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**Central Bank Independence – Theory and
Case of Czech and Slovak National Bank**

Bakalářská práce

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**Central Bank Independence – Theory and
Case of Czech and Slovak National Bank**

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Abstrakt

Tématem této bakalářské práce je nezávislost centrálních bank. Je rozdělena do dvou částí. První část je věnována teoretickým konceptům, které tvoří základ pro diskusi o nezávislé monetární autoritě. V dalších kapitolách jsou představeny různé způsoby měření nezávislosti centrálních bank, od čistě právních indikátorů až po indexy zabývající se behaviorálními aspekty centrálního bankovníctví. Druhá část předešlé poznatky aplikuje na současné postavení České národní banky a Národní banky Slovenska. Metodologicky se jedná o kombinaci více přístupů, na hranicích institucionální a politické ekonomie s čistě teoretickými přístupy k monetární politice v kombinaci s právním systémem jednotlivých států.

Abstract

The topic of this thesis is the central bank independence. It is divided in two parts. The first part is devoted to theoretical concepts that are they key instruments in discussion about an independent monetary authority. Next chapters introduce several possibilities how to measure central bank independence from purely legal indices to indicators capturing the behavioral aspects of central banking. The second part deals with application of previously acquired knowledge to the analysis of current status of the Czech National Bank and the National Bank of Slovakia. The methodological approach of this thesis balances on the borderlines of political economy, institutional economics, purely abstract monetary policy and law.

Prohlášení

1. Prohlašuji, že jsem předkládanou práci zpracoval samostatně a použil jen uvedené prameny a literaturu.
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V Praze dne 14.5.2012

Jakub Ulahel

Declaration of Authorship

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Jakub Ulahel

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Předběžná náplň práce

The independence of a central bank is an openly accepted economic concept which was mainly driven by the desire for stable price level following periods of high inflation. In this thesis we would like to focus on two aspects of central bank independence – the theory behind it and the analysis and comparison of the level of independence of central banks in the Czech Republic and Slovak Republic. After a detailed review of literature we will study the juridical background in which Czech and Slovak National Banks operate. We aim at constructing an advanced index of central bank independence that would reflect the recent literature, compare it to the so far existing indices and use them to comment and compare between the respective central banks.

Preliminary structure

1. Introduction
2. Theoretical concepts and approaches
3. Analysis of independence of CNB
4. Analysis of independence of NBS
5. Comparison
6. Conclusion

Předběžná náplň práce v anglickém jazyce

The independence of a central bank is an openly accepted economic concept which was mainly driven by the desire for stable price level following periods of high inflation. In this thesis we would like to focus on two aspects of central bank independence – the theory behind it and the analysis and comparison of the level of independence of central banks in the Czech Republic and Slovak Republic. After a detailed review of literature we will study the juridical background in which Czech and Slovak National Banks operate. We aim at constructing an advanced index of central bank independence that would reflect the recent literature, compare it to the so far existing indices and use them to comment and compare between the respective central banks.

Preliminary structure

1. Introduction
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4. Analysis of independence of NBS
5. Comparison
6. Conclusion

List of Abbreviations

BM	Board Members
CBI	Central Bank Independence
CNB	Czech National Bank
DCF	Direct Credit Facility
ECB	European Central Bank
EI	Economic Independence
GDP	Gross Domestic Product
GMT	Grilli, Masciandaro & Tabellini
LVAU	Legal Variables Aggregated Unweighted
LVAW	Legal Variable Aggregated Weighted
NBS	National Bank of Slovakia
PI	Political Independence
TOR	Turnover Rate
UB	Universal Banking

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Part I

1 Introduction

Having a central bank is a common feature of a vast majority of countries. One of the common tasks associated with central banks is the issuance of banknotes and coins. Nevertheless, central banks are often also responsible for running the monetary policy. The degree to which the bank itself decides on the goals and instruments for running the monetary policy is one of the major determinants of its independence from the government.

Central bank independence was once a very hot topic among economic theorists and practitioners. At the turn of the new millennium, however, this topic found itself out of the main attention and was placed in the background of contemporaneous events. Recent turmoil and global crises of various forms have revived the question of an optimal relationship between the country's administration and the central bank.

The principal aim of this thesis is to review and apply the existing indices and other possible measurement methods of central bank independence to the case of national banks of Czech Republic and Slovakia. Our main research question is to determine which central bank enjoys larger degree of overall independence. To answer it we will not stick to one simple methodology but rather combine several methods and theoretical as well as practical approaches. The secondary goal of this work is to revive what seems to be a slightly neglected discipline of thinking about institutional arrangements in terms of central banking.

The rest of this thesis is organized as follows. The first part, mainly a theoretical one, consists of this introduction and another three chapters. Chapter 2 reviews the most relevant theoretical concepts behind the concept of central bank independence. The main purpose of this chapter is to show that under some assumptions it is desirable to delegate the authority over monetary policy to an independent central bank. Chapter 3 looks closer on various perspectives from which the central bank independence could be evaluated. In Chapter 4 we go through the most famous measures of central bank independence and review their properties and empirical results while commenting on their applicability on the particular type of problem.

The second part consists of the analysis of central bank independence in the Czech Republic and Slovakia with Chapter 5 dealing with the Czech National Bank and Chapter 6 with the National Bank of Slovakia. This empirical part is concluded by Chapter 7 which contains the comparison of the independence and institutional settings of the respective central banks.

As stressed out repeatedly throughout this thesis we do not aim at answering the question of what is the optimal behaviour of central banks and their relationships with governments. We will rather focus on analysis and constructive critique of the main measurement methods of central bank independence. The reader should bear in mind that as with most economic models the evaluation of central bank independence is not and cannot be flawless.

2 The theory behind central bank independence

Central Bank Independence is a crucial issue in modern developed economies. As the world-renown expert Alex Cukierman in his study on measuring the independence of central banks puts it: “Economists and practitioners in the area of monetary policy generally believe that the degree of independence of the central bank from other parts of government affects the rates of expansion of money and credit and, through them, important macroeconomic variables, such as inflation and the size of the budget deficit.” [Cukierman et al., 1992, pp. 353-354]

Economic theory in the area of central bank independence experienced an unprecedented surge in the late 1980's and early 1990's. Many authors began to concentrate on the theoretical concepts that formed the essential reasons why there should or should not be an independent institution charged with monetary policy. In this part, we will investigate the theoretical reasons for an independent central bank and survey the most influencing contributions from the leading experts in the field.

2.1 Political business cycle and other political explanations

Pioneering insights in to the linkage between politics and monetary policy were made by Nordhaus (1975). The theory of political business cycle that Nordhaus presented could be summarized as follows: politicians try to maximise their tenure and try to be re-elected, for example by influencing the public opinion by the abuse of policies. If the development of GDP or employment is positively correlated with the change in voter's preferences, those in power will try to influence economic variables in times before elections so that it brings them more votes. This will lead to fluctuations that, according to the summary of Geršl (2006), will result in correlation of business and political cycles, with boosts before elections. Because of the assumptions on the possibility of exploitation of short run Phillips curve, such a policy may bring short-term benefits but in the long term only causes higher inflation due to the adaptation of inflation expectation and the lack of long term trade-off between employment and the price level or the changes of them.

Similarly to Nordhaus's approach, Hibbs (1977) developed a so-called partisan version of PBC in which the approach to monetary policy depends on which party forms the

government. This hypothesis is best applicable in two-party political systems such as in USA. In his study on political pressures on central banks, Geršl (2006) concludes that the empirical evidence is supportive of this view. He concludes that „even independent central banks are in general responsive to political pressures“[Geršl, 2006], but he differentiates the level to which they are responsive as being negatively correlated to the level of independence granted from the government. This is in line with Eijffinger & Haan (1996) who conclude the same.

Sargent & Wallace (1981) linked the independence of monetary authority with the financing of government's debt. The result of their analysis is that the more the monetary authority is independent the less it is vulnerable to pressures calling for deficit financing by money creation.

2.2 Time inconsistency of monetary policy

The most prominent and also the best known theoretical argument for central bank independence stems from models of dynamic inconsistency of monetary policy, first coined by Kydland & Prescott (1977) and later by Barro & Gordon (1983). The aim of this thesis is not to focus on these models or any other development in this field but rather to present the most important conclusions with regards to central bank independence. In particular, the model of conservative central banker as proposed by Rogoff (1985) and the optimal contracts model by Walsh (1995) will be surveyed.

The definition of dynamic inconsistency as given by Amtenbrink (1999) is pretty straight - forward. A strategy is time – inconsistent if it is the optimal to undergo its recommendations ex ante but no longer ex post. In terms of monetary policy, the usual setup used in most literature is the following: first, the monetary authority sets a specific inflation target. Afterwards, the expectations of the public are made and if the monetary authority is capable of credible commitment and people form their expectations rationally the resulting inflation expectations will be the same as the announced target. Contracts and other arrangements are made according to the expectations. But, once made, these contracts cannot be changed in the short run. The monetary authority may thus be tempted to exploit the short run Phillips curve and allow for higher inflation

with higher GDP and less unemployment as a result. As Barešová (2006) notes, this will only lead to higher than optimal inflation in the long run since the public will adjust its expectations and the output will remain at the potential.

The first of the assumptions of the basic model as summarized in Čihák & Holub (1999) is that output is given by Lucas supply function

$$y_t = y_N + \beta(\pi_t - \pi_t^e) + \varepsilon_t + z_t \quad (1)$$

where y_t is the GDP in time t , y_N is the natural level of output, π_t is the inflation in time t , π_t^e are the expectations about inflation in time t , ε_t and z_t are random shocks¹ with zero mean and variance σ^2 and β is the sensitivity of output to the difference between the anticipated and the actual inflation. It is actually the slope of the short run Phillips curve. The existence of nominal contracts makes possible that, in case of higher than expected inflation, real wage decreases and employers are able to hire more people². This in turn increases the output above the equilibrium level with non-accelerating rate of inflation.

The second building block of this model is the loss function of the monetary authority which has the following form :

$$L = a(\pi_t - \pi^*)^2 + (y_t - y^* - \varepsilon_t)^2 \quad (2)$$

where y^* is the targeted output and a stands for the weight given to inflation stabilization which is assumed to be positive since the difference between the actual and targeted inflation is thought to incur loss. For computational reasons, the deviations of inflation and output from their respective optimal levels are square. Following the reasoning of Geršl (2006), this is also because larger deviations are assumed to cause more loss. The loss function is subject to frequent criticism, but as with all economic models, it is constructed in a way that permits to explore the dynamic inconsistency phenomena in a reasonable way.

¹ ε_t represents technological while z_t represents other supply shocks, e.g. a sudden increase of oil price

² as Eijffinger & Haan (1996) note, the contract wage is usually above market-clearing wage and therefore there is a room for negotiations in case the real wage declines as in the case above

If we set the optimal level of inflation to zero, so that the first term of equation (2) changes to $a\pi_t^2$ and the resulting loss function is the following:

$$L = a\pi_t^2 + (y_t - y^* - \varepsilon_t)^2 \quad (3)$$

Dynamic inconsistency model also assumes that $y^* > y_N$. The possible reasons behind such a strange assumption, as summarized in Geršl (2006), include the presence of distortion taxes which make the natural level of output lower than desired or the presence of trade unions and their effect on real wage³ which in turn have negative effect on the level of output. Čihák & Holub (1999) argue that this could be caused by monopolistic structures, too.

If we combine the equations (1) and (3) we get:

$$L = a\pi_t^2 + (y_N - y^* + \beta(\pi_t - \pi_t^e) + z_t)^2 \quad (4)$$

It is easy to see that the technological shock cancels out and has therefore no impact on the loss function.

For simplicity, let us call $y^* - y_N \equiv d$, as for difference.

Hence we have

$$L = a\pi_t^2 + (\beta(\pi_t - \pi_t^e) - d + z_t)^2 \quad (5)$$

Taking the derivative with respect to inflation and equalling it to zero and thus making the first-order conditions yields the reaction function of the monetary authority as for the level of inflation:

$$\pi_t = \frac{\beta}{a+\beta^2} d + \frac{\beta^2}{a+\beta^2} \pi_t^e - \frac{\beta}{a+\beta^2} z_t \quad (6)$$

³for example, microeconomic models of trade union monopoly or efficient bargaining provide a theoretical basis for existence of higher than market clearing wages in the presence of trade unions

When we allow for rational expectations, i.e. when the subjects adjust their expectations of inflation in line with the monetary authority's reaction function, the optimal inflation changes in a way described below.

First we have to express the expected inflation in terms of the expected value of the right-hand side of (6). Note that the expected value of the supply shock is zero. It yields the following:

$$\pi^e = \frac{\beta}{a+\beta^2} d + \frac{\beta^2}{a+\beta^2} \pi_t^e \quad (7)$$

Then if we express the expected inflation in terms of the other parameters, we get the following expression:

$$\pi^e = \frac{\beta d}{a} \quad (8)$$

When we plug this expression into the original equation, the inflation changes to

$$\pi_t = \frac{\beta}{a} d - \frac{\beta^2}{a+\beta^2} z_t \quad (9)$$

This equation shows the existing inflationary bias when trying to follow the ex post optimal strategy for monetary policy. Because “d” is by definition positive and “a” is also assumed to be positive, the resulting inflation is also positive and its expected value is “ $\frac{\beta}{a} d$ ”.

When it comes to the actual output at this rate of inflation, the result is of much interest. We just reorganize the expressions and the outcome is then described by the following equation⁴:

$$y_t = y_N + \varepsilon_t + \frac{a+\beta^2-\beta^3}{a+\beta^2} z_t \quad (10)$$

⁴the term $(\pi_t - \pi_t^e)$ in the Lucas supply curve changes to $-\frac{\beta^2}{a+\beta^2} z_t$ since the term $\frac{\beta d}{a}$ is present in both expressions for inflation and thus cancels out

The mean value of the output is therefore still its natural level. If put together, the results of the preceding analysis suggest that focusing on ex post optimal monetary policy yields only a higher inflation and the same output. If monetary authority was credible enough and was capable to commit itself to carrying out monetary policy only for stabilizing shocks, e.g. the following:

$$\pi_t = -\frac{\beta^2}{a+\beta^2} z_t \quad (11)$$

Then the inflationary bias disappears but the central bank would have the power to stabilize supply shocks. But there is one critical problem with such an arrangement. If the public believes in such a policy and expect zero inflation, we are back at the start because the monetary authority would be tempted to fool the public again.

2.3 Conservative central banker model

One of the possible solutions to the time inconsistency problem is delegating the authority over monetary policy to an independent institution, a central bank⁵ that would be charged with carrying out the day-to-day tasks. By delegating a part of the power that they have in their hands, the politicians restrain themselves, at least formally, from the possibility of abusing the monetary policy for their own political goals. It could also be viewed as an act of commitment which should increase public credence towards the new, relatively apolitical institution (Eijffinger & Haan (1996)).

The theoretical basis for an independent central bank that would lead to lower inflationary bias was introduced by Rogoff (1985). His model of conservative central banker is very frequently cited in literature and is widely regarded as one of the key reasons for the surge in theoretical and empirical research in the field of central bank independence. As Cukierman (1992) observes, speaking of the degree of central bank independence makes sense only in the case when the CB promotes different policy objectives than the government.

⁵ there is a broad consensus among historians that the first central bank in the world was created in Sweden in 1668. The Sveriges Riksbank is still in operation today.

Also, he distinguishes the rate of time preference between the government and central bank. According to Cukierman and also Amtenbrink (1999) the central bankers take a longer view on economic processes than politicians do. As Geršl (2006) argues, the public does not want to create another institution with the same objectives as those of the „old“ policymaker. This would be only a pure change of name. Returning to the Rogoff’s model, we begin by formalizing the matters. As usual, various modern-day interpretations can be found in literature⁶, each one of them uses a bit different approach, but all are valid and useful. However, to get the essence out of it and not to drag ourselves in too much formalism that would prevail over understanding we hereby focus on a simplified version of Rogoff’s model as presented in Čihák & Holub (1999).

Output is still driven by Lucas supply curve

$$y_t = y_N + \beta(\pi_t - \pi_t^e) + \varepsilon_t + z_t \quad (12)$$

Rogoff argues that by delegating the monetary policy to a central bank which is led by a conservative, i.e. more inflation-averse banker, the society can improve its welfare. According to Fischer (1995) this model has „the smell of realism“ because such central bankers are to be found almost everywhere, judging for example by their frequent anti-inflationary speeches. As such, it is a confirmation of Rogoff’s assumptions of inflation aversion. In formal terms it means that the central bank or banker has a slightly different loss function than the society, given by :

$$L_{CB} = a_{CB}\pi_t^2 + (y_t - y^* - \varepsilon_t)^2 \quad (13)$$

Where a_{CB} is the additional weight placed on inflation since we have the following assumption: $a_{CB} > a$.

⁶ see for example Rogoff (1985), Geršl (2006), Eijffinger & Haan (1996), Briault & Haldane (1995) or Alesina & Gatti (1995)

The solution of this set of equations is pretty much the same as in the preceding case above with the resulting inflation level :

$$\pi_t = \frac{\beta}{a_{CB}} d - \frac{\beta^2}{a_{CB} + \beta^2} Z_t \quad (14)$$

As can be seen, higher weight on inflation stabilization leads to a lower inflationary bias. The delegation of monetary authority thus does not eliminate the bias, it simply decreases it. As Eijffinger & Haan (1996) point out, however, the variance of output is an increasing function of the conservatism. An optimal level of conservativeness is positive and finite as was shown by Lohmann (1992). The problem is, however, that with too much conservatism the central bank loses its flexibility and thus possibly leaves the economy as a sole fighter against unexpected supply shocks. Lohmann suggested that if an override mechanism is introduced, central banker will respond to large shocks in order not to be overridden. As Geršl (2006) argues, there is also a problem with this approach. He is sceptic about a possible abuse of this override mechanism by the politicians. However, we claim that such a mechanism should function only as an „emergency break“ and its use could be constitutionally codified and thus restricted only to certain events. From the democratic point of view, using such a procedure should also require a higher than simple majority of deputies and thus prevent the abuse of it by the government. It is not usual for the government (and the political parties involved in it) to dispose of such a voting power in most democratic countries. A consent from the opposition will therefore be needed.

2.4 Optimal contracts for central bankers

In addition to creating an independent central bank led by a conservative governor, other mechanisms to lower the inflationary bias were developed in the theoretical literature. Despite the enormous fame that Rogoff's model had acquired, the following model developed mainly by Walsh (1995) has been also abundant in literature concerning central bank policies.

The basic idea of this model, as presented by Eijffinger & Haan (2006) is to structure the conduct of monetary policy in such a way that reflects the institutional principal-agent setup.

The public⁷, acting as a principal, signs a performance contract with the central banker, the agent. Through it, the salary of the central banker is directly linked to performance of the economy, mainly the development of inflation. The two variables are negatively related, hence with high inflation the salary decreases. Čihák & Holub (1999) based on Walsh (1995) proposed the following form of the salary contract:

$$W_T = W_F - 2\beta d\pi_t \quad (15)$$

Where W_F is a fixed component of the wage and all other parameters stay the same as above. W_F should be sufficiently high to have the central banker interested in his job and at the same time sufficiently low to discourage him from „abusing“ the inflation as was presented before. The salary function will now appear in the central banker's loss function, which, following Geršl (2006) should rather be named a utility function⁸.

$$U = W_F - 2\beta d\pi_t - a\pi_t^2 - (\beta(\pi_t - \pi_t^e) - d + z_t)^2 \quad (16)$$

Central banker will try to set such a rate of inflation that maximizes his utility. Therefore, if we differentiate U with respect to π_t and set the result to zero, we arrive at the following rate of inflation:

$$\pi_t = \frac{\beta^2 \pi^e - 2\beta z_t}{a + \beta^2} \quad (17)$$

As can be seen, the performance contract has eliminated the inflationary bias. As the central banker is discouraged from using surprise inflation to achieve higher economic output because of the negative effect on his wage, his actions are credible and the inflationary expectations are zero.

⁷ or, more realistically, the government as a representative of public preferences

⁸ in a utility function, the components of the former loss functions appear with opposite signs since, logically, a loss constitutes a decline in utility.

At the same time, the ability to stabilize supply shocks is not distorted since the level of inflation will be

$$\pi_t = \frac{-2\beta}{a+\beta^2} z_t \quad (18)$$

i.e. the same as was suggested above in the original model of dynamic inconsistency. In that model, however, the bank was still tempted to use the surprise inflation to boost the economy therefore creating a vicious cycle. Walsh's model therefore brings the most effective solution – the mean value of inflation is zero, the level of output will average around its natural level due to the nonexistence of artificial inflationary boosting and the central bank retains its stabilization power over supply shocks. As Čihák & Holub point out, creating a performance contract in reality is a very simple procedure and at the same time is not information demanding since the only information used is the rate of inflation. Walsh's recommendations could be broadly summarized as creating an independent monetary institution, a central bank, and make it accountable for mismanagement of the policies that were delegated upon it.

This model is also subject to criticism from various points. First, the form of the utility function or the wage function makes it possible for the central banker to follow a deflationary policy and thus to increase his wage. The remedy to fight the inflation bias is therefore the model's proper deflationary temptation. (Čihák & Holub (1999)) Only after this „bug“ is fixed by some nominal threshold below which the inflation is undesirable⁹, such a contract might work in reality. Similar approach to central banking is present in New Zealand where the governor may be, under certain circumstances given by law, dismissed if the inflation exceeds certain nominal threshold.

As mentioned above, such a contract creates a principal – agent institutional setup. However, as Geršl (2006) points out, in reality the contract is signed between the representatives of the central bank and the government, a thing that, in his view, creates a principal – agent problem of second order since the government acts as an agent for the public.

⁹ for example a zero rate of inflation which means preventing the deflation

McCallum (1995) argues that such a contract will not be credible if the government is not able to commit itself to preserving the penalty schedule for high inflation. In his point of view, the dynamic inconsistency problem is not solved but merely relocated since the government will now face the temptation not to impose the sanction. As Geršl concludes, if the inflation is already high, why should government use a mechanism that does not decrease the inflation nor increase the social welfare?

Eijffinger & Haan (1996) summarize their view on contract – based theory with a bit of pessimism as they argue that the problem with setting an inflation target by politicians is the possible lack of correct assessment of the inflation target. Čihák & Holub (1999) present an interesting reflection on the motivation of central banker to actually perform his duties. They assure that by nominating respected experts with high reputation and collective decision-making of the Board sufficiently decreases the possibility of deviation from the socially optimal and desirable path. Also, the existence of an override mechanism constitutes a loss-incurring threat that central bank will try to avoid.

3 Evaluation of Central Bank Independence

As it was theoretically suggested in the preceding chapter, delegating the authority over monetary policy to an independent institution, which is called a central bank throughout this text, could *ceteris paribus* lead to lower level of inflation. After some bitter experience from abusing the monetary policy, many developed economies shifted their position and granted their central banks a relatively high degree of independence. Similarly, after the breakdown of Communist regime in the Central and Eastern European countries, many of these countries followed their developed counterparts and enacted laws that created, changed or in any other way affected the functioning of the central banks under the „independence banner“. Throughout this section we will further investigate the determinants of central bank independence and discuss further issues associated with it.

First of all, a clear and concise definition of independence is needed. But there is already a problem in the beginning. As Eijffinger & Haan (1996) summarize, most authors do not provide a single clear definition. The position of Alesina & Summers (1993) is that an independent CB is free from any political pressures and may behave more predictably than a dependent one. Crowe & Mead (2007) also present other, critical view on the theoretical backgrounds of CBI arguing that the time-inconsistency reason is more likely to be replaced by more pragmatic causes like political or economic factors. Their view on central banks is therefore purely practical. Bade & Parkin (1988) in their pioneering attempt to measure CBI divided their sample of countries according to whether or not their respective central banks are “subservient to the central governments”. Šmidková & Tůma (1999) define the independence as a formal independence from the government which is embedded into the constitution. Amtenbrink (1999) also agrees with Eijffinger & Haan in that a universally valid definition is missing. His explanation of this phenomena lies in different institutional settings and cross country legal differences.

In general, and without lengthy academic debate over the precise meaning of independence, the intersection of all approaches is that it is necessary to implement a law explicitly stating that a central bank is not dependent on the government. An interesting proposal was made by Goodhart (1994), who argued that the term

“independent” should be replaced by “autonomous” since the central bank is always responsible for its actions.

In practice, what does constitute the independence? Debelle & Fischer (1994) distinguish between the goal and instrument independence. The goal independence, as the name suggests, concerns the responsibility for choosing the ultimate goal of monetary policy. Should it be the price stability, preservation of the value of currency in terms of exchange rates or the control over the evolution of the stock of money? Should the monetary authority have only one goal or have different goals? The instrument independence on the other hand means the ability to freely choose how to accomplish a specific monetary goal, e.g. a 2% level of inflation.

Literature offers two standardized ways of analyzing the CBI, namely a legal approach and a non-legal approach. They are often combined in one way or the other.

3.1 Legal approach

Legal approach constitutes the basis for any other CBI-related research. Virtually all of the influential authors agree on this. The institutional setting of CB is the primary focus of majority of the studies. As Cukierman (1992) pointed out it is difficult to quantify the legal aspects of CBI, let alone the actual, non-legal, independence which depends not only on the constitutional framework but is to a large extent a byproduct of historical, cultural and other socio-historical factors. Also, the quality of the personnel and informal arrangements between the management of the bank and the members of the cabinet are virtually impossible to underpin in an analytically suitable way.

3.1.1 Institutional independence

Institutional independence describes the status of CB as an independent branch of government and also as being separate from the legislators. In this context, the CB is a monetary authority free to set the ultimate goals of monetary policy, i.e. in the view of Debelle & Fischer, the CB has goal independence. From the constitutional economics perspective, Geršl (2006) offers a slightly different approach, distinguishing between two different levels at which choices are made.¹⁰

¹⁰this approach is based on the insights of James Buchanan

On the constitutional level, choices are made between constraints, i.e. between different rules of the game. As Geršl argues, the central bank is dependent on politics in a broad sense. It is therefore pointless to speak about a degree of constitutional dependence.

Referring back to the more “mainstream” setting laid down by Debelle & Fischer, Amtenbrink (1999) adds the element of necessity of a clear and explicit legal mandate. The existence of an explicit monetary objective might, at first glance, seem to violate the principles of CBI. Nevertheless, such a provision can significantly reduce the possibility of political pressures. As Grilli, Masciandaro & Tabellini (1991) write, the credibility of monetary policy is of utmost importance for any policymaker. Unexpected monetary expansion may present a permanent temptation for those in charge of monetary policy, as outlined in the first chapter of this thesis. But as the authors argue, private agents will raise their inflationary expectations which will in turn lead to higher inflation as we saw in the previous chapter. This credibility problem can be overcome by delegating monetary policy to an independent central bank. Such an independence is called political independence in their study. Haan (1997) summarizes the preceding discussion with the claim that CBI coupled with explicit mandate for the CB to fight inflation are “important institutional devices to assure price stability.” However, CBI has produced some criticism as well.

For example, Hayo & Hefeker (2001) argue that CBI is not a necessary nor sufficient condition for price stability. They also dismiss the usual argument of the “mainstream” authors about policy credibility. In their view, only by being granted independence the central bank will not gain immediate credibility. Factors such as monetary policy historical record influence the public opinion more. In brief, they agree on the importance of CBI in most of the countries, especially those in transition, but also suggest different remedies to fight inflation such as exchange rate management.

3.1.2 Functional independence

Functional independence, using a simplistic explanation, is the ability to choose and carry out the day-to-day tasks of monetary policy without external influence. More specifically, it is the ability to decide freely on the application of monetary policy instruments, hence the name instrument independence. Grilli, Masciandaro & Tabellini call it economic independence. It is obvious that in case when government consent is necessary before CB can use a specific instrument, no independence exists. In Geršl’s

point of view, this level of decision-making is the sub-constitutional level, i.e. the choice between alternative strategies. In line with DeBelle & Fischer (1994) he argues that enforcing CB to perform some rigid rule effectively means limiting its instrument independence. For example, even though many CB's in the world make use of Taylor rule or its variations in deciding about interest rates, Geršl does not see any possible way how such a rule could be legislated because many variables are uncertain and estimated by the central bank.

Functional independence does not only cover the area of active monetary policy but also means an absolute prohibition to finance budget deficits or provide the government with any other type of credit facilities.

If this is not the case and the government has direct access to central bank credits, fiscal policy is in charge of monetary policy since the authorities are strongly motivated to finance the debts via "money printing".

Central Bank is, per se, a branch of government and is thus linked to the politics completely on the constitutional level. In line with Geršl (2006), we argue that it is impossible to achieve a zero gravity-like situation when the CB would not have any ties to the elected representatives of the public. The issues regarding the organizational independence are therefore among the most crucial ones. Even though we treated CB as a homogenous institution earlier in this text, this part concerns its internal structure and resembles Rogoff's arguments about central bankers. We argue that, opposite to the mainstream literature, it is important to distinguish the independence of the central bank as a whole and the independence of the respective central bankers. Our argument is based in the difference between the *de iure* and the *de facto* independence, the former concerning the CB as an institution and the latter concerning its behavioral patterns that are highly correlated with the opinions of its "managers".

3.2 Non – legal approach

The non-legal approach to the evaluation of central bank independence explores mainly behavioral patterns of central bank actions, relationships with government and also examines the changes in central bank management.

3.2.1 Government influence

Any participation of government officials in the bank board serves as a possible back-door for political influence if not as a back-door for corruption. The prohibition of direct or indirect participation of government officials in CB Board is thus a necessary, but not sufficient condition for organizational independence. The reason for is that, even if no cabinet member has voting rights, the bank board can still succumb to the politician wishes because of other reasons such as the possibility of being dismissed. Generally, if the member of the Board can be fired because of reasons other than serious misconduct (corruption, treason, etc.), the CB is not considered as independent. As Grilli, Masciandaro & Tabellini (1991) point out, the level of CB independence is greater if the appointment procedure is not in the control of government. We argue, however, that their explicit recognition of no government control over appointments should be extended to any public office. In this view, only appointments made by the representatives of the bank are considered fully independent.

3.2.2 Tenure

Many authors also focus on a (possible) relationship between the CBI and the length of the term of office of central bank governors. In general, countries in which there are shorter statutory terms of office are supposed to have less independent central banks. The reason behind this is not very obvious, even the authors of such theories present a reasoning which is not universally convincing. One of them is that the longer the period is the more time do the central bankers have to defend their positions and develop independent views. Also, they are less vulnerable to political changes and subsequent pressures. Eijffinger & Haan (1996), however, argue that a long term of office may also indicate a low level of independence, especially when this is teamed up with a possibility of reappointment. In their opinion, a relatively subservient governor will generally stay in the office for a longer period of time since he is politically acceptable by whoever is in the power to appoint central bank officials. Amtenbrink (1999) warns against overestimating the effect of personnel changes on the consistency of policy objectives even in cases when the cases when the terms of offices of the board members coincide with the political election cycle. This led Cukierman & Webb (1995) to construct an index of CBI based on what they call the political vulnerability of central banks. We will further comment on it in the forthcoming sections. The possibility of

reelection or reappointment, as outlined above, is thought to have an impact on the behavior of CB officials, too. Hasse (1990) argues that such a possibility has negative influence on the independence of the CB personnel since they are vulnerable to government influence for the sake of re-appointment. However, Amtenbrink advocates the possibility of a reappointment since personnel continuity helps to smooth changes in monetary policy approaches and the whole formulation of monetary policy shows signs of a continuous approach.

3.2.3 Financial matters

Financial independence is the extent of government control over the determination of central bank's budget. It is obvious that the theoretical standpoint concerning this issue assigns a higher degree of independence to central banks which do not face the budgetary control by government or any other political institution.

3.3 Determinants of CBI

We have seen that the delegation of monetary policy to an independent CB can, theoretically and *ceteris paribus*, lead to lower level and variance of inflation and may serve as a partial commitment device. It thus has a credibility-enhancing effect. By doing so, politicians lose flexibility in monetary policy and the balance between the flexibility and credibility is what determines the optimal level of central bank independence. But what, apart from the theoretical considerations, determines the level of central bank independence in the country? The following passage is based on Eijffinger & Haan (1996).

3.3.1. Equilibrium level of unemployment

High natural rate of unemployment may serve as a temptation for the government to abuse monetary policy and create surprise inflation. This is because of the assumed possibility to exploit the short-term Phillips curve as detailed in the first chapter. Several authors¹¹ studied and tested this hypothesis, but the overall results show no statistical significance of the rate of unemployment on the level of CBI.

¹¹De Haan and Van't Hag (1995), Eijffinger & Schaling (1992)

3.3.2 Government Debt

A large stock of government debt implies that a large portion of the annual budget goes to servicing this debt, i.e. the interest payments. Since the debts are usually denominated in nominal face values, any inflation distorts this value, but at the same time may also significantly reduce the credibility of the country¹² and thus increase the interest rates. The hypothesis is then the larger the debt the more independent will the CB be. De Haan and Van't Hag (1995) performed an empirical analysis of this hypothesis, but found no evidence in support for it.

3.3.3 Political instability

As often argued in literature, when faced with the possibility of removal from the office, the motives for politicians to delegate the authority over monetary policy to an independent central bank should, as the hypothesis states it, be stronger.

The increase in politicians' interest in having an independent CB is due to their fear. Very likely, they will try to restrain the ability of their potential political substitutes to maneuver in this policy area. What this hypothesis suggests is that higher political instability will lead to higher CBI. There is, however, another side of the coin. It can be argued conversely that the incumbent government will try to maximize its chances for reelection.¹³ Therefore more political instability will lead to lower CBI according to this view.

Cukierman & Webb (1995) tested the influence of political instability on CBI using their own non-legal CBI index and the result of their analysis confirmed that political instability is not a major source for CBI. In their regression, only a very high-level of political instability proved to be significant. This level was represented by the change of the regime type, e.g. from democracy to autocracy.

Similarly, De Haan and Siermann (1994) concluded that only a variable representing a non-election-based transfer of political power, i.e. a coup d'état, is significant in explaining the effects of political changes on CBI.

¹²especially in case when this inflation was "done" on purpose with the precise goal to inflate away the debts

¹³ as proposed by the Nordhaus' PBC theory discussed in the second chapter

However, an empirical paper by De Haan and Van't Hag (1995) suggested that while political changes affect CBI in a negative way, i.e. more political instability leads to lower CBI, it is not the same for a major government changes. Significant changes, as the authors call it, proved to be insignificant. To sum it up, empirical studies provides us with mixed, if any, results, so it is difficult to say final word about the importance of political instability as a determinant of CBI. As already was and will repeatedly be mentioned throughout this text, empirical studies involving CBI are difficult to compare, combine or infer from since each of them employ a different index of CBI and, more importantly, different sample of countries, which, as we will see in the forthcoming chapters, may play a significant role.

3.3.4 The financial supervision and opposition to inflation

In many indices of CBI, the central banks are also assessed on the grounds of their mandate to perform banking supervision. There are a lot of arguments against and in favor of having a central bank with such a duty.

As summarized by Eijffinger & Haan (1996), arguments against include a possible conflict of interest and a decrease in CB credibility in case of failed rescue operations. If the CB is charged with keeping the financial sector stable, it may be tempted to admit lower interest rates in order to prevent problems and this may be in direct conflict with its pursuit of price stability. Other argument may be used in favor of having the CB performing financial supervisions. These include the role of CB in the operation of payment system and its role as a lender of last resort. The empirical results in the study by De Haan and Van't Hag (1995) show no relation between the level of CBI and the degree of banking supervision. Authors also investigated if the existence of universal banking in a country contributes to higher CBI. Their hypothesis is based in the following reasoning – countries that have UB system are likely to oppose inflation more strongly since the lending in such systems is more important.

This is closely linked to another possible determinant of CBI, the opposition to inflation, which has its roots in the work of Posen (1995). His fundamental argument is that the difference in CBI across countries is due to the differences in what he calls the effective financial opposition to inflation. The FOI is thought to have a direct impact on the shape of monetary policy since a coalition of political and financial pressure is

capable to protect an anti-inflationary policy to which will the CBI succumb. Even though his empirical study presented a relationship between FOI and CBI, this finding was shown to be sensitive to the index of CBI used. Posen's view on the opposition to inflation could be extended to the society as a whole. A country with hyperinflation experience will oppose the inflation more strongly than the public in the country with no such an experience. In line with Cukierman, Webb & Neyapti (1992) we believe that the link between inflation and CBI is a two-way causal relationship.

4 Measures of Central Bank Independence

As we discussed earlier on, the aspects contributing and constituting the level of central bank independence are very broad and it may not be feasible to quantitatively express each of them. For example, Cukierman, Webb & Neyapti (1992) argue that central bank independence does not only depend on law, but also on many other less-structured factors, for example the personality of the key employees, quality of the research department or informal cultural traditions concerning the arrangements between the bank and government officials. Cukierman (1996) admits that because of this reason the existing indices are noisy and incomplete. Further criticism of the mainstream index-construction approach will be presented later on. Nevertheless, number of authors tried to construct what is called an index of central bank independence in order to have at least some measure with which the empirical analysis could be based on. This chapter will review the most famous of the existing indices based on the frequency of their use in econometric models and their appearance throughout the literature listed in references.

The existing indices could be classified based on the aspects on which they focus. As such we are speaking about legal and non-legal measures of CBI. The latter are also sometimes referred to as behavioral indices. As Cukierman (1992) points out legal indices might have an advantage over non-legal indices in that they are most likely to be exogenous with respect to the economy. Although the legal indices are pretty much based on the respective constitutional chapters and laws, these may not be specific enough to delimit the maneuver area between the central bank and the government in all possible situations. And even when the laws are quite explicit, in many countries the abyss between the legal framework and actual practice is pretty wide and deep.

Let's now turn our attention towards the survey of the indices, at first the legal ones. They are an essential complement of the actual independence and many studies argue that they are very good proxies of actual independence because they reflect the extent to which the legislators want to set the central bank free.

4.1 The first index

Bade & Parkin (1988) made a pioneering attempt to somehow grasp the meaning of legal independence and codify it. Their study was motivated by the effort to answer the question why does inflation varies across countries. In examining the reasons, the role of monetary policy and the statute of central bank gained their attention. Having analyzed twelve developed countries they categorized the central banks according to various aspects into four possible financial and four possible policy types and thus creating 16 possible settings under which central banks operate.

They examine three different features of central bank laws in their sample of countries focusing on the relationship between central banks and government, the appointment procedure of the CB board and the financial and budgetary issues.

4.1.1 The relationship between the central bank and the government in the conduct of monetary policy

The authors focus on who has the final authority for the conduct of monetary policy. They do not focus explicitly on the formulation of policy goals as we have discussed earlier in the sense of DeBelle & Fischer separation, but rather tried to find legal support for either institution's responsibilities. It should be noted, however, that while doing so they classified legal provisions according to which the government might instruct the CB to perform what is thought to be public interest policy¹⁴

4.1.2 The appointment of central bank policy boards

As the authors argue, even when the bank is independent in formulation of its policies, the governments can still exercise leverage via their control over the appointment and removal of members of the policy board. They also touch the effect of the length of the term of office by stating that banks with board members appointed independently of government and with longer tenure might enjoy a higher level of independence.

¹⁴this concerns for example the Bank of England. Bade & Parkin classified the government as the final authority because of the possibility of government interference – further details can be found in Bade & Parkin (1988)

Based on the previous two aspects, the authors constructed a “sub-index” of political independence or more specifically they classified the central banks into four different categories. The criteria were :

- a) Who is the final monetary policy authority?
- b) Are there government officials¹⁵ in the bank Board?
- c) Is a proportion of the board appointed independently of the government?

These questions can produce eight different outcomes; however, some of them are not realistic.¹⁶ We are then left with four policy types:

- 1) Government is the final authority, has officials on bank Board and appoints all Board members.
- 2) Government is the final authority, has no officials on bank Board but appoints all Board members
- 3) Bank is the final authority, there are no government officials on bank Board, but all the appointments are made by the government
- 4) Bank is the final authority, there are no government officials on bank Board and some of the Board members are appointed by the government

As can be seen, the BP index uses no special weighting of the particular components. The authors chose a simple aggregation method. The resulting four CB policy types are in ascending order with respect to their independence, i.e. higher number corresponds to higher independence.

4.1.3 The financial and budgetary relations between central banks and governments

The reason why Bade & Parkin examine these relations is suggested by the principal-agent setup in the theory of bureaucracy according to which the more closely the budget of the agent is under principal’s monitoring, the more actively does the agent follow the principal’s objectives and is thus less capable to pursue its own objectives.

¹⁵ this question really concerns a representative of the government such as ministers or their deputies sitting in the board with voting rights

¹⁶ indeed, some combinations do not exist in practice, for specific reasons see for example a critical re-assessment of BP index by Eijffinger & Schaling (1992)

Authors focus on what happens with the eventual profits of the central bank and who is in charge of determining the budget of CB and who or what determines the salaries of the Board members

On the basis of these attributes another “sub-index” was constructed, this time aiming to develop financial types of central banks.

The components of this “sub-index” are the answers to the following questions:

- 1) Is the CB budget determined by the central bank itself?
- 2) Are the salaries of the Board members determined by the central bank?
- 3) Is the profit allocation determined by the central bank?

Even though the answers are binary a “no” could be further decomposed¹⁷. Once again, these questions lead to four possible types⁵ of central banks when it comes to financial matters.

- 1) Government approves the budget, determines BM salaries and the profit allocation
- 2) Bank determines the budget, but the government determines BM salaries and profit allocation
- 3) Bank determines the budget and BM salaries, but the profit allocation is determined by the government
- 4) Bank determines the budget, BM salaries as well as profit allocation

As with the policy counterpart, the financial “sub-index” is a mere aggregation and uses no weighting scheme. As a result of combining the four policy and the four financial types, Bade & Parkin identify sixteen possible CB types. BP index was popularized by Alesina’s (1988) work on game-theoretical aspects of political business cycle theory. He extends the sample of countries used by Bade & Parkin by another five countries and criticized them for disregarding the institutional changes during the period covered, especially in the case of Italy, himself being an Italian.

¹⁷in their original paper, the BP index allows for three possible outcomes – bank, government or the statute, nevertheless, only in the first case is the bank truly independent since government has the power to change any statutes dealing with such arrangements

¹⁸once again, four of the possible types (2³) are not to be found in the sample of the developed countries used by Bade & Parkin and are therefore irrelevant in the construction of BP index

4.2 The GMT Index

One of the most important contributions to the pool of existing indices was without a doubt the publication of the study by Grilli, Masciandaro & Tabellini in 1991 that focused on public finance and policy institutions. Indeed, the authors themselves admit that their index is focused exclusively on institutional features arguing that monetary institutions are much more invariant than behavioral patterns and if an important reform took place, it is easy to trace it down and identify it.

The GMT index has two components, closely linked to the level at which the decisions are made¹⁹.

Authors distinguish between political and economic aspects of the total CBI. Political independence is the ability to choose the goal of monetary policy whereas economic independence is the capacity to choose the instruments of monetary policy.

4.2.1 Political independence

According to the authors, the political independence is determined by three aspects, namely

- a) The appointment procedure of the members of the CB Board
- b) The relations between the Board and the government
- c) Policy goals of the CB with respect to monetary policy

Grilli et al. consider the pursuit of low inflation as desirable and therefore any institutional setting that improves the ability of the central bank to consider low inflation as its top priority will add to the respective CB's degree of independence. They admit to have identified the independence with the autonomy to pursue low inflation. This and other aspects will be subsequently criticized by Mangano (1998). As we have outlined earlier in this text, the main advantage of having an independent central bank is that it provides credibility to the conduct of monetary policy. Grilli et al. are supportive of this view.

¹⁹see Geršl (2006) or Chapter 3 of this thesis for a discussion about constitutional and sub-constitutional levels of choice

Based on the aspects above, the GMT index of political independence is constructed as a simple sum of the following eight criteria in case the answer is affirmative

- 1) Governor not appointed by government
- 2) Governor term of office is more than five years
- 3) The entire Board is not appointed by the government
- 4) The tenure of Board members is more than five years
- 5) The law does not stipulate the obligatory participation of government representatives in the Board
- 6) It is not required to seek government's approval for monetary policy formulation
- 7) The pursuit of monetary stability is required by a statute to be among CB goals
- 8) There exist legal provisions that strengthen the CB position in a case of a conflict with the government

4.2.2 Economic independence

The economic independence of the central bank takes into account these two characteristics:

- a) The government influence in determining the extent of borrowings from the CB
- b) The nature of instruments in CB's arsenal

Criteria:

- 1) Direct credit facility to the government which is not automatic
- 2) DCF to the government at market interest rates
- 3) DCF to the government that is explicitly stated as temporary
- 4) DCF to the government that is of limited amount
- 5) CB does not participate in the primary market of sovereign debt
- 6) CB determines and sets the discount rate
- 7) Banking supervision is not entrusted to the CB (**) or not only to the CB (*)

As with the previous part, the resulting level of economic independence is given as a simple sum of attributes with the only exception that the supervision of financial institutions can add up to two index points. The reason why the CB should be more independent if it does not exercise the supervision is explained by the authors using a little bit surprising reasoning. In their opinion, administrative instruments such as

portfolio constraints can be used to artificially increase the demand for government bonds and thus serve as a financing instrument. This means that the authors are more concerned mainly about institutions other than banks. As pointed out by Mangano (1998) and Eijffinger & Haan (1996), the GMT index employs an asymmetric weighting scheme that is due criterion no.7. However the reason why they decided to use it is not apparent.

4.3 Works of Cukierman et al.

In the first half of the 1990's major additions were made to the pool of existing indices and knowledge about CBI measurement. The studies of Cukierman, Webb & Neyapti (1992), Cukierman (1992) and Cukierman & Webb (1995) continued in the work of their predecessors and published an advanced index of legal independence alongside the "founding" of the behavioral measurement approach. This proved to be essential in the early analysis of the CBI in post-communist and other developing or transition economies.

4.3.1 LVAW

Even though Cukierman, Webb & Neyapti (1992) state that their index uses "only a few narrow but relatively precise legal characteristics" we would like to say for the record that this index, often referred to as the LVAW^{20,21}, is considered to be the most comprehensive among all the existing indices and in its extent is comparable only to GMT.

Despite using 16 legal variables it has also been subject to criticism by Mangano (1998) for its arbitrary weighting and law interpretation scheme. Each variable can take up values between zero and one with one representing the highest level of independence in that respective aspect.

²⁰LVAW stands for Legal Variables Aggregated Weighted index to explicitly reveal that this measure is constructed by a method of aggregation of various legal characteristics – see the subsequent paragraphs dedicated to their precise enumeration

²¹authors propose two possible ways of the index construction, by adding weights to the components or only as a simple sum, they are referred to as LVAW or LVAU respectively with the "U" in the latter standing for Unweighted

This index focuses on four different groups of characteristics:

- a) Aspects regarding the appointment, tenure and dismissal of the governor²²
- b) Policy formulation and the resolution of conflicts between the CB and the government
- c) Objectives
- d) Limitations on lending to the government

All the variables were aggregated into eight clusters with their respective weight in the overall index²³. Nevertheless, as the authors themselves admit, multicollinearity among the variables may cause a reduction in precision of the estimated effect of every one of them on inflation.

As pointed out by many studies, notably Arnone, Laurens & Segalotto (2006), LVAU or LVAW are one of the most used indices, presumably due to the author's devotion in his original study where he analyzed CBI in 70 countries during a huge time span of nearly forty years. Cukierman also made an important change in overall approach to CBI when he started to treat developed and developing countries separately.

A detailed version of this indicator, taken from the original article, is to be found in the Appendix. It contains many possible outcomes and it is simply redundant to include into the main text of this thesis.

4.3.2 Turnover rate

Cukierman extended the analysis of CBI to other area that has been neglected in empirical or theoretical works up to then. His motivation, taken from his book is more than pragmatic: „ ... *the legal status of a central bank is only one of several elements that determine its actual independence. Although there are important variations in the degree of completeness of different CB laws, many are highly incomplete and leave a lot of room for interpretation. As a result, factors such as tradition or the personalities of the governor and other high officials of the bank at least partially shape the actual level of central bank independence. Even when the law is quite explicit, it may not be*

²² authors prefer the name CEO although we feel, with all due respect, that referring to it as to a governor is more internally consistent within the framework of this thesis and is also better applicable to the case of CNB and NBS

²³ for a detailed description of the aggregation process refer to Cukierman (1992)

operational if there is a tradition or an understanding within government that things should be done in different way. “²⁴

Therefore he came up with what now could be categorized in the so-called behavioral group of CBI indices. The whole idea of his Turnover rate indicator (TOR) is that, at least above some threshold, frequent changes of the CB governor correspond to lower level of independence. In countries where the governor is appointed by the government and legal provisions for his or her dismissal exist, such an indicator may serve as a very good proxy of the actual influence of the government over the central bank.

The TOR is calculated as an average number of changes of the governor in one year. In his study, Cukierman finds this indicator to range from 0.03 to 0.93. What could be inferred from these numbers? What is suggested by Cukierman is that TOR above 0.2 or 0.25 may indicate that the position of CB governor is likely to be controlled partially by the government²⁵. The threshold value is derived from the length of the election cycle which usually is four or five years. TOR of 0.25 corresponds with the change of governor after the election in a four-year cycle and any value above it indicates a tenure which is lower than four years thus leaving suspicion about government-ridden removal of inconvenient governors. This is also the basic assumption of this indicator – it is desirable to have longer tenures of CB governors. It is a view that Cukierman has been advocating throughout most of his published work. Nevertheless he acknowledges the possibility that a subservient governor will stand in the office for a longer period of time and therefore a low turnover rate does not necessarily imply a high level of independence, although in relative terms this could be the conclusion. In his sample, the average for industrial countries was lower than 0.2 and thus it probably does not reveal much information about the variation of independence in this particular group, however the sub-sample of developing countries is characterized by high variation in TOR and Cukierman concludes that TOR could actually be better applicable to the analysis of these countries. That is because the actual practice in less developed countries might

²⁴ Cukierman (1995), p. 393

²⁵the meaning of “controlled” in this context is not the fact that the government is responsible for the appointment of the governor but rather the abuse of it – when the government tries to replace the governors on purpose with the objective of discourage the CB to implement long-term policies or policies that are not considered appropriate by the government

deviate significantly from their legal framework. Interestingly enough, author found no reasonable statistical relation between the actual and legal term of office of CB governors.

4.3.3 Questionnaire-based index

Other possibility how to “measure” the actual CBI was also proposed by Cukierman (1992) and later reaffirmed by Cukierman, Webb & Neyapti (1992). It consists of a questionnaire sent to specialists on monetary policy in various central banks. The authors admit that this indicator is likely to suffer from subjectivity bias²⁶ and that the answers are not entirely uniform. Nevertheless for the sake of presentation this index is presented here although its use has been criticized the most. It consists of nine variables mostly concerned with questions similar to those already included in the LVAW or GMT. As summarized by the authors, questionnaire – based index is likely to be more noisy than LVAW and its main limitations is the availability of data since in their original sample the authors got responses only from a small number of countries.

4.3.4 Political vulnerability

Cukierman & Webb (1995) extended the previous work on non-legal measures of CBI by arguing that the frequency of change of CB governor, when correlated with political changes, may be a sign of a dependent CB. Political vulnerability index is defined as a fraction of political changes which are followed within six months by a replacement of the CB governor. What are the political changes at question? Authors consider various types of transitions, particularly change of the head of government, change of a party in the government, change in regimes, e.g. from democratic to authoritarian and irregular changes of government from one authoritarian ruler to another. As usual, authors pay close attention to the distinction between industrial and developing countries. As a result they claim that political vulnerability is more than three times larger in developing countries.

²⁶ which is assumed to be positive, i.e. indicating a higher than „real“ level of CBI

4.4 New index of political independence

Eijffinger & Schaling (1992) proposed a new legal indicator based in GMT definition of policy independence as the ability to choose the goals of monetary policy. In our view, this index contains no real new idea and only refreshes the approaches of Bade & Parkin and Grilli et al. Nevertheless it uses a different weighting scheme and is thus an interesting contribution to the pool of existing measures.

The independence is evaluated based on the three following criteria

- 1) Is the bank the only policy authority, is the authority shared with other institution or is it entirely entrusted to the government ,
- 2) Is there no government official on the bank Board? ²⁷
- 3) Is more than half of the Board appointed independently of the government?

The answers to these questions yield a possible twelve policy types. However, seven combinations do not occur in practice²⁸. We are then left with five policy types:

- 1) Government is in charge of monetary policy, there are government officials in the bank Board and no Board members are appointed independently of the government
- 2) Government is in charge of monetary policy, there are no government officials in the bank Board and no Board members are appointed independently of the government
- 3) Bank and the government share the authority over monetary policy, there are no government officials in the bank Board and no Board members are appointed independently of the government
- 4) Bank is in charge of monetary policy, there are no government officials in the bank Board and no Board members are appointed independently of the government
- 5) Bank is in charge of monetary policy, there are no government officials in the bank Board and some Board members are appointed independently of the government

²⁷it should be noted that the authors do not distinguish between members with or without voting rights

²⁸ for further details see Eijffinger & Schaling (1992), p. 35

With regard to the weighting scheme, it is not surprising that the criterion 1) has a weight of $\frac{1}{2}$ since the maximum number of “asterisks” is two for a bank that is solely in charge of the monetary policy. The ES index is thus asymmetrical.

4.5 Criticism of the main measures of CBI

CBI indices, whether legal or behavioral, are intended to reflect what the respective authors think are the major determinants of independence. From the very essence of their definition it is impossible for them to capture the whole nature of CBI but rather serve as proxies and the important question that we think should be asked – how well does the index fulfill its role as a proxy?

Take the legal measures for example. Even though similar in nature and containing similar if not the same criteria, many yield different rankings of countries. Mangano (1998) introduced an extensive comparison between the GMT and LVAW indices. He focused on differences in interpretation of the law, in the selection of criteria and in weighting scheme. The most appealing part of his extensive analysis²⁹ is his evaluation of the interpretation bias, e.g. the assignment of different values to the same criterion. A striking thirty percent of the time both indices disagreed on a particular characteristic. Indices proved to be subjective in the criteria selection with around forty percent of attributes contained in one index is disregarded in the other. However, Mangano argues that the weighting distinctions do not add much to the index’s degree of subjectivity.

We argue however, that even though significant differences appear to be present between all the indices, none of them could be considered useless since each of them captures some part of the story. In this way they are similar to econometric models that, despite their mathematical precision, can also only clarify some portion of the relationships in question. Our suggestion is to consider various indices so that an empirical paper would not be measure-specific. The subsequent review of the empirical work however suggests that the results of the analyses are usually in concordance with each other.

²⁹we highly encourage the reader to read Mangano’s work since in our view it encompasses all the possible ways how to attack an empirical paper

It should be noted that this thesis tries to review and apply indices of CBI. Recently aggravated sovereign debt crisis in Europe might lead to conclusion that the European Central Bank (ECB) despite being granted a large portion of independence may also suffer from an immense political pressure (Vanerová (2006)). At the end, one might conclude that ECB is in fact dependent since it decided to buy bonds of countries running the risk of default and by printing new money helped the troubled banking sector that also held such bonds. This may be a result of political lobby. However, such an action can only hardly be systematically measured since one-time policies do not really constitute the basis for independence. They can be pointed out and highlighted as actions that are contradictory to statutory independence but it would be too simplistic to label ECB politically dependent. Moreover, all the presented indices measure the degree of independence implicitly telling us that the answer to the question of CBI is not binary. There are no black or white conclusions made. We do not attempt to attack anyone's position or judge his opinion but to simply reaffirm the objective of this thesis and also the objective of most literature dealing with CBI – the focus is on the quality of measures and even though it might seem detached from the reality, it is not. Even if the CBI indices work only as distant proxies for the actual independence, they still reflect some of the independence factors and at the end are suitable for empirical research. This is what it is all about. To find out whether or not CBI might have real influence on inflation and GDP and raise awareness of it. To answer the question – is it desirable to have an independent central bank? Modern microeconomics are also based on assumptions that may seem strange and far from reality. Nevertheless, microeconomic models help explain the behavior of firms or consumers and in the end serve their ultimate objective.

4.6 The effect of CBI on inflation and GDP

4.6.1 Inflation

As suggested by the theory, an independent central bank should be, *ceteris paribus*, associated with lower inflation. A vast number of studies, mainly done in 1990's, tried to answer this question empirically – these studies are surveyed by Eijffinger & Haan or Arnone, Laurens & Segalotto. Detailed tables of authors, method used and conclusion can be found in these surveys. What could be inferred is that most authors, regardless of their choice of CBI proxy, find a statistically significant and negative relationship between the level (and also the variability) of inflation and the degree of central bank independence. This is of course just a gross summary, detailed nuances are to be found in the mentioned literature. Nevertheless, some authors, most notably Cukierman, Webb & Neyapti (1992), present theories of a two-way causality between inflation and CBI: *“less independence contributes to higher inflation. However, high inflation is likely to result, at least after a while, in less independence. High inflation encourages processes that make it easier for the government to influence monetary policy even if the bank charter does not change.”*

4.6.2 GDP

According to mainstream macroeconomic theories lower level and variability of inflation should lead to higher economic growth. This claim is usually explained by the following reasoning : low inflationary environment contributes to higher investments since it increases the ex-post real interest rates and thus makes investments more profitable. As summarized by Eijffinger & Hann (1996) most authors find no statistically significant relationship between GDP growth and central bank independence.

PART II

This part deals with the application of selected indicators of CBI on the Czech National Bank (Česká národní banka) and the National Bank of Slovakia (Národná banka Slovenska). In this sense this thesis is an extension of previous works on measuring CBI in transition economies, notably the works of Cukierman, Miller and Neyapti (2000), Dvorsky (2000), Radzyner & Riesinger (1997), Maliszewski (2000) and Martinčík (2006). As can be seen most of the studies were performed at the turn of the century and this thesis provides an up-to-date application and presents some of the author's contribution to the possible analysis of socio-political connections between the bank and the government.

After the fall of communist regime in 1989 Czechoslovakia found itself on a difficult path towards political and economic liberalization. New laws were introduced that abolished the former monopoly of the State Bank of Czechoslovakia (Státní banka československá) and allowed the existence of commercial banking along with the supervision of the central bank and the central bank role per se. Paradoxically, the laws were enacted in an attempt to reform the socialist form of economy and remained effective until 1992 along with some novelizations of the Constitution in the form of central bank governance. Marked by the effort of restoring democracy, this era is remembered for the open divergence between the Czech and Slovak political elites. In the wave of political and nationalist pressures, the 74 year old common state was separated into two independent state entities, the Czech Republic and the Slovak Republic.

5 The Czech National Bank

The central bank of the newly formed Czech Republic was established by the Article 98 of the Constitution of the Czech Republic³⁰ effective as of 1 January 1993. The Constitution itself contains three mentions about the CNB, first of all, found in the Article 62 letter k³¹ :”President of the Republic shall ... appoint members of the Bank Board of the Czech National Bank“. The Article 98 itself reads: “ (1) The Czech National Bank is the central bank of the State. The main purpose of its operations shall be to care for price stability. Interventions in its activities are only permissible on the basis of a law. (2) The position and competence of and other details regarding the Czech National Bank shall be defined by law.“ Indeed, an Act of Parliament³² in the same year enacted all the specific details about the CNB which will form the basis for the legal approach in our analysis of CBI in the case of CNB.

The Seat of the Czech National Bank is located in Prague and besides the headquarters itself it operates in another seven branches in the Czech Republic. The highest decision-making body of CNB is the Bank Board³³ comprised of one governor, two vice-governors and four other Board members³⁴.

We will now turn our attention towards the application of selected CBI indices on the case of CNB.

³⁰ Constitution of the Czech Republic is otherwise known as Constitutional Act no. 1/1993 Coll.

³¹ among the duties of the President of the Republic

³² Law no.6/1993 Coll. otherwise known as the Act on the Czech National Bank

³³ Act on Czech National Bank Act, Art. 5.1

³⁴ Act on Czech National Bank Art. 6.1

5.1 The GMT index

Political Independence - Criteria	CNB	Economic Independence - Criteria	CNB
1	*	1	*
2	*	2	*
3	*	3	*
4	*	4	*
5	*	5	*
6	*	6	*
7	*	7	
8			
Total	7		6

The governor of the Czech National Bank along with the other members of the Board is appointed directly by the President of the Republic without the necessity of a government approval. Their term of office is 6 years and is once renewable. The position in the Board is not compatible with the participation in the government or any other possible conflict of interest. The main objective of the CNB is the maintenance of the price stability.

The total score for the GMT index is 13 which is very high if we compare it for example with the original study of the authors. If we compare our findings with already published papers then few comments are needed. Contrary to Dvorsky's (2000) analysis we do not assign two asterisk for the criteria PI1 (governor not appointed by the government) since the original paper gave no space for such modifications³⁵. Nevertheless we agree with Dvorsky's and Martinčík's (2006) findings on criteria PI8. In general it should be noted that all the studies were performed in different periods of time and thus a direct comparison with our results might be misleading. We will therefore try to comment, when necessary and appropriate, on possible discrepancies. Regarding the EI sub-index our view differs with Martinčík and Dvorsky on item EI2 (DCF to government at market interest rates).

³⁵ Dvorsky distinguishes between appointments made by the government and/or by the Parliament. The original GMT index however provides no support for this and in the case of CNB the governor is appointed by the President

Article 30.2 of the Act on Czech National Bank clearly states that “The Czech National Bank may not provide returnable funds or any other financial support to the Czech Republic or its bodies, ... not even through the purchase of debt securities from such entities“ The DCF is strictly prohibited and this legal provision should therefore add to the bank’s degree of independence. The EI2 was, in our opinion, originally meant to distinguish between preferential and non-preferential treatment of the government by the central bank in terms of interest rate in cases when the central bank is permitted to finance sovereign debt. We therefore believe that in case when the central bank is prohibited from providing the government with any kind of credit this criterion should automatically be assigned an asterisk.

In the same way our conclusions about criteria EI5 (participation of the central bank in primary market for public debt) is different to those of Maliszewski, Martinčík and Dvorsky. According to the Articles 25 & 26 of the law no.190/2004 Coll. the government bonds are sold through the CNB – this may sound like a participation in the primary market, however, Grilli et al. clearly specify that by participation they mean the purchase of government securities by the central bank. This is prohibited by the CNBA so we assigned an asterisk to EI5. Czech laws do not contain any explicit mention or provision for situations of conflict with the government, nevertheless no direct serious conflicts have ever arose, though the CNB is found to be criticizing the lack of governmental actions regarding structural reforms from time to time.³⁶

5.2 Turnover rate

The Czech National Bank and the Czech Republic itself are young entities. As such they only have a little history of central bank governors and prime ministers. The list of prime ministers is longer than the one of CB governors indicating a first-look higher political instability.

Radzyner & Riesinger (1997) and Dvorsky (2000) focused also on this measure of CBI. However, due to the small period of calculation the results are not very informative. We will therefore update these studies with more than additional decade of information about the changes of CNB governors.

³⁶see for example the CNB Inflation Report 1/2010

TOR calculation in the case of CNB can be a little bit tricky. First of all, no explicit treatment of the case when the former governor was reappointed after tenure of other governor is given in literature. We therefore assume that such a scenario should be counted as two independent periods and definitely counted towards the number of changes of governor. Second, no explicit guideline exists for the case when the governor is temporarily absent, yet still formally a governor. Therefore the results are sensitive to the treatment of the case of Josef Tošovský who was appointed prime minister in 1997 in a period following the resignation of Václav Klaus. As a head of the caretaker government, Tošovský was unable to run the daily policies of the CNB and authorised Pavel Kysilka to act on his behalf in the full scope of his rights and duties³⁷. He then returned in 1998 and performed his duties as a governor until 2000. His successor, Mr. Tůma, was appointed directly by President Havel without any consultation with the government which led to a rise in political tensions that resulted in a dramatic change of Act on CNB. These changes, however, were later found unconstitutional by the Constitutional Court and the effort to reduce political independence of CNB was thus only a mark in history (Martinčík (2006)).

The length of period -19.25 years

Number of governors – 3 (Kysilka disregarded), 4 (Kysilka counted, Tošovský counted only once), 5 (Kysilka counted, Tošovský counted twice)

TOR – 0.16, 0.21, 0.26

The resulting TOR is of course sensitive to the number of governors that we use and we therefore report all three possibilities.

5.3 Political vulnerability

As suggested by the previous paragraphs, not many changes occurred in the post of the CNB governor since its establishment. As a result, the index of political vulnerability could be expected to not reveal much since the end of tenure of the two former governors, Mr. Tošovský and Mr. Tůma, ended either after the expiration of the term of office or by resignation due to the willingness to pursue other public posts. The resulting index of political vulnerability in the case of CNB is thus zero.

³⁷ see the list of governors at the CNB web: http://www.cnb.cz/en/about_cnb/cnb_archive/cnb_archiv_guverneri.html

5.4 New index of political independence

The Czech National Bank clearly fits into the description of policy type number 5 since the government, at least statutory, is not in charge of the monetary policy and all the Board members are appointed by the President of the Republic thus independently of the government. Also, no government officials are present in the Board as the Board membership is incompatible with such posts. Nevertheless, ministers might be present at the meetings of the Board as well as the governor of the bank or delegated vice-governor has the possibility to attend government meetings, in both cases without voting power.

5.5 LVAW

In contrast to the work of Cukierman, Miller & Neyapti (2000), we evaluate the objectives of CNB, according to the ACNB, as price stability along with other goals that are explicitly not in conflict with the primary goal. We also apply the strict restrictions on the credit facilities to government, in this approach we differ from Cukierman et al. and Dvorsky (2000) who worked with the earlier version of the ACNBA that allowed for some restricted lending practices. Following the line of reasoning we applied in GMT index, we assign the item 4c the full possible score. Even though the terms of lending such as maturity, interest and amount may not be controlled by the bank, the fact that the lending is prohibited should automatically mean a full count for this criterion as well as for the following ones, the entity allowed to borrow money from the central bank and the definition of the lending restraint and all the other factors dealing with the possibility of lending.

1) Governor

- a. Term of office – 6 years = 0.75
- b. Who appoints governor? – President = 0.50
- c. Dismissal – only for non-political reasons = 0.83
- d. May governor hold offices in government – No = 1.00

2) Policy formulation

- a. Who formulates monetary policy – Bank = 1.00
- b. Who has final word in resolution of conflict – Bank = 1.00

- c. Role in the government budgetary process – CNB has no influence – 0.00

3) Objectives

- a. Price stability is one goal, with other compatible objectives = 0.60

4) Limitations on lending to the government

- a. No advances permitted = 1.00
- b. Securitized lending not permitted = 1.00
- c. Terms of lending = 1.00
- d. Potential borrowers from the bank = 1.00
- e. Limits on central bank lending defined in = 1.00
- f. Maturity of loans = 1.00
- g. Interest rates = 1.00
- h. Central bank prohibited from buying or selling government securities in the primary market – Yes = 1.00

If we aggregate the partial scores in the same way Cukierman originally suggested and apply his weighting scheme³⁸ we arrive at the result of 0.8565 in case of LVAW which is 15 basis points higher than the result of Dvorsky and 12 basis points higher than the result of Cukierman et al. As a conclusion it can be said that the prohibition of credit facilities to government, declaration of price stability as the main goal (among others that do not threaten the main goal) and reaffirmation of independent appointment of CB officials significantly improved the independence of the CNB according to LVAW.

³⁸ Governor – the 4 components are averaged and given weight 0.2 = $0.77 \cdot 0.2 = 0.154$

Policy formulation – the 3 components aggregated using a weighted average of $0.25 \cdot 1.00 + 0.5 \cdot 1.00 + 0.25 \cdot 0.00$ and given weight of 0.15 = $0.75 \cdot 0.15 = 0.1125$

Objectives – one criterion with weight of 0.15 = $0.60 \cdot 0.15 = 0.09$

Lending – the first 4 variables are treated separately, the last four are aggregated into one using a simple average, the resulting five variables are given weights 0.15, 0.10, 0.10, 0.05 and 0.10 respectively = $1.00 \cdot 0.15 + 1.00 \cdot 0.10 + 1.00 \cdot 0.10 + 1.00 \cdot 0.05 + 1.00 \cdot 0.10 = 0.40$

6 National Bank of Slovakia

Similarly to its Czech counterpart, the Slovak central bank was established by the Constitution of the Slovak Republic³⁹ that came into effect on 1 October 1992. Current version of the Constitution enhances the independence of the NBS as well as confirms the leading role of the Bank Board. The following text is a quote from Article 56:

“(1) The National Bank of Slovakia is an independent central bank of the Slovak Republic. The National Bank of Slovakia may within its competence issue generally binding regulations, if so authorized by law.

(2) The supreme managing body of the National Bank of Slovakia is the Bank Council of the National Bank of Slovakia.“

Headquartered in Bratislava, the National Bank of Slovakia is managed primarily by the Bank Board, as given by the Constitution, comprised of one governor, two vice-governors and two other members⁴⁰. However, unlike in the Czech Republic, the Constitution does not contain any notion on the procedure of the appointment of the bank officials.

Apart from its headquarters, the NBS operates in another five local offices.

Slovakia entered the Eurozone on 1 January 2009 and thus lost the ultimate control over monetary policy. This is now done in concordance with other Eurozone members and is supervised by the European Central Bank. Within the European System of Central Banks⁴¹ the Eurosystem works as one and only monetary authority with ECB determining the monetary policy itself and national central banks implementing this policy to practice.

³⁹ otherwise known as Law no. 460/1992 Coll.

⁴⁰ Act on the National Bank of Slovakia – Law no. 566/1992 Coll. with amendments, current status as of 1 November, 2010

⁴¹ECB plus central banks of all 27 EU member countries

When applying current legal status to analyzing the independence of the NBS we have to bear in mind two important factors. First of all, during the last couple of years the legislation changed in a significant way so that the studies dealing with NBS independence such as Cukierman et al (2000), Dvorsky (2000) or Maliszewski (2000) cannot really be taken into account because they are simply obsolete. Even though they may be helpful to track down the historical process of CBI evolution on Slovakia, direct comparison is much more difficult than in case of Czech Republic.

6.1 The GMT index

Political Independence - Criteria	NBS	Economic Independence - Criteria	NBS
1		1	*
2		2	*
3		3	*
4		4	*
5	*	5	*
6	*	6	*
7	*	7	
8			
Total	3		6

While the Economic Independence of NBS is, in our view, the same as in the case of CNB, the Slovak central bank is enjoying far less political independence. Comments follow. The main part of economic independence of GMT index deals with credit facilities to government. Although not directly mentioned in Slovak legislation, NBS is prohibited to lend money to government by the Maastricht Treaty which takes precedence in this case.

Financial supervision is performed solely by NBS therefore no asterisk is awarded in this area.

NBS's result in terms of political independence is surprisingly poor. However, this result should be viewed with caution. It should be noted that the legal term of office of all Board members including the governor is five years and GMT index, somehow

subjectively, asks for tenure longer than five years. This is the reason why there are no asterisks in criteria 2 and 4. Nevertheless the striking difference between Czech and Slovak republics is the appointment procedure of the Board members. While the President of the Czech Republic is free to appoint a suitable candidate and this right is guaranteed by the Constitution, the President of Slovak Republic has a mere ceremonial function in this procedure. Even though he is the ultimate official that appoints the governor and the vice-governors the nomination is done “upon the recommendation of the Government and with approval of the National Council of the Slovak Republic”⁴². The posts of the two other members of NBS Board are tied to Government, too. This process is indirect though because the Government appoints the other members of the Board “upon the recommendation of the Governor of the National Bank of Slovakia.”⁴³

6.2 Turnover rate

The post of governor of NBS seems to be a very stabile one. As written in the previous sub-section, the legal term of office of the governor is five years. Current version of the Act on NBS allows for a reappointment of governor and vice-governors thus creating a maximum possible tenure of ten years. Nevertheless, the ordinary members of the Board can, in theory and in concordance with the law, be reappointed over and over again without any explicit limitation on the duration of their tenure. The rules have changed over the years, of course, but the low degree of political independence, in particular the fact that it is the government who nominates the governor has, in our view, contributed to relatively low turnover rate of the governors. In line with Cukierman’s reasoning about politically subservient governor we argue that at least to some degree the leading role of government in the appointment procedure makes the sitting governor less likely to be replaced by another. Even in politically turbulent 1990’s during the Mečiar’s administration the governor, Mr. Masár, stayed in the office for the full period. It is probably self-explaining that politically influenced choice of a person is not likely to be changed after the appointment.

⁴²Act on National Bank of Slovakia, Article 7.2

⁴³Act on National Bank of Slovakia, Article 7.3

Length of period: 19.25 years

Number of Governors: 4

TOR : 0.21

The result indicates that the average real tenure is pretty close to the legal tenure. The difference is only due to former longer tenure (six years) that was eventually changed to current five years.

6.3 Political vulnerability

Similarly to Czech National Bank, the changes of governors of the National Bank of Slovakia were never done in post-election times and thus the resulting degree of political vulnerability as defined by Cukierman is zero. As usual, careful interpretation of this result must follow. In no way does it mean that the position of NBS governor is independent, it merely says that, given the small sample size, no changes in this post occurred in the 6 month time after the change in government. We go even as far as say that, had another result come up, it would be only a coincidence. Our analysis as well as our experiences with Slovak political system make us conclude that despite the fact that government has the power to nominate the governor, no politician is capable of abusing the legal system by forced dismissal of previous governors. This can be done, as the law dictates, only for serious misconduct and related reasons.

6.4 New index of political independence

Unlike the Czech National Bank, the National Bank Slovakia is characterized by policy type number 4 which, in comparison with CNB, means lower degree of independence as defined by this index. The NBS is in charge of monetary policy, although in reality it is the ECB that sets the direction of it. In the context of this index we do not have other option as the authors only distinguished between government and central bank. NBS Board members are not government officials no deputies in Parliament and this is strictly forbidden by law, but the appointments are done by government, hence the lower degree of independence.

6.5 LVAW

The calculation can be found in the footnotes.

- 1) Governor
 - a. Term of office – 5 years = 0.50
 - b. Who appoints governor ? – Government = 0.25
 - c. Dismissal – only for non-political reasons = 0.83
 - d. May governor hold offices in government – No = 1.00
- 2) Policy formulation
 - a. Who formulates monetary policy – Bank = 1.00
 - b. Who has final word in resolution of conflict – Bank = 1.00
 - c. Role in the government budgetary process – NBS has no influence – 0.00
- 3) Objectives
 - a. Price stability is the only objective = 0.80
- 4) Limitations on lending to the government
 - a. No advances permitted = 1.00
 - b. Securitised lending not permitted = 1.00
 - c. Terms of lending = 1.00
 - d. Potential borrowers from the bank = 1.00
 - e. Limits on central bank lending defined in = 1.00
 - f. Maturity of loans = 1.00
 - g. Interest rates = 1.00
 - h. Central bank prohibited from buying or selling government securities in the primary market – Yes = 1.00

Governor – the 4 components are averaged and given weight 0.2 = $0.645 \times 0.2 = 0.129$

Policy formulation – the 3 components aggregated using a weighted average of $0.25 \times 1.00 + 0.5 \times 1.00 + 0.25 \times 0.00$ and given weight of 0.15 = $0.75 \times 0.15 = 0.1125$

Objectives – one criterion with weight of 0.15 = $0.80 \times 0.15 = 0.12$

Lending – the first 4 variables are treated separately, the last four are aggregated into one using a simple average, the resulting five variables are given weights 0.15, 0.10, 0.10, 0.05 and 0.10 respectively = $1.00 \times 0.15 + 1.00 \times 0.10 + 1.00 \times 0.10 + 1.00 \times 0.05 + 1.00 \times 0.10 = 0.5$

The resulting value of LVAW is 0.8615 which is surprisingly slightly higher than in the case of CNB. The construction of the index and the weighting scheme made possible that, despite lower scores in the first section the objective criterion outweighed the lower political independence of NBS. For comparison, Dvorsky reports a value of 0.62 which means a rough 38 % increase in this measure of CBI. This is mainly due to the last part of the index which improved most relative to other because of the ban on credit facilities to government which is, as in the case of Czech Republic, a central pillar of today's central banking system of European Union.

7 Comparison of results and remarks

Our analysis proved our initial hypothesis about a high degree of central bank independence in both Slovakia and Czech Republic. Deeply rooted in common legal and political history the institutional design of both central banks is very similar. It has also all signs of a continental (meaning European and in this sense mainly German) model of central banking which relies heavily on an independent central bank. Nevertheless, the path towards the current status was not an easy one as the respective central banks faced many changes in laws and also political pressure. Therefore the results of “quantitative” independence varied greatly in the past 19 years as can be inferred from the frequent comparisons with studies performed earlier on that are found in this text. As a summary of these comparisons a simplistic conclusion could be drawn that the level of central bank independence improved over the years in both republics. It should be noted that a major factor in this development was the ascension to the European Union that implied the membership in European System of Central Banks. This effectively forbid any possible credit facilities to governments and thus improved the positions of the respective central banks vis-à-vis measures of economic independence. Our analysis concerns only the current status and position of central banks, however, we introduced brief comments on important changes that happened over the years. A historical evolution of CBI, as measured by the following indices, can be drawn by time-

	CNB	NBS
GMT index	13	9
Turnover rate	0.16, 0.21, 0.26	0.21
Political Vulnerability	0	0
New index of political ind.	5	4
LVAW	0.8565	0.8615

A nice overview of results of our analysis is given in the table above. The GMT index is, in our view, the most relevant one among all the others. The only thing that could be subject of criticism is the arbitrary selection of tenure threshold (five years) that caused the surprisingly low score of NBS. Besides this, the index contains every important

factor that could somehow influence the legal independence of central bank and is therefore the easiest one to use in empirical work. Cukierman's LVAW, although similar in principal idea, is different in the nature of construction. Its scoring procedure made it possible for the NBS to get higher score than CNB. Our commentary to the analysis argues that CNB enjoys a higher degree of statutory independence and that the discrepancy in LVAW scores was made possible because of the scoring and weighting system. The unweighted version of this index was not used because of two main reasons. Firstly, it would not give us a uniform answer to the problem and secondly, it is only rarely used in empirical work. We felt that there is a strong preference of LVAW over LVAU among the authors of important studies so we did not want to breach this unwritten rule.

When it comes to the New index of political independence it clearly confirms our findings and answers our primary point of research. CNB stands better in comparison with NBS in terms of legal independence which is mainly caused by the process of appointment of central bank officials. In Czech Republic, this procedure is put away from governmental influence, however, in Slovakia it is effectively the government who selects the members of the Bank Board.

The behavioral measures (turnover rate and political vulnerability) did not reveal much and did not help us in analyzing the independence of the respective central banks. The turnover rate points out, if anything, that the position of the governor in both countries is a fairly stable one and that no surprising dismissals or any other serious conflicts with the government occurred, except for, of course, the case of appointment of Mr. Tůma as governor of CNB. This case was, however, rather a political conflict between the government and the President who only exercised his constitutional privilege and duty. This led to the mentioned attempt to reduce the independence of CNB which was later found unconstitutional. We therefore conclude that, contrary to Cukierman, the turnover rate is not an ideal measure of non-legal CBI. We perfectly understand its suitability for a panel data analysis of a large sample of countries, however, in countries so similar institutionally as Czech Republic and Slovakia, this measure is unable to explain any differences in CBI and is not really suitable for direct comparison of CBI in different countries. Regarding the index of political vulnerability, nor Czech Republic nor Slovakia experienced any forced politically-related dismissal and subsequent appointment of a new central bank governor in the period following the general

elections. Therefore, the big zero that appears as a score for both central banks is in reality of no good use. We go as far as to argue that even in case when this number would not be a zero it would be attributable to a pure coincidence of two events – the (natural) end of tenure of the governor and the post-election time. We are strongly convinced that no politician would be able to dismiss the governor since the laws in both countries allow the dismissal only for non-political reasons such as crime conviction. Both Czech Republic and Slovakia are members of EU, UN and other international organizations and would for sure be highly criticized if their governments tried to bypass or bend the laws, especially when it comes to possible abuse of monetary policy.

Overall, both countries performed very well in every measure of CBI attaining high or above-average⁴⁴, except maybe for GMT in case of NBS which was explained above.

There are few things that we would like to suggest in further analysis of central bank independence. It seems to us that no attention was paid whatsoever to further destiny of former governors or member of the Bank Board, particularly in political area. One of the topics for further investigation of this phenomena could be the ex-post investigation of central bank behaviour when it was led by governor that seeked or had political career after the end of his tenure as CB governor. For example, former CNB governor Zdeněk Tůma ran for the office of Mayor of Prague, winning the popular vote but eventually lost the seat to Bohuslav Svoboda following the creation of political coalition that prevented Mr. Tůma from taking the office. His political aspirations could, however, somehow influence his behaviour as CNB governor. Up to this point it is just a theory that we present here without any supportive evidence but rather as a possible issue of further research in the area of behavioral aspect of CBI.

⁴⁴ this comparison relates both to the maximum score (or expected result, e.g. in TOR) of given indicator and comparison among other countries in studies of principal authors referenced to repeatedly throughout this text

8 Conclusion

This thesis focused on central bank independence – a concept that attained considerable attention from economists and practitioners in the late 1980's and 1990's. Nevertheless it disappeared from the spotlight during the global economic golden years of early 2000's and it is only now, in the period following the global financial and economic crisis and the ongoing sovereign debt crisis in Europe when it finds its way back to the surface. The main aim of this work was to apply the existing indices of CBI to the current status of the Czech National Bank and the National Bank of Slovakia while providing the reader with an overview of underlying theoretical approaches to central bank independence, mainly related to the dynamic inconsistency of monetary policy which leads to inflationary bias that could, in theory, be lowered or removed by creating an independent monetary authority. We also tried to present the reader with a broad spectrum of different approaches to measuring the CBI as well as brief overview of research work done by leading experts in the area.

The real contribution of this thesis is its up-to-date extension of existing studies on central bank independence in transition economies. We therefore captured the effects of many changes in laws. Larger time period allowed us to calculate the behavioral indices more precisely and to draw conclusions about their usefulness. Our main finding is that the Czech National Bank enjoys larger degree of statutory independence than the National Bank of Slovakia despite little discrepancies in the scores of various indices. The most important factor that improved the position of an independent central bank in both countries was the abolishment of any credit facilities to the government. Relatively speaking, CNB “won” its higher degree of independence (when compared to NBS) by the procedure of appointment of central bank officials that is independent on the government.

We also presented lots of our own opinions of the issue of CBI in general and on the usefulness and limitations of CBI measures that are based on our research in this area. It places this thesis far away from a simple compilation of existing literature and opinions and makes it a hybrid between theoretical, analytical as well as critical approaches to academic work. In our view, the concept of central bank independence itself is located on the borderlines of purely theoretical monetary economics, political economics,

institutional economics and law and should therefore be treated complexly. It would not be enough to look at it through the eyes of equations nor would it be correct to assess the central bank independence only by the law. This thesis therefore presents an attempted synthesis of major approaches.

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Appendix

A1: LVAW

A2: List of CNB governors

A3 : List of Prime Ministers of the Czech Republic

A4 : List of NBS governors

A5 : List of Prime Ministers of the Slovak Republic

A1.1: LVAW Part 1

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Table 1. *Variables for Legal Central Bank Independence*

<i>Variable number</i>	<i>Description of variable</i>	<i>Weight</i>	<i>Numerical coding</i>
1	Chief executive officer (CEO)	0.20	
	a. Term of office		
	Over 8 years		1.00
	6 to 8 years		0.75
	5 years		0.50
	4 years		0.25
	Under 4 years or at the discretion of appointer		0.00
	b. Who appoints CEO?		
	Board of central bank		1.00
	A council of the central bank board, executive branch, and legislative branch		0.75
	Legislature		0.50
	Executive collectively (e.g. council of ministers)		0.25
	One or two members of the executive branch		0.00
	c. Dismissal		
	No provision for dismissal		1.00
	Only for reasons not related to policy		0.83
	At the discretion of central bank board		0.67
	At legislature's discretion		0.50
	Unconditional dismissal possible by legislature		0.33
	At executive's discretion		0.17
	Unconditional dismissal possible by executive		0.00
	d. May CEO hold other offices in government?		
	No		1.00
	Only with permission of the executive branch		0.50
	No rule against CEO holding another office		0.00
2	Policy formulation	0.15	
	a. Who formulates monetary policy?		
	Bank alone		1.00
	Bank participates, but has little influence		0.67
	Bank only advises government		0.33
	Bank has no say		0.00
	b. Who has final word in resolution of conflict? ^a		
	The bank, on issues clearly defined in the law as its objectives		1.00
	Government, on policy issues not clearly defined as the bank's goals or in case of conflict within the bank		0.80
	A council of the central bank, executive branch, and legislative branch		0.60
	The legislature, on policy issues		0.40
	The executive branch on policy issues, subject to due process and possible protest by the bank		0.20
	The executive branch has unconditional priority		0.00
	c. Role in the government's budgetary process		
	Central bank active		1.00
	Central bank has no influence		0.00
3	Objectives	0.15	
	Price stability is the major or only objective in the charter, and the central bank has the final word in case of conflict with other government objectives		1.00
	Price stability is the only objective		0.80
	Price stability is one goal, with other compatible objectives, such as a stable banking system		0.60
	Price stability is one goal, with potentially conflicting objectives, such as full employment		0.40

Source : Cukierman, Webb & Neyapti (1992), p.358

A1.2: LVAW Part 2

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Table 1. (continued)

Variable number	Description of variable	Weight	Numerical coding
	No objectives stated in the bank charter		0.20
	Stated objectives do not include price stability		0.00
	Limitations on lending to the government		
a.	Advances (limitation on nonsecuritized lending)	0.15	
	No advances permitted		1.00
	Advances permitted, but with strict limits (e.g., up to 15 percent of government revenue)		0.67
	Advances permitted, and the limits are loose (e.g., over 15 percent of government revenue)		0.33
	No legal limits on lending		0.00
b.	Securitized lending	0.10	
	Not permitted		1.00
	Permitted, but with strict limits (e.g., up to 15 percent of government revenue)		0.67
	Permitted, and the limits are loose (e.g., over 15 percent of government revenue)		0.33
	No legal limits on lending		0.00
c.	Terms of lending (maturity, interest, amount)	0.10	
	Controlled by the bank		1.00
	Specified by the bank charter		0.67
	Agreed between the central bank and executive		0.33
	Decided by the executive branch alone		0.00
d.	Potential borrowers from the bank	0.05	
	Only the central government		1.00
	All levels of government (state as well as central)		0.67
	Those mentioned above and public enterprises		0.33
	Public and private sector		0.00
e.	Limits on central bank lending defined in	0.025	
	Currency amounts		1.00
	Shares of central bank demand liabilities or capital		0.67
	Shares of government revenue		0.33
	Shares of government expenditures		0.00
f.	Maturity of loans	0.025	
	Within 6 months		1.00
	Within 1 year		0.67
	More than 1 year		0.33
	No mention of maturity in the law		0.00
g.	Interest rates on loans must be	0.025	
	Above minimum rates		1.00
	At market rates		0.75
	Below maximum rates		0.50
	Interest rate is not mentioned		0.25
	No interest on government borrowing from the central bank		0.00
h.	Central bank prohibited from buying or selling government securities in the primary market?	0.025	
	Yes		1.00
	No		0.00

Note: The ranking under each criteria indicates the degree of independence of central banks—the higher the code, the more independent the central bank.

a. Often the law does not contain a separate provision on the resolution of conflict. In those cases, the variable was coded on the basis of the impression from reading the law in its entirety. If the law gives the impression that the government formulates policy guidelines that the bank simply follows, then the ranking is low.

Sources: Various central bank laws, Aufrecht (1961, 1967); Bank for International Settlements (1963); Effros (1982); and the IMF's computerized files on central bank laws.

Source : Cukierman, Webb & Neyapti (1992), p.359

A2: List of CNB governors

Governor	Tenure
doc. Ing. Josef Tošovský	20/01/1993-17/12/1997
Ing. Pavel Kysilka, CSc.*	17/12/1997-23/07/1998
doc. Ing. Josef Tošovský	23/7/1998-31/11/2000
doc. Ing. Zdeněk Tůma, CSc.	01/12/2000-30/06/2010
Ing. Miroslav Singer, PhD.	01/07/2010-

Source: CNB archive, available at

http://www.cnb.cz/cs/o_cnb/archiv_cnb/archiv_cnb_guverneri.html

*acted on behalf of Mr. Tošovský in full scope of his right and duties

A3: List of Prime Ministers of the Czech Republic

Prime Minister	Period
Václav Klaus	02/07/1992-02/01/1998
Josef Tošovský	02/01/1998-17/07/1998
Miloš Zeman	22/07/1998-12/07/2002
Vladimír Špidla	15/07/2002-04/08/2004
Stanislav Gross	04/08/2004-25/04/2005
Jiří Paroubek	25/04/2005-04/09/2006
Mirek Topolánek	04/09/2006-08/05/2009
Jan Fischer	08/05/2009-13/07/2010
Petr Nečas	13/07/2010-

Source: Archive of the Government of the Czech Republic, available at

<http://www.vlada.cz/cz/clenove-vlady/historie-minulych-vlad/prehled-vlad-cr/default.htm>

A4 : List of NBS governors

Governor	Tenure
Ing. Vladimír Masár	29/07/1993-28/07/1999
Ing. Marián Jusko	29/07/1999-31/12/2004
Ing. Ivan Šramko	01/01/2005-11/01/2010
Doc. Ing. Jozef Makúch, PhD	12/01/2010-

Source : NBS website, available at

<http://www.nbs.sk/en/about-the-bank/bank-board-of-the-nbs>

A5: List of Prime Ministers of the Slovak Republic

Prime Minister	Period
Vladimír Mečiar	24/06/1992-15/03/1994
Jozef Moravčík	15/03/1994-13/12/1994
Vladimír Mečiar	13/12/1994-30/10/1998
Mikuláš Dzurinda	30/10/1998-04/07/2006
Robert Fico	04/07/2006-08/07/2010
Iveta Radičová	09/07/2010-04/04/2012
Robert Fico	04/04/2010-

Source : Office of the Government of the Slovak Republic, available at <http://www.vlada.gov.sk/historia-vlad/>