighted average of LVES and of the subaggregate of all legal limitations on lending by the central bank to government with weights of 0.6 and 0.4, respectively.

Loungani and Sheets (1997) construct an index of legal independence by combining elements of the GMT index and the work by Debelle and Fischer (1994). Their index is calculated on the basis of a questionnaire consisting of 14 questions about legal provisions of the central bank law.

Schwödiauer et al. (2006) point out two weaknesses associated with the central bank independence indexes based on the law. First, the laws cannot precisely specify the limits of authority between the central bank and the government. This results in voids which are "filled by tradition at best and by power politics at worst." Second, the practice can always differ from the law, regardless of how explicit the latter is.

I proceed with the issue of measuring actual independence. Obviously, legal independence is an essential component of actual independence. Given that measuring legal independence itself involves arbitrary judgement, measuring actual independence thus becomes even more difficult task. The research highlights two significant methods of measuring the actual practice of central bank independence. Both are introduced in Cukierman (1992). First, the turnover rate of the central bank governors is used as a proxy of actual independence. This indicator is simple and easy to calculate. The turnover rate (TOR) is defined as the average annual number of turnovers of the central bank governors.

[23] The weights used are 0.4, 0.4 and 0.2, respectively.

In particular, a higher turnover rate means that an average term in office of the governor is lower than that of the government, which prevents the central bank from taking a long-term view of monetary policy. The weakness of this indicator lies in the possibility that a low turnover of governors can be mistakenly perceived as a sign of independence in the case of a central bank that is relatively subordinate to the executive branch. Cukierman (1992) points out that this method may not be quite relevant for OECD countries (where the values are all below 0.20 turnovers per year), while it has a practical meaning for developing countries, where it is common for the actual practice to deviate from the law. He finds that for developing countries the turnover rate ranges from 0.03 (which corresponds to an average term in office of approximately 33 years) for Ireland to 0.93 (approximately 13 months) for Argentina. Nevertheless, according to the literature, TOR is a useful indicator of actual central bank independence in developed economies based on the assumption that, at least above a certain threshold, a more rapid turnover rate indicates a lower level of central bank independence. If the average term of a governor is four years, the critical threshold should be between 0.2 and 0.25.

Another method involves judging by index scores based on responses to a questionnaire sent out to a nonrandom sample of internal and external experts on monetary policy. Cukierman (1992) lists two indexes of actual independence: Questionnaire Variable Weighted (QVAW) index and Questionnaire Variable Unweighted (QVAU) index. In addition to certain legal aspects, the questions importantly explore different aspects of *de facto* central bank independence, such as the instruments that are under the control of the central bank and the practices that are followed when they differ from the law.

Arnone, Laurens and Segalotto (2006) present an update of the GMT index as of end-2003. They apply their index to a set of OECD and developing countries, and emerging market economies. Their findings indicate a significant increase in the central bank autonomy over the last decade. They observe a three-stage process underlying the increase: an initial stage in which the political foundations for the central bank independence are laid; a second stage in which operational autonomy develops; and a final stage in which the central bank gains independence in terms of policy formulation and the appointment of senior management.

3.4 THE LEGAL STATUS AND HISTORY OF THE NATIONAL BANK OF AZERBAIJAN

3.4.1 Brief Historical Overview

In Soviet Azerbaijan the coordination structure of banking activity was represented by the local branch of the State Bank of the USSR. Governing credit relations within the conditions of the administrative-command economic system was nothing but formality. The branch office of the State Bank in Azerbaijan had no rights and authorities, which were conventional for Western central banks. Its functions were limited to financing the local transactions implied by the central plan.

Radical economic and structural reforms began in the mid-1980s within the framework of *perestroika*. As a result of these reforms, a new structure of the state banks emerged: five specialized banks and their local branch offices were established in 1988. As the reforms were advancing, the relevant legislative tools were adopted for strengthening the status of the central bank in 1990. This new legislation enabled transition to the two-tier banking system. According to the Law on the State Bank of the USSR, central banks were

established in all Soviet republics, which were even granted the right to issue licenses for banking operations. After getting such right, the Azerbaijani Branch Office gave several licenses, but other functions, e.g. monetary and exchange policies, were still concentrated in the Soviet State Bank.

In May 1991 the basis of an independent banking system in Azerbaijan was established after adoption of the Constitutional Law "On the Economic Independence of Azerbaijan Republic." This law defined the National Bank as "an emission institution, pursuing the state policy in the fields of monetary-credit relations, monetary turnover, payment and exchange systems, regulating activity of banking system as a whole and fulfilling duties of reserve bank."

The assets and liabilities of four state-owned banks were transferred to the Bank. Prior to adoption of the law on the National Bank and the law on Banks and Banking Activity in August 1992 two state-owned banks (Industrial Investment Bank and Agro-Industrial Bank) were subordinated to the Bank. The first banking legislation of 1992 withdrew these banks from subordination to the Bank, and they became more independent.

The National Bank of the independent Azerbaijan Republic[24] was officially founded by the Decree of the President in February 1992. New banking legislation adopted in August fixed the main provisions for the National Bank and banking activity in the country. Simultaneously the national currency *manat* was issued and used alongside the Soviet *ruble*. In December of 1992 Resolution on Approval of the Charter of the National Bank of the Azerbaijan Republic was passed by the Milli Majlis (Parliament) of the Azerbaijan Republic. These legislative acts defined the legal structure of the Bank and created the framework for banking activity under the new political and socio-economic conditions.

[24] I will occasionally use "Bank" for the "National Bank of Azerbaijan" from here on.

They determined the National Bank as a supreme state bank, which has exclusive rights of banknotes issue and fulfills the function of the reserve system. At the same time, the National Bank was granted regulatory and supervisory authority over the banking system.

According to the Law of 1992 the Bank is under control of the Milli Majlis and its Chairman has to report to the parliament at least once a year on the work completed and plans or policy changes.

The 1992 Law also includes provisions for the Western-type banking system. It divides the banking system in Azerbaijan into two levels: the central bank (NBA) and commercial (private) banks. According to the Constitution of the Azerbaijan Republic, the National Bank of the Azerbaijan Republic is the exclusive property of the state. Legal regulations of the two-level system are further reflected in the Laws on the National Bank of Azerbaijan Republic adopted in 1996 and 2004. The National Bank bears a vital importance as long as it guarantees stability of the national currency and, on the other hand, monitors and establishes legal and institutional terms for operations of local commercial banks.

3.4.2 Legislation on the National Bank of Azerbaijan

In this section I review the laws on the National Bank of Azerbaijan, particularly the most recent one. As noted previously, the first one was adopted in 1992 and created the legal framework for the Western-type central bank. The next one was adopted in 1996 with the expert support of the International Monetary Fund (IMF). The most recent one is dated 2004. The main difference between these laws is in the levels of independence, accountability and transparency.

The 1996 law grants the Bank more political independence, but does not support its transparency for the public. This law is based on the new Constitution passed in 1995, which

strengthened the executive power at the expense of the legislative. In this law, the National Bank is "taken away" from the parliament and "given" to the President. Moreover, the policymaking process of the National Bank is not subject to any kind of parliamentary control or monitoring. The 2004 law, as shown in this study, grants a substantially higher degree of *legal* independence to the bank.

A strict segregation of fiscal and monetary policies is reflected in the formally independent status of the National Bank as stipulated in the Constitution of the Azerbaijan Republic of 1995 (Article 19:2).

Article 3 of the 2004 Law assigns the following goals to the Bank:

1) To ensure the stability of the national currency
2) To ensure the development and strengthening of the banking and payment systems.

Most importantly, the law gives priority to the goal of the currency stability over the financial stability objective. Article 5 lists the functions of the Bank arising from its goals:

1) To determine and implement monetary policy
2) To organize cash circulation
3) To determine and announce the official exchange rate of manat
4) To implement foreign currency regulation and control
5) To maintain and manage the gold and foreign currency reserves in its charge
6) To manage the drawing up of the reporting balance of payments
7) To license, regulate and supervise banking system
8) To determine, coordinate and regulate activities of payment systems

The National Bank is formally independent. It does not assume obligations of the state, likewise the state does not assume obligations of the Bank. No state body, local self-

governing body or another governing body has the right to interfere with the National Bank's activity. The Bank reports only to the President (Article 7).

The Bank is actively represented in the process of "law-making" concerning the money-credit sphere in Azerbaijan. It has the right to move resolutions on draft laws and other normative acts directly referred to the fulfillment of its functions. Another important issue regarding the status of the Bank is that when selling the shares of state-owned banks the Ministry of Economic Development (organ responsible for the privatization process) must take into consideration the opinion of the Bank (although the bank does not supervise them).

The organizational structure of the National Bank includes the Policy Board and other structural divisions. The Board consists of seven members (the Chairman, his deputies and two members). The Chairman carries out the functions of the governor of the Bank. The members of the Policy Board are to be appointed for a five-year period by the parliament upon the nomination by the president. Members of the Board cannot be members of the parliament or members of the Cabinet of the Azerbaijan Republic as well as elected members of local self-governing bodies. They also cannot join political parties, or hold positions in non-governmental and religious organizations.

All decisions by the National Bank are adopted through the resolutions of the Board. Resolutions of the Board are moved by the simple majority of votes from the Board members present at the meeting. In the case of even distribution of votes, the person presiding over the meeting has a decisive vote. The presiding person is the Chairman or the person temporary replacing him. The meeting of the Board is to be considered authorized at

the quorum of more than half of the Board members, one of whom is to be the Chairman or his substitute.

3.5 IS THE NATIONAL BANK OF AZERBAIJAN INDEPENDENT?

Having discussed the various aspects of the theory behind central bank independence and provided general information on the history and current legislative framework of the National Bank of Azerbaijan, I want to focus on the degree of independence of the Bank. I evaluate the Bank's independence according to the different criteria presented earlier. Article 6 of the latest Law on the National Bank of Azerbaijan defines the independence of the Bank as follows:

> "National Bank shall be independent in discharge of its responsibilities and exercise of its authorities prescribed by the Constitution and laws of the Republic of Azerbaijan, and no state authority or self-administration body, physical person or legal entity may directly or indirectly by any reason, illegally influence or interfere with its activities. In case of any restrictions of the NBA's activity, interference with the affairs of the National Bank or any influence on the NBA senior management, the Chairman shall inform the President of the Azerbaijan Republic. National Bank shall report only to the President of the Republic of Azerbaijan."

Inclusion of a separate article on the independence in the latest law is definitely progress on the part of lawmakers. Yet the analytical framework presented above as well as the experience of other developing countries in terms of legal and actual independence raise certain questions. Clearly, given that research identifies several dimensions of legal independence of a central bank, the article above on its own is not sufficient to claim the legal independence of the bank, let alone the actual one. So, what about these other dimensions of legal independence? Have they been stipulated in this legislation? And if so, have the provisions of central bank independence in the Law of 2004 been translated to the actual independence of the Bank?

To answer these questions, I apply methods described earlier which help me measure independence of the central bank along different dimensions, such as goal and instrument independence, legal and actual independence, political and economic independence, and financial and personnel independence. Independence from the financial markets is out of the question for Azerbaijan, since these markets are underdeveloped and have no importance in regard to the objectives of this work.

More precisely, I calculate Cukierman's LVAW and QVAW indexes to measure legal and actual independence, respectively, and I use the GMT index to assess political and economic independence. Given that these indexes do not cover all aspects of independence, I rely on my own interpretations to shed light on these other issues.

3.5.1 Legal and Actual Independence of the National Bank of Azerbaijan

I start with the LVAW index that is concerned with the legal independence of the Bank. As mentioned previously, this index is based on calculated aggregate characteristics of central bank charters that include the allocation of authority over monetary policy, procedures for resolution of conflicts between the central bank and government, the relative importance of price stability objective as stated in the law, limitations on lending by the central bank to government, and procedures of appointment and dismissal of the central bank's governor.

Although the LVAW index, just like other central bank independence indexes, can be considered subjective in its interpretation of laws, it is useful for comparability purposes with other studies. Moreover, the index scores give a general picture of the real situation when supplemented by appropriate interpretation. The LVAW index does not measure the independence to do anything that pleases the central bank. Rather it evaluates the ability of

the central bank to pursue the goal of price stability even at the cost of other short-term real goals.

In Cukierman et al. (2002), the LVAW index based on the Law on the National Bank of Azerbaijan of 1992 scored 0.22 whereas the one based on the Law of 1996 scored 0.24, which ranked the lowest among the 26 former socialist countries under the scope of their study. Here I calculate the LVAW score based on the National Bank Law of 2004. According to my calculations, the LVAW index based on this latest law scores a total of 0.61, which is a substantial improvement over the 1996 score.[25]

Table 3.3 reports index values for all three central bank laws. The values range from 0 to 1, with higher values indicating a stronger degree of independence.

Interestingly, Cukierman et al.'s (2002) calculations based on the previous two laws indicate that legal independence of the Bank was rather limited and there had not been a noteworthy improvement if we compare the National Bank Laws of 1992 and 1996. This is despite their observation that the latecomers to the circle of central bank reformers generally tend to enact laws with higher levels of independence. According to LVAW the legal independence slightly increased, whereas according to LVESX it diminished.[26]

A reason for this decrease could be the political regime changes in Azerbaijan. The changes in the legal status of the Bank were made after the political changes took place in Azerbaijan, in contrast to the other transition countries, where central bank reforms changes were undertaken within the existing political regime. The changes in the political arena transformed Azerbaijan into a country with much more centralized ruling power. Had not

[25] In fact, my calculations of the LVAW score based on the 1996 Law differ slightly from those in Cukierman et al. (2002). Their calculations yield an index value of 0.24, while mine yield a score of 0.26. My LVAW is different because while Cukierman et al. (2002) assign a score of 0.00 to the item on "Limitations on securitized, I mark it "NA", as there is no record of the relevant item in the law.
[26] It decreased from 0.42 to 0.37.

Azerbaijan at the time been in the strong need of external assistance from the IMF, the Bank could have ended with even less independence.

Quite the contrary, the Law of 2004 yields a significantly higher score when compared to the previous ones. Numerically, the LVAW value more than doubles from 1996 to 2004 – it increases by 134%, as shown in Table 3.3. This is a clear evidence for the argument that lawmakers *meant* to grant higher legal independence to the central bank. I believe this should not come as a surprise and the main reason for the improvement is not that the changes have occurred with the same political regime. Azerbaijani policymakers are now well aware of the importance of having a credible monetary authority. As Cukierman et al. (2002) note, an independent central bank has become a "stamp of economic respectability" for the emerging economies, not to mention that one of the requirements to join the European Union (which is an ultimate goal of every country in the region) is an establishment of the independent central bank. Moreover, central bank independence together with transparency and accountability are important prerequisites of adopting an inflation targeting regime.

As reported in Table 3.3, progress has occurred in all four aggregated clusters: a central bank governor, central bank objectives, policy formulation and central bank lending. Nevertheless, the greatest advance in the Bank's legal independence index stems from the now much stricter provision against lending to the government. With the new law passed, the weighted central bank lending sub-index improved from 0.07 in 1996 to 0.31 in 2004. Direct loans to the government are now strictly prohibited. Only in a case of a short-run liquidity gap in the state budget may the National Bank purchase government securities in

the secondary market. Article 16 of the Law clearly defines the maximum amount and the repayment conditions for the loan.[27]

In trying to determine empirically the degree of fiscal dominance, some authors use a simple approach: based on central bank accounts, they analyze to what extent the changes in monetary base are dominated by changes in central bank net credit to the government (Fratianni and Spinelli 2001). Indeed, I go over the Bank's monthly balance sheet statements for the 2001-2007 period. Beginning in 2003, one can note a gradual decrease on the assets side of the balance sheet for the "loans to government" and "T-bills" items. From January 31, 2004 and on there is no evidence of direct loans to the government or T-bills purchases. However, as Da Costa and Olivo (2008) point, for oil economies, changes in the monetary base may occur as a result of fiscal policy without being reflected in net credit to the government in central bank accounts. Fiscal dominance of monetary policy is more likely to manifest itself as an increase in net international reserves accompanied by an increase in monetary base. Indeed this is what is happening in Azerbaijan since 2004. Large unsterilized conversion operations by the National Bank, presumably under government pressure, lead to increased money supply and inflation. To illustrate the point, consider the following identity

$$\Delta MB = \Delta NIR + \Delta NDA$$

where MB is monetary base, NIR is net international reserves and NDA is net domestic assets. When an oil export occurs, there is a simultaneous increase in NIR (as the oil company sales the foreign exchange proceeds to the central bank) and in the deposits of the government at the central bank, reflected in the decline on the same amount in NDA, so that monetary base does not change. As the government finances its expenditures with those

[27]The total amount can be no higher than 3% of state budget average revenues for the past three years. The loan must be repaid in 6 months.

deposits, NDA increase and the monetary base expands. Table 3.8 shows the National Bank's summary accounts over the period 2001-2007. As you may see, there is hardly a change of equal proportions in NIR and NDA: while NIR increase by huge amounts, NDA do not decrease at the same pace. Moreover, in some years NDA even increase reflecting the fact that let alone keeping its oil receipts in the Bank, the government borrows money to finance its expenditures. Even though these loans to government do not exceed legally allowed amounts, this analysis leads to conclusion that the budget deficit is financed directly through seigniorage revenues, i.e. increases in the monetary base. Actual independence of the National Bank of Azerbaijan is severely undermined, since it proves incapable of resisting pressures for large foreign exchange conversions.

Another aggregated variable that improves considerably since 1996 is the one on the "policy formulation." Actually, there is a gradual improvement on this particular aspect of legal independence from the 1992 Law and on. The executive branch of the government is now legally bound to consult with the Bank before making decisions on policies that to some extent concern the Bank. Nevertheless, the legislation still does not assign the Bank an active role in the formation of the government's budget.

The index item on the resolution of conflicts is not specified in the current legislation. I mark it as "NA" in Table 3.3 and do not consider when calculating the index.[28] As will be argued in the corresponding section, the National Bank of Azerbaijan is instrument independent, and formally no state organ has the right to interfere with its activities and policy decisions. But in a case of potential conflicts concerning the goals of the policies to be implemented by the Bank, the executive branch in the person of the

[28] I follow Cukierman (1992) and assign the weights of the index items marked as "NA" proportionately to other items under the same sub-index.

President has an advantage over the Bank, as it can dissolve the Board and appoint new candidates. Thus this measurement would not be very high anyway. In the Azerbaijani legislation it is not stipulated that the National Bank has to follow the exchange policy established by the government. In legal terms it can mean that the Bank is free to carry out the exchange policy that it considers relevant but must report to the President about it.

The sub-index score on the central bank objectives equals the unweighted value of 0.60, as back in 1992. The 1996 Law does not recognize the price stability as a principal goal of the monetary policy; hence the sub-index value decreases to 0.40 between years 1992 and 1996. The current 2004 Law makes a distinction between the principal and other goals of the central bank. Although price stability is not explicitly stipulated as the principal goal, the principal goal of currency stability can be interpreted as a commitment to stable prices. In fact, on the website of the National Bank price stability is mentioned as its primary objective.

As far as the sub-index on the terms of office, appointment and dismissal procedures of the governor is concerned, its value has also registered progress over time. Current legislation makes it almost impossible to fire the governor before his term in office is over, especially on political grounds.

Size and structure of a central bank board are other essential factors of central bank independence. Blinder (2004) thinks that one of the hallmarks of the revolution in central banking has been a movement toward making decision by a committee rather than by the dictatorial central bank governor. He further emphasizes that “in many countries a movement from an individual central banker to a committee went hand-in-glove with granting independence to the central bank.” Lybek and Morris (2004), in an extensive study

of some 101 central bank laws, stress that the "size of a board should strike a balance between having a sufficient number of members to ensure an informed, balanced and professional view, while at the same time limiting the number so that the board remains effective and avoids a dilution of individual responsibilities." Numerically, they think that the size of a monetary policy board of the central bank should vary from 7 to 9. Authors also think that the individual responsibility by all board members is an essential element of an autonomous and accountable central bank.

According to the latest law, there should be two outside members of the Board who are not employees of the Bank. However, these two members are not accountable to the president or parliament, but to the Chairman. Thus, this provision, aimed to establish some kind of outside monitoring of the National Bank, actually does not exercise such functions. In fact, decisions can be made without them, since votes of simple majority of the Board members present at the meeting are enough for a quorum.

Having discussed the progress in the legal independence of the National Bank, I attempt to measure the actual practice of the law. First, I take a look at the turnover rate of the governors. In fact, given the short span of the Bank's history, the list of all governors, their respective terms and the rates of turnover can be summarized in Table 3.4. One may note a steady decline in the TOR value, which equals 0.8 in 1997, 0.4 in 2002 and 0.25 in 2009. As to what the numbers mean, the TOR value of 0.8 in 1997 implies that for the corresponding reference period the average term of office of the governor is 15 months, while in 2009 it rises to the whole 4 years. As you see, Azerbaijan has improved its TOR value a lot since 1995. In fact there has been no new governor since 1994, Elman Rustamov got re-appointed twice. If we compare these results with those obtained for Central

European countries from 1992 to 2000 in Dvorsky (2000), we see that the governor turnover rates in these countries are lower, albeit not much when compared to the current value for the National Bank of Azerbaijan, e.g. 0.13 for Czech Republic, 0.23 for Hungary, 0.35 for Poland, 0.26 for Slovakia and 0.11 for Slovenia. However, the short reference periods raise questions about the reliability of the calculated results and conclusions. Moreover, it can be argued that turnover rates do not truly reflect the state of actual central bank independence. If government has the right to participate in the appointment procedures, it may use it to exert political pressure on the central bank.

The subjective factors, namely personal characteristics of the Chairman and his relationship with the ruling elite, are also crucial in assessing the actual central bank independence. For example, in Azerbaijan Qalib Aghayev had to resign from his post of the Chairman of the Board because of his disagreement with the government on issues of borrowing money from the IMF (Aliyev 2002). A new Chairman, Elman Rustamov, has no record of resisting any decisions made by the executive branch of the government, and it could be one of the explanations for his second and third reappointments in 1999 and 2004. This fact can support the claim that a low turnover rate does not imply a high level of actual central bank independence. Moreover, in countries like Azerbaijan, where the political power and decision-making are concentrated, it might be the other way round: low turnover can imply a lower level of actual independence.

Another method to assess the actual independence of the central bank is to look at the Cukierman's QVAW index. As noted previously, this index is based on responses to a questionnaire that was sent to experts on monetary policy and institutions. Despite the legitimate concern for subjectivity of this measure, I find it useful for comparability

purposes between legal and actual independence. I have collected the responses from 6 internal and 6 external experts. Internal experts are affiliated with various departments of the National Bank, whereas external experts are from the academia, private sector and various public institutions in Azerbaijan. Table 3.5 reports the QVAW scores.

As of March 2009, the "internal" and "external" QVAW scores for the Bank are 0.81 and 0.64, respectively. At the beginning of 1990s, the German Bundesbank scored 1.0 on this index, Finland – 0.78, Australia – 0.76, Denmark – 0.73, France – 0.65, UK – 0.64, Uruguay – 0.49, Belgium – 0.47 (Cukierman 1992). Unfortunately, as far as the transition countries are concerned, I can compare the QVAW index scores only to those calculated in Schwodiauer et al. (2006) for the National Bank of Ukraine. Responses of Ukrainian experts yield an "internal" score of 0.71 and an "external" one of 0.57. Moreover, there is no way to compare the QVAW scores across legal regimes, as there is no study that calculated this index for Azerbaijan before. Two general observations are worth mentioning here. First, internal experts tend to give higher scores to the actual independence of the Bank than external experts do. This is driven partly by better access to information on central banking activities and partly by subjectivity present in judging yourself. Second, the Azerbaijani central bank seems to be more independent than the Ukrainian one.

Since the QVAW index includes both legal and actual criteria of the independence, and we have already analyzed the significant improvement in the legislation as regards central bank independence, it should not come as a surprise that in comparison to the scores above the National Bank of Azerbaijan earns a score which is above average. If we look at the criteria used to calculate the QVAW index score, indeed, the 2004 Law severely limits lending to the government, contains provisions for the financial independence of the Bank

and currency stability, which can be interpreted as the price stability, is considered a primary goal of the Bank. However, I would argue that this index, in addition to conventional degree of subjectivity inherent in all central bank independence indexes, has other shortcomings. For instance, the resolution of conflicts between the government and the Bank is assigned a low weight of 0.1. In the case of Azerbaijan, however, I think that the main problem of the Bank is its subservience to the government and existence of no record of the conflict resolution in favor of the Bank.

Overall, in my opinion actual central bank independence must be viewed in the context of the political system of a given country. It is hard to speak of any kind of high actual central bank independence in Azerbaijan, as well as in other countries with concentrated political regimes. The National Bank of Azerbaijan has always suffered from a lack of credibility because it has not had actual independence and the perception among the population that "the President decides everything" is often true. This has not only been a problem for the Bank but for all other public institutions as well.

3.5.2 Goal vs. Instrument Independence of the Bank

Analyzing the legislation on the National Bank, one can clearly see that it is definitely an instrument independent institution. Instrument independence is fixed in Article 5 of the 2004 Law on the Bank, which states that the Bank has the authority to determine and implement monetary policy, determine and announce the official exchange rate of the manat, etc.

However, according to the legislation, the Bank's goal independence is ambiguous. It has to provide the President with general directions of the monetary policy for the forthcoming year not later than August 1st. This report includes analysis of the

macroeconomic and financial situation, and reflects basic guidelines of the monetary policy and banking sector development as well as the determination of aims and tasks of the monetary policy for the forthcoming year and means to accomplish those. However, it does not imply that the President necessarily should accept this document. Since the executive branch is responsible for implementing the macroeconomic policy of the state and has its own objectives, the President can require the Bank to change its policy targets, if necessary (Aliyev 2002). The Bank administration takes these suggestions into consideration. Otherwise the President may nominate other people to the Milli Majlis for appointment to the Board. Taking into consideration the structure of the Parliament (where pro-president members are traditionally an overwhelming majority) there is no doubt about the way they will vote.

3.5.3 Political vs. Economic Independence of the Bank

To measure the political and economic independence of the Bank, I use the GMT index as described in Grilli et al. (1991). Calculations according to this index seem to confirm the results of the Cukierman index. The overall index in 2004 has significantly increased compared to that based on the 1996 Law.

Table 3.6 presents the calculations. In comparison with some other transition countries, the economic independence of the National Bank in 1996 was extremely low, while the political independence was more or less at the same level. For example, according to Dvorsky (2000), in Czech Republic overall independence was 13 (PI – 9, EI – 4), Hungary – 15 (7 and 8), Poland – 16 (9 and 7), Slovakia – 11 (6 and 5) and in Slovenia – 12 (8 and 4). However, mostly because of the amendments to legislation regarding the Bank's loans to the government, the economic independence in 2004 more than doubled.

Results for political independence in Azerbaijan are rather unexpected. In spite of the predominantly authoritarian regime the National Bank is legally "independent" in political terms. In fact, it is not surprising. Having an "obedient" parliament and unconstrained by electoral procedures, the president can easily appoint his people to the Board and change them in case of their "extreme" independence even without using formal channels.

I would like to highlight the fact that the institutional separation of banking supervision from monetary policy in the GMT index (coded as M7) is counted as conducive to the higher central bank independence. It can be argued that a combination of these functions might make the central bank more powerful and weighty, and thus contribute to its higher independence. However, this issue is too sophisticated to be applied in general to any country without consideration of peculiarities of each country together with its political system and "political culture" (Hillman 1999).

In case of Azerbaijan, where the system of public administration is heavily centralized, it is difficult to predict whether there will be a possibility and grounds for such an institutional separation. In my view, it should remain combined as it is, given the domestic peculiarities that the efficiency of institutions is inversely related to their number. When everyone tries to be "more senior," it is hard to coordinate policies if necessary. This may result in an unhealthy power struggle. Combination of the supervisory and monetary functions within the Bank at least helps to achieve policy coordination.

3.5.4 Summary of the Index Scores

Overall, the LVAW index scores indicate that the 2004 Law on the National Bank of Azerbaijan assigns a notably higher degree of legal independence to the Bank. However,

several flaws remain if the Bank is to achieve a degree of independence that enables it to keep the inflation down:

- ✓ Price stability is not unambiguously the National Bank's primary goal. The main objectives of the National Bank of Azerbaijan are to preserve the value of the national currency and to develop and strengthen the banking system, as stipulated in Article 4 of the law. Clearly, exchange rate targeting or interpreting a legal mandate for maintaining the stability of currency as pegging the exchange rate to one particular foreign currency or a basket of currencies precludes price stability. If the exchange rate is pegged, the path of the inflation rate is determined by the requirement to keep the real exchange rate in line with the longer-run development of the terms of trade (if balance-of-payment problems are to be avoided). However, as recent Azerbaijani macroeconomic experience shows, expansionary fiscal policies and capital inflows exert an upward pressure on the real exchange rate which, given that the nominal exchange rate has been de facto pegged, are realized mostly through higher rates of inflation (IMF 2007). The strong political opposition to greater exchange rate flexibility is rooted in widespread dollarization and to some extent in concerns about competitiveness. The two largest players in Azerbaijan's foreign exchange market – the International Bank of Azerbaijan (IBA) and the State Oil Company – would incur large valuation and income losses from nominal appreciation. In addition, the widespread belief that nominal appreciation will lead to faster real appreciation and to a loss of competitiveness contributed to the government's hesitation to allow greater nominal exchange rate flexibility.
- ✓ The legislation does not include provisions for the resolution of potential conflicts between the Bank and the government.

- ✓ The position of the Chairman of the Board is not sufficiently secure to make it immune to political pressure. Five-year tenure is not longer than that of the president who is in charge of appointing the governor. Also legislation making the governor report only to the president causes the governor's position to appear rather precarious. While persistence of the current governor in the office (15 years in a row) might be a sign of the independence of the bank, actually it most probably represents his willingness to pursue accommodative monetary policy even at the expense of higher inflation.
- ✓ The Board of the Bank acts, according to Article 21, as the Bank's monetary policy committee. Nevertheless, the role of the board is not satisfactorily regulated by the legislation. Board members seem to be in the shadow of the Chairman. Nor are they held individually responsible for the outcomes of the Board's decision. The weak position of the Board in this sense puts all the burden of responsibility on the shoulders of the Chairman, who may not be able to carry out his duties effectively all the time.

There are also important drawbacks regarding the actual practice of monetary policy that undermine the independence of the Bank:

- ✓ So far there exists no proven record of policy conflicts of the Bank with the government of which the public is aware and which were won by the Bank. Even if the central bank is in charge of determining the exchange rate regime and is prohibited from extending direct credit to the government, there may still be a need for a conflict resolution mechanism, since government policies may adversely affect the real exchange rate and capital flows, which can make it difficult for the central bank to maintain price stability, which is indeed what happens in Azerbaijan. For instance, in February 2005 the Bank abandoned the peg and allowed the slow appreciation of the nominal exchange rate. In late summer 2005, the

focus of monetary policy was gradually shifted from the exchange rate path to base money targets. Together with fiscal prudence these policy had an encouraging effect on inflation: the rate declined from 15.4% in April to about 10.5% in September. However, yielding to public opinion against nominal appreciation and exchange rate volatility, the government publicly announced the return to peg in September 2005. The Bank just complied with this decision despite the obvious expected adverse consequences on the rate of inflation.

- ✓ In Article 6, the law has grants the Bank instrument independence to conduct monetary and exchange rate policies. However, its operations are still subject to political interference – the example above is a case in point.
- ✓ In Azerbaijan, the current debt level is moderate and a large accumulation of foreign assets is expected during the oil boom. Nevertheless, in an oil-producing country like Azerbaijan, fiscal dominance can manifest itself in a different way. In particular, the financing of the non-oil deficit with oil revenues and fast expansion of quasi-fiscal operations are normally accompanied by rising liquidity levels. This in turn can result in unmanageable monetary and exchange rate shocks, which can ultimately endanger the central bank's ability to meet its inflation target.
- ✓ Despite recent improvements in information sharing between the Ministry of Finance and the Bank, surprise requests for the large foreign exchange conversion operations are still common.
- ✓ The 2004 Law has a provision for the Board of the bank to include two independent members, but these appointments have not taken place yet.

3.6 TRANSPARENCY AND ACCOUNTABILITY OF THE NBA

Is the National Bank of Azerbaijan a transparent institution? The answer is mostly positive. The Bank issues annual reports on the state of monetary policy and financial sector, which are available to the public. These annual reports also include results of the audit conducted by the internationally renowned audit companies. The Chairman and other members of the Board are in touch with the media representatives all the time and hold press conferences. Beginning in 2001, the Bank on a regular basis informs the public about its strategic activities. In 2002 the official web site of the Bank was launched and ever since it has proved to be an efficient channel of communication to the public. Yet there is still some veil of secrecy regarding methods of analysis the Bank employs in its macroeconomic forecasts.

As for the accountability of the Bank, it is definitely accountable to the president. The question is open, however, over whether this is the right path to follow. The former chairman of the parliamentary commission on economic policy, Sattar Safarov, said in 2002 that very often he could not get necessary information from the Bank, but only information the Bank considers necessary to send. He suggested changing legislation and granting the parliament controlling functions. The first Chairman of the National Bank of Azerbaijan and author of the first law on central banking in Azerbaijan, Qalib Aghayev, argues that a central bank must be under parliamentarian control.[29] His point is that the President already has many functions and it is not good to endow one person with such authority. At the same time Milli Majlis is a collegial organ and decisions are made as a result of debates but not by one person (no matter how talented this person is). Different social strata (and thus interests) are also represented in the parliament, and there is less space for concentration and

[29] From the interviews in Aliyev (2002)

monopolization of economic activity. In other words, for the sake of democracy ex-post accountability and transparency for the public must be higher.

An argument against this transfer of the control over the Bank could be the fact that Azerbaijan is constitutionally a presidential republic and the powerful president as the head of executive branch is responsible for the implementation of economic policy. In turn, the parliament is a legislative organ and the policy implementation is out of its competence. Thus, it is quite logical that the Bank is accountable to the president, but not to the parliament. The solution is quite radical: changing constitutional norms in Azerbaijan and giving more authority to the parliament or even changing the structure of the domestic political system.

A common practice worldwide is granting two external members of the Board the responsibilities of monitoring the process of decision-making and reporting to the Parliament. Thus these members of the Board would be the representatives of the parliament in the Bank and mediators between these two institutions. However, as noted previously, this legal provision has not been fulfilled – there is no outsider attending the Board meetings.

As I have mentioned several times throughout this work, an excessively high level of independence can be in conflict with democracy. Thus, higher accountability and transparency will be conducive to more credible monetary and exchange rate policies. But what is the case in countries which cannot be considered sufficiently democratic? Even if we assume that a central bank has high legal independence, it can be undermined by low actual central bank independence, because of the various factors mentioned above.

A transparent and independent monetary authority is one of the determinants of a democratic state. Once the relevant political culture is developed and political power is democratized, the public and the political actors will be able to realize a necessity of central bank independence, and the gap between legal and actual independence can be lowered as well. In other words, growth in actual independence of the National Bank of Azerbaijan is possible with progress in the process of institution building, loosening of the strong presidential regime and democratization.

3.7 OVERVIEW AND PERSPECTIVES OF AZERBAIJANI ECONOMY

The natural resource boom in Azerbaijan has resulted in exceptionally high real GDP growth and a significant improvement in external position during 2005-2008. Real GDP rose by 23.4 % in 2007 after a record 30.5% in 2006. This unprecedented growth made it possible to increase budgetary expenditures from 37.7% of non-oil GDP in 2004 to 66.1% in 2007 (Table 3.7). High economic growth continued in the first half of 2008, reaching 16.5% (EBRD 2008). The inflow of revenues from oil and gas exports resulted in a major accumulation of foreign exchange reserves in the National Bank and the State Oil Fund of Azerbaijan. At end-September 2008, Azerbaijan's gross official reserves and state oil fund assets jointly reached $16 billion, six times the size of public external debt (IMF 2008).

Annual real growth has been above 20% since 2005 because of the major expansions in oil and gas production and increased public expenditure. Non-oil GDP rose substantially (15% in 2007) triggered by large increases in public expenditure directed at large infrastructure projects as well as increases in wages and pensions. Fiscal revenues rose substantially and despite a nearly 30% increase in expenditures the consolidated central government budget recording a surplus of about 2.4% of GDP in 2007 (Table 3.7). While

overall fiscal balance over recent years was in surplus, the non-oil primary deficit deteriorated. The problems are deepened with strong concerns about quality and efficiency of public expenditure. There is a strong need for structural reforms in this regard.

The fiscal expansion in the context of a de facto slowly appreciating exchange rate crawl contributed to an increase in inflation from 5.5% in December 2005 to 19.6 % in 2007 and remained high at 20.8 % July 2008 (EBRD 2008). As part of its efforts to lower inflation, the National Bank of Azerbaijan raised its refinancing rate from 13 % at the end of 2007 to 15 % in June 2008. In an attempt to slow imported inflation and reduce the impact of the weaker dollar on domestic inflation, in March 2008 the Bank switched the targeted currency from the US dollar (effective peg) to a currency basket that comprised 70% US dollars and 30% euros. Large foreign currency inflows caused a real exchange rate appreciation of about 16.5% during 2007 and about 5% in the first half of 2008, further threatening the competitiveness of non-oil sectors, in the absence of significant productivity-enhancing reforms. Until late 2008, inflation remained high due to rising international food prices, surging oil exports and a substantial fiscal expansion that has fuelled domestic demand. In addition, the monetary base doubled in 2007 (101.4% increase, Table 3.7) due to large unsterilized purchases of foreign exchange by the National Bank of Azerbaijan.

Ironically, the help with the "war on inflation" came from abroad - the global financial crisis has provided Azerbaijan with the immediate benefit of reversing the high inflation trend that has afflicted the economy since late 2005. A sharp decline in international food and commodity prices reduced the rate of inflation to 19 % at end-November and 17% at end-2008. Inflation is projected to decline to 9 % by end-2009, reflecting falling international food and commodity prices and cooling domestic demand

(IMF 2008). The external position would remain strong and the accumulation of strategic foreign assets should continue, albeit at a slower pace. Currently, the National Bank is taking measures against potential depreciation of manat in contrast to the recent past, when it was pursuing exactly the opposite objective.

The economy maintained a very strong growth performance over the first 10 months of 2008. Non-oil activity responded strongly to the exceptional fiscal stimulus and growth accelerated to about 15 %, led by a robust expansion in construction, services and agriculture. The current global financial downturn has so far had limited impact on Azerbaijan's financial sector, but a credit slowdown may be under way. An undeveloped financial market, the rather low dependency of domestic banks on "hot" capital inflows, and a very strong international reserve position helped to shield Azerbaijan from the early effect of the crisis. In addition, the National Bank of Azerbaijan responded quickly and appropriately to the situation. In April 2008, the Bank started tightening liquidity to slow down rapid credit growth and strengthened prudential regulations and supervision, to counter banks' inadequate risks assessment and management practices. As a result, banking soundness indicators at end-September showed that Azerbaijan's banks entered this period of turmoil and uncertainty in a relatively solid position. When external and domestic liquidity conditions reversed in October, the Bank promptly reduced reserve requirements and refinancing rates, and signaled its willingness to provide temporary liquidity to solid banks that had been hit by the unexpected reversal of inflows from foreign banks. This shows that when allowed acting independently, the Bank becomes quite effective at dealing with shocks to the financial sector. In my opinion, a stronger de facto involvement of the Bank in the

design of fiscal policy, i.e. monetary dominance of fiscal policy, would lead to lower rates of inflation.

Monetary policy needs to strike a better balance between ensuring that inflation expectations are set firmly on a downward trend and the support of non-oil growth (IMF 2008). The reduction of refinancing rates by 7% over 2 months was excessive, particularly with inflation still in the high double digits. Even under the expectation of a substantial decline in inflation, refinancing rates at the current level would remain negative in real terms in 2009. In addition, given that the transmission mechanism does not seem to work, rate cuts are not likely to have the intended effect on banks' lending rates, hence on economic activity. The Bank should not reduce the refinancing rates from the current level until inflation expectations are more firmly set to lower levels.

The Bank's decision to temporarily suspend the use of the two-currency basket peg regime at a time of high uncertainty was, on balance, well grounded. The major volatility in the exchange rate between the two currencies in the basket peg of the manat (the dollar and the euro) would have implied a notable depreciation of the manat against the dollar, with the potential of triggering panic and re-dollarization.

3.8 CONCLUSION AND POLICY RECOMMENDATIONS

The analysis of the National Bank Law of 2004 as well as its implementation by Azerbaijani authorities has shown that despite a substantial improvement in the degree of legal independence of the Bank, there are still important issues to be considered to ensure both legal and actual independence of the Bank, which is an important condition for price stability. Drawing on the analysis above, I propose a list of recommendations for the policymakers.

In particular, I recommend the lawmakers to make the following amendments to the National Bank Law of Azerbaijan:

- In the short term, the authorities need to examine whether the current legal framework is consistent with price stability being the primary objective of the Bank.
- The functions of the Board members should be clarified in the legislation. Especially, the members of the Board should be held accountable for the decisions so that they do not simply follow the Chairman's view.
- The law should include a clear conflict resolution mechanism between fiscal and monetary authorities. In case of such conflicts, monetary policy aimed at price stability should be considered superior to fiscal objectives.
- The requirement for approval of the monetary policy by the President on a yearly basis should be removed.

On the other hand, there are measures that could and should be taken immediately without having to pass changes to the law:

- Over the medium term, an independent Policy Board, including at least two independent directors, would help ensure that policy implementation is free of political interference and consistent over time.
- Absence of a properly functioning secondary market creates a problem with the Bank's lending procedures to the government as there is now no other way to provide short-term loans to the latter than in the primary market. The authorities should foster the development of the secondary market.
- The Bank's independence can be strengthened by improving its financial position, allowing it to conduct foreign exchange and open market operations without undue

concern for its financial results. Because of its large open position in foreign exchange, the Bank is likely to incur valuation losses that will reduce its equity.

- As soon as excess volatility in the bilateral exchange rate of the basket currencies is left behind, the Bank should return to the full implementation of the two-currency basket exchange rate regime. This system has served the country well by introducing the idea of two-sided exchange rate risk to market participants. More exchange rate flexibility will be essential, as the Bank plans to move to inflation targeting in the future.

Table 3.1

Structure of the Legal Variables Weighted (LVAW) index

Criteria	Values
I. Central bank CEO (0.20)	
1. Term of office of CEO (0.25)	
Equal or more than 8 years	1
6 years or more but less than 8 years	0.75
Equal to 5 years	0.5
Equal to 4 years	0.25
Less than 4 years	0
2. Who appoints the CEO (0.25)	
The Central Bank Board	1
Council composed by executive and legislative branch and Central Bank Board	0.75
By legislative branch	0.5
By executive branch	0.25
By one or two members of executive branch	0
3. Provisions for dismissal of CEO (0.25)	
No provision	1
Only for non-policy reasons (e.g., incapability, or violation of law)	0.83
At a discretion of Central Bank Board	0.67
For policy reasons at legislative branch's discretion	0.5
At legislative branch's discretion	0.33
For policy reasons at executive branch's discretion	0.17
At executive branch's discretion	0
4. CEO allowed to hold another office in government (0.25)	
Prohibited by law	1
Not allowed unless authorized by executive branch	0.5
No prohibition for holding another office	0
II. Central Bank objectives (0.15)	
Price stability is the only or major goal, and in case of conflict with government, the Central Bank has final authority	1
Price stability is the only goal that do not seem to conflict with the former	0.8
Price stability along with other objectives	0.6
Price stability along with other objectives of potentially conflicting goals (e.g., full employment)	0.4
Central Bank charter does not contain any objective	0.2
Some goals appear in the charter but price stability is not one of them	0
III. Policy formulation (0.15)	
6. Who formulates monetary policy (0.25)	
Central Bank has the legal authority	1
Central Bank participates together with government	0.67
Central Bank in an advisory capacity	0.33
Government alone formulates monetary policy	0
7. Government directives and resolution of conflicts (0.50)	
Central Bank given final authority over issues defined in the law as objectives	1.0
Government has final authority over issues not clearly defined as CB goals	0.8
Final decision up to a council whose members are from the CB, executive branch, and legislative branch	0.6
Legislative branch has final authority	0.4

Executive branch has final authority, but subject to due process and possible protest by CB	0.2
Executive branch has unconditional authority over policy	0
8. Central Bank given active role in formulation of government's budget (0.25)	
Yes	1
No	0
IV. Central Bank lending (0.50)	
9. Limitations on advances (0.30)	
Advances to government prohibited	1
Permitted but subject to limits in terms of absolute cash amounts or relative limits (government revenues)	0.67
Permitted subject to relatively accommodative limits (more than 15 percent of government revenues)	0.33
No legal limitations on advances. Subject to negotiations with government	0
10. Limitations on securitized lending (0.20)	
Advances to government prohibited	1
Permitted but subject to limits in terms of absolute cash amounts or relative limits (government revenues)	0.67
Permitted subject to relatively accommodative limits (more than 15 percent of government revenues)	0.33
No legal limitations on advances. Subject to negotiations with government	0
11. Who decides control of terms of lending to government (0.20)	
Central bank controls terms and conditions	1
Terms of lending specified in law, or Central Bank given legal authority to set conditions	0.67
Law leaves decision to negotiations between the Central Bank and government	0.33
Executive branch alone decides and imposes to the Central Bank	0
12. Beneficiaries of Central Bank lending (0.10)	
Only central government	1
Central and state governments, as well as further political subdivisions	0.67
Also public enterprises can borrow	0.33
Central Bank can lend to all of the above and to the private sector	0

13. Type of limits when they exist (0.05)	
As an absolute cash amount	1
As a percentage of Central Bank capital or other liabilities	0.67
As a percentage of government revenues	0.33
As a percentage of government expenditure	0
14. Maturity of loans (0.05)	
Limited to a maximum of 6 months	1
Limited to a maximum of 1 year	0.66
Limited to a maximum of more than one year	0.33
No legal upper bounds	0
15. Restrictions on interest rates (0.05)	
Must be at market rate	1
On loans to government cannot be lower than a certain floor	0.75
Interest rate on Central Bank loans cannot exceed a certain ceiling	0.5
No explicit legal provisions regarding interest rate in Central Bank loans	0.25
No interest rate charge on government's borrowing from Central Bank	0
16. Prohibition on Central Bank lending in primary market to Government (0.05)	
Prohibition from buying government securities in primary market	1
No prohibition	0

Due to the problems of availability of the large number of the postulated variables, Cukierman initially regroups them to form eight more comprehensive legal variables. The four CEO items are combined into a single item, which is calculated by computing their arithmetic mean. The three items of the Policy Formulation sub-index are combined using a weighted average with weights given above. Finally, the last four variables for the Limitations on Lending sub-index are combined using an arithmetic mean. On the final level of aggregation, the LVAW score is calculated using a weighted average of the resulting eight variables, with weights shown below:

Aggregated Variable	**Assigned Weight**
CEO	0.20
Policy Formulation	0.15
Objectives	0.15
Limitations on lending – advances	0.15
Limitations on securitized lending	0.10
Limitations on lending – who decides	0.10
Limitations on lending – width	0.05
Limitations on lending – miscellaneous	0.10

Source: Cukierman (1992)

Table 3.2
Questionnaire (QVAW) Variables, Weights, and Numerical Coding

Criteria	Value
1. Tenure of central bank CEO overlap with political authorities (0.1)	
Little overlap	1
Some overlap	0.5
Substantial Overlap	0
2. Limitations on lending in practice (0.2)	
Tight	1
Moderately tight	0.66
Moderately loose	0.33
Loose or nonexistent	0
3. Resolution of conflict (0.1)	
Some clear cases of resolution in favor of bank	1
Resolution in favor of government in all cases	0
All other cases	0.5
4. Financial independence (0.1)*	
a. Determination of the central bank's budget	
Mostly central bank	1
Mixture of bank and executive or legislative branches	0.5
Mostly executive or legislative branches	0
b. Determination of the salaries of high bank officials and the allocation of bank profits	
Mostly by bank or fixed by law	1
Mixture of bank and executive or legislative branches	0.5
Mostly executive or legislative branches	0
5. Intermediate policy targets (0.15)**	
a. Quantitative monetary stock target	
Such targets exist; good adherence	1
Such targets exist; mixed adherence	0.66
Such targets exist; poor adherence	0.33
No stock targets	0

b. Formal or informal interest rate targets	
No	1
Yes	0
6. Actual priority given to price stability (0.15)	
First priority	1
First priority assigned to a fixed exchange rate	0.66
Price or exchange rate stability are among the bank's objectives, but not first priority	0.33
No mention of price or exchange rate objectives	0
7. Function as a development bank, granting credit at subsidy rates? (0.2)	
No	1
To some extent	0.66
Yes	0.33
The central bank heavily involved in granting subsidized credits	0

As in the case of LVAW, we follow two combination procedures. On the first level, variables (4a) and (4b) are combined with equal weight into a single variable (4). The same process is used for variables (5a) and (5b) to obtain (5), which summarizes both intermediate objectives. On the second and final level, QVAW is obtained using a weighted average of seven variables with the weights shown in the parentheses.

Source: Cukierman (1992)

Table 3.3

Legal Independence (LVAW) Index

National Bank of Azerbaijan

	Criteria	1992-1996 (weighted)	1996 - 2004 (weighted)	2004 – 2008 (weighted)
	Central Bank CEO	**0.05**	**0.08**	**0.13**
1.	*Term of office of CEO*	NA	0.50	0.50
2.	*Who appoints the CEO*	0.50	0.00	0.25
3.	*Provisions for dismissal of CEO*	0.33	0.17	0.83
4.	*CEO allowed to hold another office in the government*	0.00	1.00	1.00
	Central Bank Objectives	**0.09**	**0.06**	**0.09**
5.	*Central Bank objectives*	0.60	0.40	0.60
	Policy formulation	**0.02**	**0.05**	**0.08**
6.	*Who formulates monetary policy*	0.33	0.67	1.00
7.	*Government directives and resolution of conflicts*	NA	NA	NA
8.	*Central Bank given active role in formulation of government's budget*	0.00	0.00	0.00
	Central Bank lending	**0.06**	**0.07**	**0.31**
9.	*Limitation on advances*	0.00	0.00	0.66
10.	*Limitation on securitized lending*	NA	NA	NA
11.	*Who decides control of terms of lending to government*	0.00	0.33	0.66
12.	*Beneficiaries of Central Bank lending*	NA	0.33	0.33
13.	*Types of limits when they exist*	NA	NA	0.66
14.	*Maturity of loans*	1.00	0.00	1.00
15.	*Restrictions on interest rates*	0.25	0.25	0.25
16.	*Prohibition on Central Bank lending in primary market to Government*	0.00	0.00	1.00
	Total	**0.22**	**0.26**	**0.61**

Table 3.4

Governover Turnover Index (TOR)

National Bank of Azerbaijan, 1992-2009

Governors	Qalib Aghayev 02.12.92-11.20.92	Cavanshir Abdullayev 11.20.92– 09.02.93	Qalib Aghayev 09.02.93 - 04.20.94	Elman Rustamov 06.29.94 – present
Period of reference		from February 1992 to February 2009		
Turnover rate in 2009		0.25		
Turnover rate in 2002		0.4		
Turnover rate in 1997		0.8		

Table 3.5

Actual independence (QVAW) Index

National Bank of Azerbaijan, 2009

Variable description	Internal	External
Tenure of central bank CEO overlap with political authorities	0.4	0.1
Limitations on lending in practice	0.91	0.73
Resolution of conflict	0.6	0.2
Financial independence	0.9	0.8
Intermediate policy targets	0.79	0.67
Actual priority given to price stability	0.79	0.66
Functions as a development bank, granting credit at subsidy rates?	1	0.93
Total (weighted)	**0.81**	**0.64**

Table 3.6
GMT Index of Political and Economic Independence
National Bank of Azerbaijan

Political Independence	1996	2004
Governor		
G1. Governor not appointed by the government (1) and not by the parliament only (2)	2	2
G2. Governor appointed for more than five years		
Board		
B3. No board member appointed by the government		
B4. Board appointed for more than five years		
B5. Provisions for governor's dismissal non-political only		1
Relationship with government		
R6. No mandatory government representative on the board	1	1
R7. Government/parliamentary approval of monetary policy is not required	1	1
Constitution		
C8. Statutory responsibility to pursue monetary policy	1	1
C9. Presence of legal provision supporting the Bank on conflicts with the government		
Total PI	**5**	**6**
Economic Independence	1996	2004
Direct credit to the government		
D1. Direct credit facility is not automatic		1
D2. Direct credit facility is at the market interest rate (or the basic CB rate)		
D3. Direct credit facility is temporary	1	1
D4. Direct credit facility is of limited amount		1
D5. CB does not participate in the primary market for public debt		1
Monetary Instruments		
M6. The discount rate is set by the CB	1	1
M7. Supervision of commercial banks is not granted to the CB (**) or not granted to the CB alone (*)		
Total EI	**2**	**5**
Overall Index	**7**	**11**

Table 3.7
Selected Economic Indicators, Azerbaijan, 2001-2007
(annual percentage changes, unless otherwise specified)

Years	2001	2002	2003	2004	2005	2006	2007
Real GDP	9.9	10.6	10.5	10.4	24.3	30.5	23.4
Oil Sector	7.9	3.9	0.6	2.5	65.4	62	37.3
Non-Oil Sector	10.4	12.3	15.3	13.8	8.4	11.9	11.5
CPI (end-of-period)	1.5	3.3	3.6	10.4	5.5	11.4	19.5
Nominal GDP per capita (in US dollars)	701	742	880	1040	1574	2469	3663
Poverty (in percent of population)			39.7	28.5	24	20.8	16
Overall fiscal balance (in percent of GDP)	-0.4	-0.5	-0.8	1	2.6	-0.2	2.4
Non-oil primary fiscal balance (in % of non-oil GDP)			-17	-12.9	-12.6	-31.1	-32.1
Oil revenue (in percent of non-oil GDP)			16.2	14.7	17.4	30.8	38.2
Non-oil revenue (in percent of non-oil GDP)			22.1	24.3	27.5	29.9	33.3
Expenditure (in percent of non-oil GDP)	0.9	36.8	40.8	37.7	40.5	59.3	66.1
Manat base money	8.8	10.9	23.7	38.2	7.5	132.6	101.4

Source: IMF, EBRD and State Statistical Committee

Table 3.8
National Bank of Azerbaijan Summary Accounts, 2001-2007
(in millions of manats)

	2001	2002	2003	2004	2005	2006	2007
Net Foreign Assets	394	425	535	850	930	2071	3527
Net international reserves	395	426	535	850	931	2061	3524
Gross international reserves	669	664	790	1054	1082	2179	3612
Foreign Liabilities	-274	238	-255	-205	-151	-118	-88
Other items, net	-1	-1	0	0	-1	9	9
Net domestic assets	-35	-17	-32	-16	-44	-26	-87
Domestic credit	47	48	63	64	-9	8	-60
Net claims on central government	136	91	16	20	-52	25	93
of which: claims on central government	136	91	16	142	140	138	137
manat deposits of government				-94	-158	-74	-33
Pre-2000 oil bonus deposit	-109	-61	-1	0	0	0	0
Credits to the economy	20	17	47	1	1	1	1
NBA notes	0	0	0	-20	-31	-113	-251
Other items, net	-82	-65	-48	-80	-35	-34	-27
Reserve money	359	408	503	834	886	2045	3441
Manat reserve money	337	374	463	640	688	1600	3221
Currency outside NBA	307	351	434	526	594	1449	2911
Bank reserves and other deposits	30	23	29	114	94	150	310
Reserves in foreign currency	22	34	40	194	198	445	220

Source: IMF and State Statistical Committee

BIBLIOGRAPHY

Aidt, T. (2003), "Economic Analysis of Corruption: A Survey," Economic Journal 113, pp. F632-652.

Aiyagari, R. and M. Gertler (1985),"The Backing of Government Debt and Monetarism," *Journal of Monetary Economics*, 16, pp. 19-44.

Alesina, A. (1988), "Macroeconomics and Politics," *NBER Macroeconomics Annual 1988*, pp. 13-52.

Alesina, A. (1989), "Politics and Business Cycles in the Industrial Democracies," *Economic Policy*, 8, pp. 58-98.

Alesina, A. and L. Summers, (1993), "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence," *Journal of Money, Credit and Banking*, 25, 2, pp.151-62.

Aliyev, F. (2002), "The International Monetary Fund and Reforms in Azerbaijan," *Local Government Brief LGI OSI Journal*, Spring 2002, Budapest, Hungary.

Arellano, M. and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies* 58, pp. 277-297.

Arellano, M. and O. Bover (1995) "Another Look at the Instrumental Variable Estimation of Error Components Models," *Journal of Econometrics* 68, pp. 29-52.

Arnone, M., B. Laurens and J. Segalotto (2006), "The Measurement of Central Bank Autonomy: Survey of Models, Indicators, and Empirical Evidence," IMF Working Paper No. 06/227.

Bagehot, W. (1873), *Lombard Street*, London, H.S. King.

Bade, R. and M. Parkin (1980), *Central Bank Laws and Monetary Policy: A Preliminary Investigation*, Ontario, University of Western Ontario.

Bagheri, F. and N. Habibi (1998), "Political Institutions and Central Bank Independence: A Cross-Country Analysis," *Public Choice*, 96, pp. 187-204.

Barro, R. and D. Gordon (1983), "A Positive Theory of Monetary Policy in a Natural Rate Model," Journal of Political Economy 91, pp. 589-610.

Barro, R. and D. Gordon (1983), "Rules, Discretion, and Reputation in a Positive Model of Monetary Policy," *Journal of Monetary Economics*, 12, pp. 101-22.

Barro, R. and J. Lee. (2003), "IMF Programs: Who Is Chosen and What Are the Effects?" mimeo.

Barro, R. and X. Sala-i Martin (1995), *Economic Growth,* 2nd Edition, MIT Press, Cambridge, Massachussets.

Barro, R. (1986), "Recent Developments in the Theory of Rules versus Discretion," *Economomic Journal*, 86, Supplement, pp. 23-37.

Beck, T., R.Levine and N. Loayza (2000), "Finance and the Sources of Growth," *Journal of Financial Economics* 58, 1, 2, pp. 261-300.

Berger, H., J. de Haan and S. Eijffinger (2000), "Central Bank Independence: An Update Theory and Evidence," CEPR Discussion Papers No. 2353.

Berger, H. and U.Woitek (1997), "How Opportunistic Are Partisan German Central Bankers: Evidence on the Vaubel Hypothesis," *European Journal of Political Economy*, 13, 4, pp. 807-822.

Blinder, A. (1998), *Central Banking in Theory and Practice*, MIT Press, Cambridge, Massachusetts.

Blinder, A. (2004), *Quiet Revolution in Central Banking*, Yale University Press, New Haven, Connecticut.

Boycko, M., A. Schleifer and R. Vishny (1996), "A Theory of Privatization," *Economic Journal* 106, pp. 309-19.

Brunner, K. (1981), "The Art of Central Banking," Centre for Research in Government Policy and Business Working Paper No. 81-6.

Buiter, W. (1999), "The Fallacy of the Fiscal Theory of the Price Level," NBER Working Paper No. 7302.

Campillo, M. and J. Miron (1997), "Why Does Inflation Differ Across Countries?" in *Reducing Inflation: Motivation and Strategy*, edited by C. Romer and D. Romer, pp. 335-57.

Cargill, T. (1995), "The Statistical Association Between Central Bank Independence and Inflation," *Banca Nazionale del Lavoro Quarterly Review*, 193, pp. 159-72.

Cukierman, A. (2008), "Central Bank Independence and Monetary Policy-Making Institutions: Past, Present and Future," *European Journal of Political Economy*, 24, pp. 722-36.

Cukierman, A. (1992), *Central Bank Strategy, Credibility and Autonomy*, MIT Press, Cambridge, Massachusetts.

Cukierman, A. (1994), "Central Bank Independence and Monetary Control," *The Economic Journal*, 104, pp. 1437-48.

Cukierman, A., S. Webb and B. Neyapti, (1992), "Measuring the Autonomy of Central Banks and Its Effects on Policy Outcomes," *The World Bank Economic Review*, 6, pp. 353-98.

Cukierman, A., G.Miller and B. Neyapti (2002), "Central Bank Reform, Liberalization and Inflation in Transition Economies – An International Perspective," *Journal of Monetary Economics*, 49, pp. 237-264.

Da Costa, M. and V. Olivo (2008), "Constraints on the Design and Implementation of the Monetary Policy in Oil Economies: The Case of Venezuela," IMF Working Papers No. 08/142.

Debelle, G. and S. Fischer (1994), "How Independent Should a Central Bank Be? Goals, Guidelines, and Constraints Facing Monetary Policymakers," Federal Reserve Bank of Boston, Conference Series No. 38, ed. by J. Fuhrer, pp. 195-221.

De Haan, J. and G. Van't Hag (1995), "Variation in Central Bank Independence across Countries: Some Provisional Empirical Evidence," *Public Choice* 85, pp. 335-351.

Dewatripont, M. and J. Tirole (1994), *The Prudential Regulation of Banks*, The MIT Press, Camdridge, Massachusetts.

Dvorsky, S. (2000), "Measuring Central Bank Independence in Selected Transition Countries," *Focus on Transition* 5, 2.

EBRD (2008), *Economic Overview of Azerbaijan*, European Bank for Reconstruction and Development website, http://www.ebrd.com

Eijffinger, S., M. Van Rooij and E. Schaling (1996), "Central Bank Autonomy: A Panel Data Approach," *Public Choice*, 89, pp. 163-82.

Farvaque, E. (2000), "Corruption, Central Bank Independence and Inflation", *Kwansei Gakuin University Social Sciences Review*, 5, pp. 107-20.

Fischer, S. and R. Sahay (2000), "The Transition Economies After Ten Years," NBER Working Paper No. 7664.

Fratianni, M. and F. Spinelli, (2001), 'Fiscal Dominance and Money Growth in Italy: The Long Record," *Explorations in Economic History*, 38, pp. 252-72.

Fry, M. (1998), "Assessing Central Banking Independence in Developing Countries: Do Actions Speak Louder than Words?" *Oxford Economic Papers*, July, pp. 512-29.

Fuhrer, J. (1997), "Central Bank Autonomy and Inflation Targeting: Monetary Policy Paradigms for the Next Millennium?" *New England Economic Review*, 1-2, pp. 19-36.

Gerschenkron, A. (1962), *Economic Backwardness in Historical Perspective*, Harvard University Press, Cambridge, MA.

Goldsmith, R. (1969), *Financial Structure and Development*, Yale University Press, New Haven, CT.

Goodfriend, M. and J. Lacker (1999), "Limited Commitment and Central Bank Lending," Federal Reserve Bank of Richmond Working Paper 99-2.

Goodfriend, M. and R. King (1988), "Financial Deregulation, Monetary Policy, and Central Banking," Federal Reserve Bank of Richmond *Economic Review* 74, pp. 3-22.

Goodhart, C. and D. Schoenmaker (1995), "Institutional Separation Between Supervisory and Monetary Agencies," in *The Central Bank and The Financial System*, MacMillan Press Ltd., London.

Greenwood, J. and B. Jovanovic (1990), "Financial Development, Growth, and the Distribution of Income," *Journal of Political Economy* 98, pp. 1076-1107.

Greenwood, J. and Smith (1997), "Financial Markets in Development, and the Development of Financial Markets," *Journal of Economic Dynamics and Control* 21, pp. 145-81.

Grilli, V., D. Masciandro and G. Tabellini (1991), "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries," *Economic Policy* 13, pp. 342-91.

Hayo, B. (1998), "Inflation Culture, Central Bank Independence and Price Stability," *European Journal of Political Economy*, 14, pp. 241-263

Hayo, B. and C. Hefeker (2002), "Reconsidering Central Bank Independence," *European Journal of Political Economy*, 18, pp. 653-74.

Hawtrey, R. (1932), *The Art of Central Banking*, London, Longman's Green, pp. vi-vii.

Hefeker, C. (2008), "Taxation, Corruption and the Exchange Rate Regime," HWWI Research Paper 2-12.

Hillman, A. (1999), "Political Culture and the Political Economy of Central Bank Independence," in *Major Issues in Central Banking, Monetary Policy and Implications for Transition Economies*, Kluwer Publishing, Amsterdam, Netherlands, pp. 73-86.

Huan, H. and S-J. Wei (2006), "Monetary Policies for Developing Countries: The Role of Institutional Quality," *Journal of International Economics* 70, pp. 239-252.

IMF (2000), *Code of Good Practices on Transparency in Monetary and Financial Policies*, International Monetary Fund, Washington, DC.

IMF (2007), *Azerbaijan Country Report*, International Monetary Fund, Washington, DC.

IMF (2008), *Azerbaijan: Aide Memoire for the 2008 IMF Staff Visit Discussions*, International Monetary Fund, Washington, DC.

Jain, A. (2001), "Corruption: A Review," Journal of Economic Surveys, 15, 1, pp. 71-121.

Jacome, L. and F. Vazquez (2005), "Any Link Between Central Bank Independence and Inflation? Evidence from Latin America and the Caribbean," IMF Working Paper No. 05/75.

Jenkins, M. (1996), "Central Bank Independence and Inflation Performance: Panacea or Placebo?" *Banca Nazional del Lavoro Quarterly Review*, 197, pp. 241-70.

King, R. and R.Levine (1993), "Finance and Growth: Schumpeter Must Be Right," *Quarterly Journal of Economics* 108, pp. 717-737.

Krueger, A. (1993), "Virtuous and Vicious Cycles in Economic Development," *American Economic Review* 83, pp. 351-55.

Kydland, F. and E. Prescott (1977), "Rules Rather Than Discretion: the Inconsistency of Optimal Plans," *Journal of Political Economy*, 85, 3, pp. 473-92.

Lambsdorff, J. and M. Schinke (2002), "Non-Benevolent Central Banks," CeGE Discussion Papers 16.

Law on the National Bank of Azerbaijan of 1996.

Law on the National Bank of Azerbaijan of 2004.

La Porta, R., F. Lopez-de-Silanes and A. Schleifer (2002), "Government Ownership of Bank*," Journal of Finance* 57, 1, pp. 265-301.

Lastrapes, W. and G. Selgin (2008), "Banknotes and Growth," Manuscript, University of Georgia.

Leeper, E. (1991), "Equilibria under 'Active' and 'Passive' Monetary and Fiscal Policies," *Journal of Monetary Economics*, 27, pp. 129-47.

Leite, C. and J. Weidmann (1999), "Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth," IMF Working Paper 99/85.

Levine, R. (2004), "Finance and Growth: Theory and Evidence," NBER Working Papers, Working Paper No 10766.

Levine, R., N. Loayza, and T. Beck (2000), "Financial Intermediation and Growth: Causality and Causes," Journal of Financial Economics 46, pp. 31-77.

Lohmann, S. (1992), "Optimal Commitment to Monetary Policy: Credibility versus Flexibility," *American Economic Review*, 82.

Loungani, P. and N. Sheets (1997), "Central Bank Independence, Inflation, and Growth in Transition Economies," *Journal of Money, Credit and Banking*, 29, 3, pp. 381-99.

Lybek, T., 1999, "Central Bank Autonomy, and Inflation and Output Performance in the Baltic States, Russia, and Other Countries of the Former Soviet Union, 1995-97," IMF Working Paper No. 99/4.

Lybek, T. and J. Morris (2004), "Survey of Central Bank Boards and Governance," IMF Working Paper No. 04/226.

Maliszewski, W. (2000), "Central Bank Independence in Transition Economies," *Economics of Transition*, 8, pp.749-89.

Maloney, J., A. Pickering and K.Hadri (2003), "Political Business Cycles and Central Bank Independence," *The Economic Journal*, 111, pp. C167-81.

Mangano, G. (1998), "Measuring Central Bank Independence: A Tale of Subjectivity and Its Consequences," *Oxford Economic Papers,* 50 (July), pp. 469-92.

Mauro, P. (1995), "Corruption and Growth," *Quarterly Journal of Economics* 110, pp. 681-712.

Mauro, P. (1998), "Corruption and Composition of Public Expenditure," *Journal of Public Economics* 69, pp. 263-279.

McCallum, B. (1995), "Two Fallacies Concerning Central Bank Independence," *American Economic Review*, *Papers and Proceedings*, 85, 2, pp. 207-11.

McKinnon, R. (1973), *Money and Capital in Economic Development*. The Brookings Institution, Washington, DC.

Mishkin, F. (2007), *Monetary Policy Strategy*, MIT Press, Cambridge, Massachusetts.

Murphy, K., A. Shleifer and R. Vishny (1991), "The Allocation of Talent: Implications for Growth," *Quarterly Journal of Economics* 106, pp. 503-30.

National Bank of Azerbaijan Web Site: http://www.nba.az

North, D. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge, MA.

Papyrakis, E. and R. Gerlagh (2004), "The Natural Resource Curse Hypothesis and its Transmission Channels," *Journal of Comparative Economics* 32, pp. 181-93.

Persson, T. and G. Tabellini (1993), "Designing Institutions for Monetary Stability," *Carnegie-Rochester Conference Series on Public Policy*, 39, pp. 53-84.

Posen, A. (1993), "Why Central Bank Independence Does Not Cause Low Inflation: There is No Institutional Fix for Politics," in *Finance and the International Economy*, ed. by R. O'Brien, Oxford University Press, pp. 40-65.

Posen, A. (1995), "Declarations Are Not Enough: Financial Sector Sources of Central Bank Independence," *NBER Macroeconomics Annual Report 1995*, pp. 253-74.

Rioja, F. and N. Valev (2004), "Does One Size Fit All? A Reexamination of the Finance and Growth Relationship," *Journal of Development Economics* 74, 2, pp. 429-447.

Robertson, William (1777), *The History of America*, London.

Rogoff, K. (1985), "The Optimal Degree of Commitment to an Intermediate Monetary Target," *Quarterly Journal of Economics*, 100, pp. 1169-90.

Rousseau, P. and P. Wachtel (2001), "Inflation Thresholds and the Finance-Growth Nexus," *Journal of International Money and Finance* 21, pp. 777-793.

Sachs, J. and A. Warner (1995), "Natural Resource Abundance and Economic Growth," NBER Working Paper No. 5398.

Sargent, T. and N. Wallace (1981), "Some Unpleasant Monetarist Arithmetic," *Federal Reserve Bank of Minneapolis Quarterly Review*, 5, pp. 1-17.

Schumpeter, J. 1912. *Theorie der wirtschaftlichen Enwicklung [The Theory of Economic Development]*. Leipzig: Dunker & Humblot.

Schwodiauer, G., V. Komarov and I.Akimova (2006), "Central Bank Independence, Accountability and Transparency: The Case of Ukraine," FEMM Working Paper Series No. 30.

Sims, C. (1994), "A Simple Model for Study of the Determination of the Price Level and the Interaction of Monetary and Fiscal Policy," *Economic Theory*, 4, pp. 381-99.

Sims, C. (1997), "Fiscal Foundations of Price Stability in Open Economies," Working Paper, Yale University.

Stiglitz, J. (2002), *Globalization and Its Discontents*, W.W. Norton and Company, New York, NY.

Tanzi, V. and H. Davoodi (1997), "Corruption, Public Investment, and Growth," IMF Working Paper 97/139.

Wagner, H. (1999), 'Central Bank Autonomy and the Lessons from Developed and Developing Countries," *Comparative Economic Studies*, 41, 4, pp. 1-22.

Walsh, C. (1995), "Optimal Contracts for Central Bankers," *American Economic Review*, 85, pp. 150-67.

Woodford, M. (1994), "Monetary Policy and Price-Level Determinacy in a Cash-in Advance Economy," *Economic Theory*, 4, pp. 345-80.

Woodford, M. (1995), "Price Level Determinacy without Control of a Monetary Aggregate," NBER Working Paper No. 5204.

Woodford, M. (1996), "Control of the Public Debt: A Requirement for Price Stability?" NBER Working Paper No. 5684.